

BILL OF QUANTITIES (BOQ)

Name of Work: Construction of Elevated Viaduct (including Ramps) of length 7.795 Km (-0.675km to Ch -0.050km & Ch 11.230km to Ch 16.755km & Ch: 16.755km to Ch 18.400km) and RoR (Ch: (-) 0+100, 12+400, 16+612 to 16+709) including Double Decker Viaduct (Rail cum Road Flyover) from Ch. 14+562.903 to Ch. 15+680.447, Double Decker Station at Mathikere, Entry /Exit structure, Ramp for Road Flyover, Y-loop ramp, BSTP Viaduct ramp at Bennigenahalli, Hebbal, Shettyhalli, FOB's , Multi Modal Integration works, part work up to substructure for Corridor-1 (Ch:16+900 to 18+055 (from P 192 / UP 192 to C1-P10)) at Yeshwanthpur and other related infrastructural works of Elevated section in between Bennigenahalli to Shettyhalli of Corridor-2 of Bengaluru Suburban Transport Project (BSTP).

Summary of Bill of Quantity				
S.NO	SCHEDULE	DESCRIPTION	AMOUNT EXCL. GST	
			IN WORDS	IN FIGURES
Summary of item rate BOQ				
1	Schedule 1	Construction of BSTP Elevated viaduct including ramps for a total length of 7.795 km (Ch. -0.675 km to Ch. -0.050 km, Ch. 11.230 km to Ch. 16.755 km, and Ch. 16.755 km to Ch. 18.400 km) along with Road-over-Rail (RoR) works and associated infrastructure between Bennigenahalli and Shettyhalli.	425,94,14,131	
	Schedule 2	Construction of Double-Decker rail cum road flyover from Ch. 14+562.903 to Ch. 15+680.447 including Mathikere Station Structural Works	1,99,55,30,709	
	Schedule 3	Construction of Double-decker Mathikere Station including concourse level girders, platform level girders, entry/exit structures, steel FOB, roof structures, PEB works, architectural finishes, plumbing, façade, and E&M works etc.,	40,22,16,145	
2	Schedule 4	Multi Modal Integration (MMI) Works and any other items not covered in above Schedules are to be executed under Common SR for year 2023-24 or latest, published by KPWD/ IR-USSOR / CPWD / BESCOM / KPTCL / BWSSB as per sequence of priority and with the approval of Engineer with the concurrence of Employer	1,69,49,153	(Rupees One crore sixty-nine lakh forty-nine thousand one hundred fifty-three only)
5	Schedule 5	Lump sum provision for incidental and unforeseen item likely to occur during the execution of work. These items of Schedule '4' will be executed under schedule of rates 2023 - 24 or latest, published by KPWD. The cost under this Schedule stands fixed as 5,00,00,000/- and this amount Five crores is provided as fixed amount in the summary of Financial Bid / Price Schedule. Whenever KPWD rates are not available Only other department rates (i.e. IR-USSOR / CPWD / BESCOM / KPTCL / BWSSB) shall be considered as per sequence of priority and with the approval of Engineer with the concurrence of Employer.	4,23,72,881	(Rupees Four crore twenty-three lakh seventy-two thousand eight hundred eighty-one only)
	Total of Schedule	In Figures	671,64,83,019	
		In Words	Six hundred seventy-one crore sixty-four lakh eighty-three thousand nineteen only	

Bill of Quantities (BOQ)

Item no.	Description of items	Unit	Quantity	Rate	Amount
	SCHEDULE-A: PILE FOUNDATIONS AND OPEN FOUNDATIONS				0
1	Providing and installing cast-in-situ vertical bored piles of depth as per drawing with M35/20 grade of reinforced cement concrete as per drawings and technical specifications including all operations such as mobilization, installation and shifting of piling rig etc., in all soil strata, road, footpath, including boulders and kankar and soft rock / weathered rock. The Cost shall also include built up of piles up to the required level. The item includes disposal of earth muck, slush released from piles at Contractor's dumping yard with all leads and lifts as per the approved methods & specifications. The cost shall also include the cost of empty boring wherever required. Reinforcement steel shall be paid separately under relevant BOQ item. Rate shall include the cost of required dosage of admixture in concrete for obtaining required workability as per approval of Engineer. Drilling shall be done by use of hydraulic rig using temporary casing of required depth (min of 4.5m), using polymer slurry and as directed by the Engineer. (Use of bentonite slurry is not permitted). Socketing shall be as per specification and the decision of Engineer shall be final and binding. The Cost is inclusive of tests as per clause 8.7.11 of Technical Specification and ASTM D6760.				0
	Note: 1. Pile measurement shall be from cut-off level which majorly around 4m from GL, however, in few cases it will go up to 6m (Pile length shall be paid from bottom of pile cap, however anchoring length of 75mm above PCC top will not be paid separately) to founding level records shown in the drawing or actual as recorded whichever is lesser. The lengths of each pile diameter is indicative only and may vary in Detailed Design stage. Contractor shall locate suitable place for dumping waste material at his own. 2. Payment will be made in stages, 97.50% of the rate will be paid on the successful completion of the piling work and balance 2.5% will be released on completion of pile cap including road restoration over satisfactory maintenance of adjoining roads. 3. Dumping yard related to debris and other disposable construction materials shall be collected and transported for disposal at BBMP (GBA identified C&D waste management facility as per 'Construction & Demolition Waste Management Rules, 2016'. 4. Dumping yard related to all disposable excavated material shall be collected and transported for disposal at contractors dumping yard which has to be approved by relevant authorities.				0
1.1	For 1200 mm dia. Pile By hydraulic rigs using partial depth temporary casing and polymer	Rm	27,797	19,610.39	545110086
1.1.1	Extra over Item No. A-1.3 (For 1200mm dia. pile) for drilling & socketing in hard rock as per specification and as directed by the Engineer. Note: Socket depth shall be paid as per the drawing or actual as recorded whichever is lesser and certified by Engineer at site.	Rm	1,141	21,570.50	24616258
1.1.2	Extra over Item No A-1.3 (For 1200 mm dia. pile) for providing 6 mm thick mild steel permanent liner including Cost of liner and driving the same wherever required. Note: In case 8mm thick plate is used 30% enhancement over accepted rate will be paid. Note: Permanent liners at certain utility pipeline, Nallah locations and any other locations shall be used as per the site requirement and only after obtaining prior approval of Engineer.	Rm	1,359	23,555.50	32001618

Item no.	Description of items	Unit	Quantity	Rate	Amount
2	Carrying out initial vertical load test on piles as per relevant IS Codes including all arrangements for measuring settlement / deflections and submitting reports. This includes cost of all the piles (including test pile, and reaction piles, if required), making of pile head ready for testing at the desired level, supporting/reaction arrangement (including reaction piles/soil/rock anchors, if any) for the kentledge load for 2.5 times the theoretical design vertical load capacity. The test arrangements designed shall cater for additional 25% above test load. Note: 1.The accepted rate shall remain unchanged for variation in test load of +/- 25% than the test load stipulated. 2. The tests shall be carried out by agencies having NABL accreditation and approved by Engineer.				0
2.2	For 1000mm dia. Pile, having pile capacity of 550 MT	Nos	1	24,56,207.95	2456208
2.1	For 1200mm dia. Pile, having pile capacity of 750 MT	Nos	3	30,59,020.32	9177061
3	Carrying out initial lateral load tests on piles as per relevant IS Codes including all arrangements for measuring deflections and submitting reports. This includes cost of all the piles, making of pile head ready for testing at the desired level, Supporting/reaction arrangement (include reaction piles/soil/rock anchors, if any) for the kentledge load. Note: 1. The tests shall be carried out by agencies having NABL accreditation and approved by Engineer.				0
3.1	For 1000mm dia. Pile, having pile capacity of 30 MT	Nos	1	4,93,652.78	493653
3.1	For 1200mm dia. Pile, having pile capacity of 40 MT	Nos	3	7,10,608.13	2131824
4	Carrying out initial pull-out test on Piles as per Clause 9.0 of IS 2911 (Part IV) 2013 including all arrangements for measuring displacement and submitting report. This includes cost of all piles (Test piles and reaction piles as required), making pile head, and cap for resting the Jack at desired level for supporting/reaction arrangement . the kentledge load for 2.5 times the theoretical design load capacity. The safe uplift load shall be based on the acceptance criteria specified in the codal provision. (The design working uplift load is 100 MT) for 1200mm dia pile. Note: 1. The tests shall be carried out by agencies having NABL accreditation and approved by Engineer.	Nos		18,91,271.63	0
5	Carrying out static routine vertical load tests on working piles as per relevant IS Codes including all arrangements for measuring settlement/deflections and submitting reports. This includes making of pile head ready for testing at the desired level supporting/reaction arrangement (including reaction piles/soil/rock anchors, if any) for the kentledge load. (Cost of piles is paid in item A1) Routine load shall be 1.5 times the theoretical design vertical load capacity. The test arrangements designed shall cater for additional 25% above test load. Note: 1. The tests shall be carried out by agencies having NABL accreditation and approved by Engineer.				0
5.1	For 1000mm dia. Pile, having pile capacity of more than 400 MT upto 550 MT	Nos	2	9,24,425.99	1848852
5.1	For 1200mm dia. Pile, having pile capacity of mo re than 500 MT upto 750 MT	Nos	6	12,75,876.80	7655261

Item no.	Description of items	Unit	Quantity	Rate	Amount
6	Carrying out static routine lateral load tests on working piles as per relevant IS Codes including all arrangements for measuring deflections and submitting reports. This includes making of pile head ready for testing at the desired level supporting/reaction arrangement (including reaction piles/soil/rock anchors, if any) for the kentledge load. (Cost of piles is paid in item A1). The routine load shall be 1.5 times the theoretical design lateral load capacity. The test arrangement design shall cater for additional 25% above test load.		-		0
6.1	For 1200mm dia. Pile, having pile capacity of 25 MT to 40 MT	Nos	4	35,404.99	141620
7	Conducting dynamic load testing on selected piles all as per specifications and directions of the engineer.		-		0
7.1	For 1000mm dia. Pile as per ASTM 4945 Section 08	Nos	2	85,393.40	170787
7.1	For 1200mm dia. Pile as per ASTM 4945 Section 08	Nos	14	1,17,858.64	1650021
8	Non-destructive tests for Integrity testing of Pile of all dia, using Low Strain Integrity 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 computerized equipment and high skill trained personnel for conducting the test & submission of results, all complete as per direction of Engineer. Note: The tests shall be carried out by agencies having NABL accreditation and approved by Engineer	Nos	476	3,928.11	1869779
9	Integrity Pile Test using cross hole sonic logging for pile as per the provision of ASTM standard D6760, as per drawings & technical specifications (Payment shall be made for number of piles tested). Note: The tests shall be carried out by agencies having NABL accreditation and approved by Engineer	Nos	475	3,928.11	1865851
10	Providing & laying M35/20 grade Reinforced Cement Concrete (RCC) as per drawings and technical specifications for following concrete works: Pile cap, Open Foundation /stepped foundation /Raft, Combined Footing, Columns, Grade beam, monopile pedestals and Structures of road widening works such as foundation, substructures and superstructures of culverts, retaining walls, return walls, precast/cast-in-situ culvert deck slabs, road median, drains etc. including excavation up to 4.0 m from lowest ground level through existing water bound macadam road / bituminous road / concrete road /soil/Murum/ hard rock /soft rock old structures below ground as encountered of all thicknesses ,dismantling other structures, dead utilities, dewatering. pumping and bailing out water, strutting and shoring, formwork, including application of shuttering releasing agent, backfilling in foundation with quarry dust/sand watering. Compacting with a vibratory plate compactor complete as per specifications. The cost includes loading, unloading and disposal of surplus excavated material along with pile heads using covered trucks at Contractor's dumping yard with all leads and lifts and as directed by the Engineer. The contractor has to ensure that during transportation, the carried material does not spill out. Reinforcement steel shall be paid separately under relevant item; Rate shall include cost of using required dosage of admixture in concrete for obtaining required workability as per approval of Engineer, curing of concrete.	Cum	32,142	13,222.31	424987601
	Note: 1.)10% of the amount shall be withheld. Out of this. 5 % of the amount shall be released after disposal of excavated material and 5% of the amount shall be released after completing road restoration works on pile caps. Payment for road restoration works will be paid under relevant items of BOQ. 2.) Dumping yard related to debris and other disposable construction materials shall be collected and transported for disposal at BBMP (GBA identified C&D waste management facility as per 'Construction & Demolition Waste Management Rules, 2016'. 3.) Dumping yard related to all disposable excavated material shall be collected and transported for disposal at contractors dumping yard which has to be approved by relevant authorities.		-		0

Item no.	Description of items	Unit	Quantity	Rate	Amount
	<p>4.) The excavation depth for pile cap and open foundation is up to 4m and necessary shoring to be provided before excavation by inserting suitable steel columns, runners, struts, bracings etc., as per the designed sketch. In connection with driving of vertical members, suitable drilling machines / equipment may be arranged. The excavated vertical face to be supported with suitable precast laggings / plates with concrete backfilling of 1:3:6. The unit rate indicated is inclusive of all the above operations. The typical sketch is enclosed for reference in Tender drawing documents.</p> <p>5. During pile cap excavation,</p> <p>5.1) the concrete pavement dismantling works shall be carried out by segregating the retaining portion of the concrete paved road using a diamond cutter to ensure no damage to the retaining portion of the concrete pavement, which shall then be dismantled using pneumatic/mechanical breaking.</p> <p>5.2) If encountered with Hard rock, excavation work can be continued only either with Mechanical cutters or by using controlled chemicals for disintegration of rock / cracking the strata.</p>				0
11	<p>Excavation exceeding 4m in depth, for open foundations, combined footing, underground water tank, pile caps etc. in all types of soil, soft rock, hard rock, boulders, old structures below ground as encountered of all types & thickness, including dismantling of other structures, dead utilities and backfilling using good earth including watering, compacting with a vibratory plate compactor complete as per specifications and loading. leading and disposal of surplus excavated material using covered trucks to contractor's dumping yard and as directed by the Engineer so as to ensure that during transportation, the carried material does not spill out with all leads and lifts. Including all supports (by sheet pile! shoring/ strutting to retain and support the soil/ Sloped Excavation or other methods) for stability including dewatering, pumping and bailing out of water.</p> <p>Note: 1.This item shall be measured on basis of area of PCC for pile cap/foundation multiplied by the excavation depth beyond 4m.</p> <p>2. Dumping yard related to debris and other disposable construction materials shall be collected and transported for disposal at BBMP (GBA identified C&D waste management facility as per 'Construction & Demolition Waste Management Rules, 2016'.</p> <p>3. Dumping yard related to all disposable excavated material shall be collected and transported for disposal at contractors dumping yard which has to be approved by relevant authorities.</p>	Cum	5,966	3,590.58	21420985
12	<p>Plain Cement Concrete (PCC): Providing & laying plain cement concrete M20/20 grade in open foundation, stepped foundation, combined footing, raft foundation, retaining walls, return walls, walls, U/G water tank, culverts, below pile cap, drains, slab on grade, tie beams, basements, levelling course or any other works as directed by the Engineer, etc. rate is inclusive of required dosage of admixture in concrete for obtaining required workability and as per specifications, approved drawings, laid in layers not exceeding 15cms thick layers, as per drawing including cost of all material, form work/ shuttering, dewatering during concreting, vibrating, compacting, curing, hire charges of machinery, all lead and lift, loading, unloading, transporting, stacking, finishing the exposed faces etc., complete.</p>	Cum	1,938	7,939.94	15391505
	Total of Schedule-"A"				1092988970
			-		
SCHEDULE-B: CAST-IN-SITU/PRECAST WORK			-		
	Providing and laying PCC/RCC for viaduct, road cum rail flyover, stations structures		-		

Item no.	Description of items	Unit	Quantity	Rate	Amount
1	Providing and laying grade M50/ 20 reinforced cement concrete at all levels for Viaduct & station piers of all size, shapes & heights (standard pier, portal pier & cantilever pier), pier head, shear key, portal beams, pier-arms, corbels, pier-ledge, diaphragms, pedestals, deck slab, cast-in-situ Pier Cap of all shapes etc. including centering, shuttering, propping, staging, scaffolding, curing, necessary tools, plants, machinery and all related operations etc. using steel shuttering & steel props. Formwork to be designed in such a way that traffic on road is allowed during the work at all times. Rate shall include cost of providing grooves, chamfers, mouldings, cut-outs, necessary fixtures, insert plates, sleeves for various purposes, shear connectors etc. complete as per drawings, specifications and as directed by the Engineer. The rate shall also include preparation of construction joints as per specification and providing approved wire mesh/weld mesh at such locations as approved by Engineer or as shown in drawings. Reinforcement steel shall be paid separately under relevant BOQ item. Rate shall also include cost of using required dosage of admixture in concrete for obtaining required workability as per specification & approval of Engineer.	Cum	21,231	16,063.43	341036682
	Note: (i) No cold joints are permitted. The rate is inclusive of all above bonding agents/methods. However if any additional cold joints are unavoidable due to the reasons not beyond the control of contractor, all above bonding measures shall be on account of the contractor. (ii) The cost is included for all provisions of HDPE pipes for pre-stressing system, ducts, etc. in Metro Viaduct, Road cum rail flyover piers/structures as per drawings complete. (iii) Self-compacting concrete shall be designed as required				0
2	Pre-Cast Concrete: Providing M55/20 grade reinforced cement concrete for Providing, casting, pre-stressing and curing precast Standard Pier Caps supporting superstructure, including shear key, pedestals, in-situ connection with pier. The item includes lifting the pier caps from the mould and shifting the same to the stacking yard. The item includes provision of holes for lifting and filling of holes after erection using non-shrink grout. Pre-stressing strand/system, Reinforcement steel, anchorages and sheathing shall be paid separately. Rate shall include cost of using required dosage of admixture in concrete for obtaining required workability as per approval of Engineer and all related operations as required to complete the work as per drawing & specifications. The cost shall be inclusive of the cost of centering, shuttering, scaffolding, providing cut-outs where specified, curing arrangements as required, steam curing arrangement if deemed necessary, all handling etc. complete Cast insitu Pier cap/arm concrete shall be paid as per the rate for item B.1	Cum	5,737	17,456.75	100149480
3	Providing M55/20 grade Reinforced cement concrete for pre-cast pre-stressed U-girder of all simply supported spans (straight or tapered) in the casting yard including provision of shear connector for secondary pour concrete (rail plinths), dowels to be provided as per the approved track geometry, including for third rail, additional bars for earthling, bars/strands/hooks for lifting of U-Girder, cutting of bars/strands/hooks after transportation and sealing of lifting recess as specified in drawings, lifting the full spans from the mould and shifting the same to the stacking yard. HOPE debonding pipes to be provided as per GFC. Rate shall include all inserts. Cost shall be inclusive of the cost of centering, shuttering, scaffolding, providing cut- outs where specified, curing arrangements as required, steam curing arrangement if deemed necessary, all handling etc. complete. Pre-stressing strand/system and Reinforcement steel shall be paid separately. Rate shall include cost of using required dosage of admixture in concrete for obtaining required workability as per approval of Engineer, anti-corrosive paints for lifting hooks, insert plates and exposed steel surfaces and all other related operations as required to complete the work as per drawings and specifications. Contractor to provide shop drawing based on approved GAD for dowel alignment, fixtures for cable trays (Electrical and Signals). The cost shall be inclusive of the cost of centering, shuttering, scaffolding, providing cut-outs where specified, Supply and fixing of U-Bolt by embading into concrete on U-Girder	Cum	8,578	17,230.62	147795656
	Note: (i) Payment at 85% of accepted rate on casting, 13% on completion of erection, stitch concrete & related works and 2% will be released after handing over to the designated contractor. (ii) Cost inclusive of providing KRIDE logo as per drg.				0

Item no.	Description of items	Unit	Quantity	Rate	Amount
4	Providing and laying M50/20 Grade reinforced cement concrete for precast PSC I-Girder, (pi)/ T-girder (Pre-Tensioned/ Post Tensioned), for standard/special spans of all types (straight as per approved GAD) in the casting yard including provision of lifting the girders from the mould and shifting the same to the stacking yard. Quoted rate shall be inclusive of all infrastructure in the casting yard, gantry cranes, moulds, casting beds, mobile cranes, stores, concrete batching plant, testing labs, bulk heads, approved curing arrangements as required, all handling etc. complete, 2mm teflon sheet at the end for placing on portal/arrangement for placing bearing with suitable downstand etc. as required and shown in drawing etc. complete. Pre-stressing strand and Reinforcement shall be paid separately under respective BOQ items. Rate shall include cost of lifting hooks and using required dosage of admixture in concrete for obtaining required workability as per approval of Engineer. Note: Type, Size and number of shutter moulds and debonding pipes (HDPE) as per requirement shall be as per the GFC drawings. Rate shall include all inserts.	Cum	6,125	17,722.53	108544382
5	Providing and laying M40/20 grade reinforced cement concrete for precast parapet, over Deck slab on both side of viaduct, including transition span as per the drawing in all spans (straight or curved), in the casting yard including provision of lifting the parapet from the mould and shifting the same to the stacking yard. Quoted rate shall be inclusive of all infrastructures in the casting yard, gantry cranes, moulds, shuttering, casting beds, mobile cranes, stores, concrete batching plant, testing labs, approved curing arrangements as required. The cost shall be inclusive of shuttering, scaffolding, special adjustable props for alignment of units, moulds, providing cutouts, required dosage of admixture for concrete. Quoted rate shall also inclusive of Loading, transporting precast parapets from casting yard to work site, launching and erection in position using gantry or crane complete with cast in situ stitch concrete of same grade. Bolts & inserts for fixing hand rails will be paid separately under relevant BOQ item.The cost shall be inclusive of the cost of centering, shuttering, scaffolding, providing cut-outs where specified, Supply and fixing of U-Bolt by embading into concrete on parapet . Reinforcement Steel shall be paid separately under relevant BOQ Items. Note: (i) Payment at 70% of accepted rate on casting, 28% on completion of erection, stitch concrete & related works and 2% will be released after handing over to the designated contractor. (ii) Cost inclusive of providing KRIDE logo in parapet as per drg.	Cum	2,345	15,320.01	35924741
6	Transporting precast Standard Pier-Caps from the casting yard / storage yard to the work site, erection in position including the cost of all temporary supports, erection equipment, lifting cranes, transporting etc, positioning and fixing on pier with cement concrete of M55/20 grade along with post tensioning as required. The weight shall be calculated assuming concrete density of 2.5t/m3. Shifting within the site/yard is the responsibility of the contractor and shall not be paid separately. Cast insitu connection concrete shall be paid as per the rate for item B.1	MT	16,217	3,136.95	50873463
7	Transporting precast full spans U-Girder (in Viaduct/Station) of simply supported span from the casting yard to worksite, erection in position including the cost of all temporary supports, erection equipment, lifting cranes (Using Mobile crane having capadty 500MT as per Site requirement), transporting etc, and positioning on bearings etc for viaduct into completed structures conforming to required lines, grades and dimensions complete as per drawings and specifications. The weight shall be calculated assuming concrete density of 2.5 t/m3. Shifting within the site/yard is the responsibility of the contractor and shall not be included for payment.	MT	43,990	3,096.31	136206848
8	Loading, transporting precast I-Girders, (pi)/T-Girder, pier-arm and portal beams (PSC & RCC) from casting yard to work site, launching and erection in position with cranes, including the erection and shifting of launching girder/crane, cost of all temporary supports, erection equipment, transporting, and positioning on bearings etc. The weight shall be calculated assuming concrete density of 2.5t/m3.	MT	15,652	3,301.42	51673722

Item no.	Description of items	Unit	Quantity	Rate	Amount
9	Conducting Load Testing of PSC U-Girder/I-Girder/(pi)/T-Girder, Composite steel girder of any span length as per IRC SPSI, including making all arrangement and conducting satisfactory Load testing on simply supported span erected in position on the piers at site. Arrangement for application of actual design serviceable vertical load as directed by Engineer and arrangement for measurement of deflection at various salient points of the girder and submitting a report. The details of placement, position, increment of load on the simply supported span and installation of measurement devices etc., shall be as directed by the Engineer. Note: Rate shall include submission of method statement and third party certification of the test.	MT	4,550	6,389.31	29071353
	Total of Schedule-"B"				1001276328
			-		

Item no.	Description of items	Unit	Quantity	Rate	Amount
SCHEDULE-C: STEEL WORKS			-		
STEEL REINFORCEMENT, PRESTRESSING & STRUCTURAL STEEL			-		
1	<p>Providing TMT-500 D grade steel bar reinforcement (conforming to IS:1786, HYSD Fe 500 grade) at all heights & depth including straightening bars, cutting, bending, hooking binding with approved quality 18 gauge G.I binding wire, after placing in position tying, lapping and/or welding wherever required and anchoring to the adjoining members wherever necessary as per drawings (Laps, Hooks, and Wastages shall not be measured and paid) including cost of all materials, bar bending charges, labour, lead & lifts etc., Complete as per specifications and as directed including welding involved towards stray current protection effects as per the system approved by Engineer.</p> <p>Note: (i) No extra payment will be made for lap joint welding in pile reinforcement. (ii) 18-gauge GI binding wire (2 ply) in diamond form at each reinforcement junction. (iii) Splices (Laps, couplers. welds etc.) not payable shall be included in the rate quoted. (iv) The rate quoted should cover all welding and providing mechanical couplers (20 mm dia. & above) including required tests as and when required/specified frequency, etc. as per codal provisions, complete.</p>	MT	13,006	91,391.63	1188596270
	<p>(v) The cost quoted should cover all types of splices including stiffeners hooks, spacer bar. U-bar, chair, bend deduction etc. as required and nothing extra is payable on this account even though the same is shown in the drawing. (vi) The use of couplers in reinforcement (20 mm dia. & above) shall be carried out only after obtaining approval from BMRCL, and the detailed Bar Bending Schedule (BBS) must also be approved prior to implementation. (vii) Reinforcement bars shall be provided with or without anti-corrosive paint at some locations, as specified in the project requirements and subject to KRIDE's approval. (viii) The cost includes earthing rod as shown in the drawing and while using Earthing Rods, including supply, transportation, welding, necessary connecting plates, earthing arrangements, and all incidental works of approved diameter and length as specified in the drawings, specifications, or as approved by the Engineer in Charge, complete in all respects. (ix) Stage payment at 60% of the accepted rate or 90% of the invoice value whichever is minimum shall be paid on receipt of material at site and its certification by the Engineer against submission of original invoice and manufacture test reports and the indemnity bond. The total stage payment made at any given time shall not exceed 10% of the accepted rate value of this item.</p>				0
2	<p>Supplying and threading uncoated stress-relieved low relaxation steel conforming to IS:14268, class-2 in already positioned Precast Pier-arm, precast I-girder,(pi)/T--Girder, portal beams including Providing corrugated 2.3mm (Tolerances + 0.3mm) thick HDPE duct 107mm ID (Tolerances + 1mm), OD 124mm (Tolerances + 1mm) for 19K15 & 90mm ID (Tolerances + 1mm), OD 104mm (Tolerances + 1 mm) for 12K15 with couplers & vent pipes, spacers, anchorages, stressing using 19K15 or 12K15 system or any other approved pre-stressing system and grouting as per approved methodology including water testing, epoxy protection of anchorages, related operations to complete the work, with all lead and lift and as per specifications. This item shall include Providing and fixing all Strands, Corrugated HDPE Duct (including blister portion) for Laying the Strands, Required Anchorages for live & dead end and at blister portion for future pre-stressing, Stressing up to required level using all tools and equipment's & consumables. After stressing is completed, the voids in all ducts are to be grouted with non-shrink cement grout, and filling of all recess with concrete with adequate reinforcement as per drawing & specifications, all complete, as directed by the engineer.</p> <p>Note: (i) For payment, only pre-stressing strand (weight of pre-stressing strand, final in place) will be measured of individual girder average straight length.</p>	MT	604	1,88,210.19	113734635

Item no.	Description of items	Unit	Quantity	Rate	Amount
3	High Tensile Prestressing Steel(viaduct) Supplying of uncoated stress-relieved low relaxation steel strands conforming to IS:14268, class-2 for pretension of precast full span U-girders, I, (pi)/T Girders (all types of spans including spacers, stressing of strands, protection of exposed cut-strands, anti-corrosive paints, HDPE debonding tubes at ends of strands if required, and all related operations to complete the work for viaduct. HDPE debonding tubes for prestressing strands (to be cut-off flush to concrete after casting), epoxy based sealing compound at edges of strand and epoxy putty to avoid slurry ingress during concreting. The quantity given is the net length of tubes without extra tube length required during construction. Rate includes supply, fixing and filling of HOPE tube with grease as specified in ASTM. Note: For Payment, only pre-stressing strand (final in place weight) is to be measured of individual girder average straight length at middle.	MT	523	1,90,565.72	99582840
4	Providing, fabricating and erecting structural steel for hand railing and other structural members for viaduct including transition span consisting of tubular and rolled sections profiled to require shape, base plates, strips and flats for structural and general engineering purposes with welded hold fasts for walk-way, earth terminal plates, insert plates with welded hold-fast, internal threaded sleeves including MS bolts Confirming to IS-3757:1985 (Reaffirmed:2008)& IS-4000:1992 (reaffirmed:2013) (Code of practice for high strength bolts in steel structures) tightened by Torque wrench and primer coat and aluminium paint as per specification and drawing, with all lead and lifts and as per the directions of engineer. The rate shall also include required surface preparation (sand blasting). Painting of steel sections shall be done as below. (a). First coat- Primer to IS:5666. (b) Second coat- Zinc chromium paint to IS:104 (c) Third & fourth coat- Aluminium paint to IS:2339	MT	8	1,14,825.00	862910
5	Supply, fabrication, transportation and erection of fabricated steel girder work of Grade E450BR confirming to IS 2062-2011 (with all latest amendments) including, painting, fully killed and fully normalized at appropriate location using various structural steel sections including MS-plates, etc. as per approved drawing for composite girders including cutting, bending, drilling holes with necessary field rivets welding HSFG bolts tightened by Torque wrench as per drawings supply of necessary templates etc. complete for fixing accessories such as bolts and nuts, etc. Complete duly providing necessary scaffoldings arrangements, temporary staging and metalizing the girders in accordance with the Indian Railway Bridge manual and any other incidental work as required with all leads and lifts, etc. compete and as directed. NOTE: (i) In case of superstructure over flyover all steel girders with bracings together shall be launched using push and pull methodology/suitable launching schemes including rolling over the track bed, Crib Crane method, etc. (ii) All labour, materials, tools and plants consumables such as welding rods, etc., by contractor. (iii) Metalizing treatment of all steel surfaces shall be done by spraying aluminium having 99.5% purity with a coating of 150microns by minimum 2-phases.	MT	2,415	1,90,026.65	458897280
	(iv) Painting of metalized steel sections shall be done as below. a) First coat- Primer to IS-5666. b) Second coat- Zinc chromium paint to IS:104. c) Third & fourth coat -Aluminium paint to IS:2339. (v) The rates are inclusive of testing of all raw materials, shear connections, HSFG bolts, nuts and welding, etc. including allowances for all types of wastages. (vi) The rate is inclusive of surface preparation, sand blasting, etc. (vii) The rate shall also included supplying and providing of detailed fabrication drawing prior to execution. (viii) The rate shall also include provision and installation of base plates, anchor bolts (For payment measured in Tonnes, etc.,) as per relevant drawings, specifications and direction of the engineer.				0

Item no.	Description of items	Unit	Quantity	Rate	Amount
	(ix) Using standard plate sections, H sections, hollow round/square/rectangle sections etc., welded and built. (x) The launching scheme has to be submitted by the contractor using sufficient capacity cranes and get it approved by Engineer/KRIDE. When girder is to be erected over the existing flyover then each girder is to be launched with proper care and with proper frame to avoid toppling during launching. The girder so placed will be temporarily braced with bolts and nuts before freeing from the frame. (Xi) Rate shall include third party inspection by Government agency.				0
7	Supply, fabrication ,transportation and erection of fabricated shim plates (wedges) of Grade E450BR conforming to IS:2062-2011 (with all latest amendments) including, hot dip galvanised, fully fitted and normalized at appropriate location using various structural steel sections including MS-plates, etc. as per approved drawing. Metalizing in accordance with the Indian Railway Bridge manual and any other incidental work as required with all leads and lifts, etc. complete and as directed.	MT	83	2,27,908.61	18935650
			-		
	Total of Schedule-"C"				1880609586
			-		
SCHEDULE-D: OTHER WORKS			-		
PRELIMINARIES AND GENERAL			-		
1	During the contract period including the extended contract period till the final completion of the work, the contractor shall provide Surveying by establishing DGPS control points and TBMs, Marking of alignment and pier locations, vertical & horizontal clearances for the elevated section including modifications, if any, as per drawings. No extra amount will be paid to re-do or to re-establish any of the survey points. The control points are to be fixed using DGPS double frequency and the accuracy of 1 in 50,000 or better are to be assured. Note: The payment schedule for the item shall be as follows: (i) Payment at 25% of total cost of the item on checking and verification of all control points and submission of drawings. (ii) Payment at 70% of total cost of the item equally distributed over the duration of the contract period and will be paid on pro-rata basis. (iii) Payment at 5% of total cost of the item on satisfactory completion of work along with the final bill.	Km	7	4,49,502.44	3236720
2	Providing temporary barricade of 2m height of plain MS sheet 16 Gauge fixed with steel frame as per drawing, painting (including primer of approved quality) with synthetic enamel paint of approved colour, quality and brand, writing lettering and logo of Metro including maintenance of the same duly cleaning the same on fortnightly basis and painting if required, arrangement for blinker lights on barricades during night as per requirement and as per the instruction of the engineer. Barricading should be rugged. During the construction, barricading has to be kept continuously. Nothing extra will be paid for dismantling and re-erecting the barricades anywhere on the stretch. There should not be any opening at the end of barricade except at locations approved by Engineer Note: (i) Barricades on either side shall be measured individually , Barricades to be counted in the entire stretch on monthly basis and billing made as per availability of barricading boards. (ii) Once barricade has been provided and work started, removal of barricade is not permitted till completion of pile, pile cap, pier and pier caps, portal beams, segment (U-Girder) erection, I girder erection, till completion of construction or as directed by engineering as per site requirements. (iii) While erecting barricade, the bottom gap between barricade and road should be plugged with cement concrete from inside. (iv) There should be minimum openings at the end of barricade to allow access of trucks/lorries and machine to site work area. Even these spacing should have proper opening & closing arrangements	Rm	14,391	5,174.90	74473762

Item no.	Description of items	Unit	Quantity	Rate	Amount
3	Deployment of adequate manpower (Traffic marshals) for management of traffic at intersection, junctions, traffic diversions etc. at various levels to the complete satisfaction of local traffic police and as directed by engineer. Marshals daily shift wise attendance will be maintained and checked by Engineer, will be basis for the payment.	Man Day	14,040	726.39	10198546
4	Boring of 150 mm dia. (confirmatory bore holes), in all types of soil at selected Pier locations (Locations to be decided by the Engineer) up to 3m in hard rock or 30m boring whichever is earlier and collecting core samples in rock for determination of core recovery, RQD and carrying out compressive strength test on rock samples . The rate inclusive of boring in soil, conducting SPT and collecting samples at 3m depth intervals and submitting bore log reports with soil classifications/SPT, Drilling 3m in hard rock with double barrel core for obtaining samples for testing of core recovery, RQD and compressive strength as per standard practice, Preparation and submission of report containing core recovery, RQD, Compressive strength at Hard Rock Locations with all lead and lifts and as per the directives of Engineer with in three to six months of possession of site by Contractor.	Rm	240	2,421.90	581255
5	Submitting color photographs of the works as directed by the engineer at intervals as instructed by the engineer. One set shall comprise of 25 photographs in 3 copies each of size not less than 225mm x 175mm each in album form duly bound, apart from 3 soft copies of all photographs on DVD. The photographs chosen should cover important activities of the work.	Set	36	1,887.89	67964
6	Supply of video in a Pendrive of 180 minutes duration comprising duly edited titled showing the progress of works and methodology and at interval as directed by the engineer.	Set	46	10,891.69	501018
7	Diagonal Cross trenching works for identifying underground utility at every Pier locations to the required length, width and depth, as per drawing, which includes excavation in all types of soil, hard soil, rock, footpath, bitumen road, concrete road, medians etc. cutting of all types road surfaces and backfilling the same with available excavated earth. The rate includes surveying and taking coordinates of the existing utility and submitting the reports (hard & soft copy) of the same as per the directions of the Engineer.	Cum	11,974	574.17	6875074
	Bearings		-		0
8	Design, manufacture, supply & installation of the approved expansion joint (Omega Seal) at the site at track level under the supervision of manufacturer's representative as per specification and expected movement (25 to 50 mm) as mentioned in relevant GFC drgs.	Rm	261	10,909.17	2847293
9	Providing and Fixing the Sealing Gasket for Gap Between U girders , With EPDM Material, Hard Wearing, Temperature resistant (-30deg to +120 deg), Easy installation and Secure fixing and the Joint shall be Water tight. All as per Drawings and Specifications. Cost inclusive of testing and fixing with all necessary fixtures and epoxy Adhesive etc Complete.	Rm	1,690	2,689.31	4543851
10	Design, manufacture, supply & installation of the approved expansion joint (Strip Seal) at the site at track level under the supervision of manufacturer's representative as per specification and expected movement (25 to 50 mm) as mentioned in relevant GFC drgs	Rm	4,038	15,952.96	64410397
11	Supply and fixing in position true in line & level, Elastomeric bearing both horizontal & vertical type of approved make, placing and fixing in location as per specification/drawings certifying to EN1337 and as directed by the engineer with CE Certification.	Cucm	1,93,79,200	1.34	26058295

Item no.	Description of items	Unit	Quantity	Rate	Amount
12	Supplying to site and placing of POT Cum PTFE Bearing and its components in position during casting of pier/ pedestal and superstructure, including, grouting of holes for anchor bolts and underside of base plate with approved non-shrink cementitious grout as per specification and drawings. Note: Quoted price shall hold good for forces and movements varying by+/- 25% for those minimum loads/ forces indicated.		-		0
12.1	Free POT Bearing: V = 426 MT (normal) 460 MT (seismic). Longitudinal Translation +50mm / -25mm.Trans Translation +10mm/-10mm	Nos	15	1,32,254.67	1983820
12.2	Fixed POT Bearing : V =425 MT, Hr= 45 MT (Normal) V = 460 MT, Hr=120MT (seismic)	Nos	15	1,32,254.67	1983820
12.3	Longitudinal Guide POT Bearing: V = 425 MT, Hr= 45 MT (Normal) . V = 460 MT, Hr=120MT (seismic) . Longitudinal Translation +50mm/-25mm	Nos	7	1,32,254.67	925783
12.4	Transverse Guide POT Bearing: V = 426 MT, Hr= 45 MT (normal). V = 460 MT, Hr= 120 MT (seismic). Trans Translation +10mm/-10mm	Nos	7	1,32,254.67	925783
	Viaduct Drainage Works		-		0
13	Providing & fixing UPVC pipes outside the piers and pier cap/pier arm/ portal of OD 200mm, 6.00kg/Sqcm working pressure, approved make with pipe fittings (door bend, door tee, plain tee, plain bend, end cap, reducer, collar, etc.), including cost of fixing arrangement, such as clamp, anchor fasteners etc. with concrete structure, cost of scaffolding, cost of all materials, labour charges, HOM of equipment and testing complete as per drawings & specifications.	Rm	3,900	2,062.25	8042794
14	Fabrication & Supply of drainage spout hot dip galvanized of dimension 300mm x180mm with MS Flat 50mmx6mmx100mm long with gratings of MS Flat 25mmx6mm with spacing of 50mm c/c and MS pipe 122mm dia. verticals as per drawing including installation of the spout with all tools, plants, leads and lifts and in position in complete and as directed by the Engineer.	Nos	413	1,663.34	686958
	Road Works		-		0
15	Cutting of trees girth from 175mm to 600mm including serviceable materials with all lifts & lead and earth filling in the depressions/pit, complete as per specifications. MORTH specification No.201. Note: Girth measurement from 1m above the ground level.	Each	156	883.44	137816
16	Cutting of trees girth from 600mm to 2700mm including serviceable materials with all lifts & lead and earth filling in the depressions / pit, complete as per specifications. MORTH specification No.201. Note: Girth measurement from 1m above the ground level.	Each	154	10,300.04	1586206

Item no.	Description of items	Unit	Quantity	Rate	Amount
17	Direction and Place identification signs upto 0.9 sqm size board: Providing and erecting direction and place identification retro-reflectorised sign as per IRC : 67 made of high intensity grade sheeting wide clause 801.3, fixed over aluminium sheet ing, 2mm thick with area not exceeding 0.9 sqm supported on a mild steel single angle iron post 75 x 75 x 6 mm firmly fixed to the ground by means of properly designed foundation with M15 grade cement concrete 45x45x60 cm, 60 cm below ground level as per approved drawing.	Sqm	130	9,782.35	1271705
18	Portable barricades in construction Zone: Installation of steel portable barricade with horizontal rail 300mm wide, 2.5m in length fitted on a 'A' frame made with 45x45x5mm angle iron section, l.5m in height, horizontal rail painted (2 coats) with yellow and white stripes, 150mm in width at an angle of 45 degree,'A' frame painted with two coats of yellow paint, complete as per IRC: SP:55-2001 including cost of all materials, labour, loading, lead, lift, transporting etc., complete. MORTH specification: 813.6.	Nos	-	3,548.54	0
19	Traffic cones: Supplying of red fluorescent with white reflective sleeve traffic cones made of low density polyethylene (LOPE) material with a square base of 390x390x35mm and a height of 770mm, 4Kg in weight, placed at 1.5m interval all as per BS-873 including cost of all material, labour, loading, unloading, lead, lift, transporting, etc., complete.	Nos	224	586.27	131324
20	Retro -Reflectorized traffic signs: Supplying and fixing of retro -reflectorized cautionary, mandatory and informatory sign as per IRC: 67- 2001 made of high intensity grade micro prismatic HIP type-IV sheeting, including lettering fixed over aluminium sheeting, 2 mm thick firmly fixed to the ground by means of properly designed foundation with M15 grade cement concrete 45cmx45cmx60cm, 60cm below ground level as per approved drawing . The item includes earthwork excavation, Cement Concrete M -15 grade, 2 coats of approved colour synthetic enamel painting to the steel surface, as per clauses, including curing, cost of all materials, labour, loading, unloading, lead, lift, transporting etc., complete supported on a mild steel angle iron post 75mm x 75mm x 6mm, 3.50mtrs height (minimum effective height 1.90 mtrs) with 60 cm equilateral triangle/ 60cm circular. MORTH specification: 801	Nos	112	6,653.34	745174
21	Providing supplying and fixing in position, boundary pillars of standard design as per IRC-25-1967 with KRIDE logo on it with reinforced cement concrete of M15 grade using 20mm down size granite metal as per standard design including cost of materials, steel, labour, curing, fixing in position, painting, with all lead and lift, transportation etc. complete as per MORTH specification: 806.	Nos	350	673.67	235785
22	Clearing and grubbing road land including uprooting rank vegetation, grass, bushes, shrubs, saplings and trees girth upto 300mm. Removal of stumps of trees cut earlier and disposal of unserviceable materials and stacking of serviceable material to be used or auctioned, with all lead and lifts including removal and disposal of top organic soil not exceeding 150mm in thickness including all labour, hire charges of all machineries etc., complete with all lead & lifts. By Mechanical Means or any other means.	Ha	6	26,406.29	148535
23	Transplanting the marked trees of various species and girth(175mm to 2000mm girth) to the place shown by Engineer with all leads and lifts, tools, plants men & machinery and necessary preparation such as: (i) Preparation of earth ball of tree roots of desired depth & diameters. (ii) Dislodging, lifting, transportation and transplanting tree from original place to the new place including all arrangements, labour etc. for successfully completing the work. (iii) Excavating pits of adequate size, arranging loose soil, mixing of manure, fertilizer, insecticides etc. to ensure survival of the trees being transplanted. (iv) Maintenance of tree i.e. watering, soil heaping, spray of insecticides for six months. All above operations shall be executed as per specification .	Each	62	16,860.60	1045357

Item no.	Description of items	Unit	Quantity	Rate	Amount
24	Painting pier identification number on piers & parapet inner face at different locations as directed by Engineer duly following the colour scheme including all material and labour, with all lead & lift. Final coating to be done at the time of handing over.	Nos	460	235.31	108245
25	supply, fabrication and erection of cable tray supports/hangers made out of Hot dip galvanized (65 micron) GI angle / channels / flats fabricated to the required size and shape falling in the category of standard GI sections. Rate shall include cost of Anchor Fasteners and other accessories required for Installation of supports at U-girder Parapet/ I-Girder Parapet. a)GI channel section of 100 x 65 mm b)GI channel section of 75 x 75x 50 mm c)GI channel section of 50 x 50 x 40 mm d)GI L-Angle section of 75 x 75 x 8 mm e)GI L-Angle section of 50 x 50 x 6 mm f)GI L-Angle section of 40 x 40 x 5 mm g)GI L-Angle section of 25 x 25 x 5 mm h)GI L-Angle section of 25 x 25 x 3 mm i)GI flat section of 75 x 10 mm j)GI flat section of 65 x 10 mm	kgs	3,21,520	162.84	52356751
26					
27	Back filling with Granular material behind abutment, wing wall, return wall and foundation trenches as per drawing in layers not exceeding 20cms in depth, compacting deposited material by plate compactor/power rammer after duly watering to achieve the desired degree of compaction, including cost of materials, labour, hire charge of machineries, transportation, with all lead and lifts, loading, unloading etc. complete. MORTH specification: 710.1.4 of IRC: 78 & 2200.	Cum	100	1,004.46	100446
28	Filling pot holes and patch repairs with bituminous concrete, 40mm thick: Removal off all failed material, trimming of completed excavation to provide firm vertical faces, cleaning of surface, painting of tack coat on the sides and base of excavation at 2.5Kg/ 10sqm as per Cl.500.3 , back filling the pot holes with hot bituminous material as per Cl. 500.4, compacting, trimming & finishing the surface to form a smooth continuous surface, all as per cl.3004.2, including cost of all material, labour, hire charges of machinery, lead, lifts, loading , unloading, stacking, transporting, including all lead for bitumen and emulsi on etc., complete, using Grading-I material. MORTH specification : 3004.2.	Sqm	300	492.14	147643
29	Providing Weep Holes in stone masonry/Plain/Reinforced concrete abutment , wing wall, return wall with 100 mm AC pipe extend ing through the full width of the structure with slope of 1V;20H towards drawing force. Complete as per drawing and technical specifications including cost of materials, labour, HOM complete as per specifications . MORTH Specification No.2706 & 2200	Rm Sqm	2,214	213.80	473299
30	Painting pier identification number on piers & parapet inner face at different locations as directed by Engineer duly following the colour scheme including all material and labour, with all lead & lift. Final coating to be done at the time of handing over.	Nos	220	235.31	51769
			-		0
31.0	Rain water harwesting Recharge Pit		-		0

Item no.	Description of items	Unit	Quantity	Rate	Amount
31.1	Earth work excavation for Foundation by mechanical means for all works & depth upto 3 m, as per drawing and technical specifications, including setting out, shoring, strutting, barricading, caution lights, including dressing of excavated surfaces, disposing off or levelling the excavated earth or sorting & stacking the selected earth for reuse in a radius of 50 m and lift upto 1.5 m including cost of labour, tools, usage of machinery & other appurtenances In all kinds of soils Depth upto 3m Note : Cost of De-watering upto 5 % of (A+B) may be added, where required assessment for dewatering shall be made as per site condition	cum	1,986	112.20	222777
31.2	Providing and laying in position Cement Concrete for levelling course for all works in foundation. The granite/trap/basalt crushed graded coarse aggregates and fine aggregates as per relevant IS Codes machine mixed, laid in layers not exceeding 150 mm thickness, well compacted using plate vibrators, including all lead & lifts, cost of all materials of quality, labour, Usage charges of machinery, curing, and all the other appurtenances required to complete the work as per technical specifications. Mix 1:2:4 Using 20 mm nominal size graded crushed coarse aggregates	cum	55	6,867.30	380419
31.3	Providing and laying in position Cement Concrete for all Foundation works. The granite/trap/basalt crushed graded coarse aggregates and fine aggregates as per relevant IS Codes machine mixed with super plasticizers laid in finished layers, well compacted using needle vibrators, including all lead & lifts, cost of all materials, quality confirming to the requirements of relevant IS codes, labour, Usage charges of machinery, curing and all the other appurtenances required to complete the work as per technical specifications. M20 Design Mix Using 20 mm nominal size graded crushed coarse aggregates	cum	569	6,915.70	3932213
31.4	Providing to work spot rolling, lowering and placing in position RCC perforated rings in the already excavated pit including loading and unloading at both the destinations with all lead and lift with appurtenances., complete.	Each	462	13,123.00	6062826
31.5	Providing and laying 100mm thick pre-cast cover slabs over drains & Rain pit of width not exceeding 800 mm using M20 concrete reinforced with Micro Alloyed High carbon steel with 3mm - 3ply wired steel @ 2.00 kg/m2, slabs jointed in CM 1:3 proportion and nicely finished Including providing holes in the Cover slabs wherever necessary for easy drainage of surface water including of labour, materials, scaffolding, usage of machinery, curing, lead and lift charges etc, Complete.	Sqm	350	1,020.80	356820
31.6	Sinking of Borewell of 165mm dia clear using super fast hydraulic rig of capacity 300 PSIG & above 1100 CMF & above in all strata including over burdern upto 20 m. Fixing of casing pipes, collars and cap with necessary cutting, threading and welding including transportation of rig and supporting vehicle, crew charges and cost of consumables etc., complete including yield testing at the final depth with a minimum working of compressor for one hour (Excluding cost of casing pipes, collars, cap etc., complete) (Above 450m of drilling add 10% for every 50m depth) Borewell depth of 0 to 50 Mtrs	RMT	2,464	407.00	1002848
31.7	Providing & fixing PVC pipes of OD 200mm, 6.00kg/ Sq cm working pressure, approved make wit h pipe fittings (door bend, door tee, plain tee, plain bend, end cap, reducer, collar, etc.), Including cost of fixing arrangement with concrete structure, cost of all materials, labor charges, HOM of equipment and testing complete as per drawings & specifications.	RMT	3,542	1,233.05	4367451
31.8	Supply & Fixing of Polycarbonate End Cap	NO	154	50.00	7700
31.9	Providing & installing at site of work Perforated corrugated PVC pipes conforming to IS 9271 with prewrapped 250gsm. Geosynthetic filter material by laser guided trencher machine/by mechanical means including cost of pipe, filter material, pipe accessories and all taxes including all other ancillary operations complete and labour charges only for installation of site at work perforated corrugated PVC pipes including lowering into trenches, laying true to lines, level land and perfect leak proof linking at joints, fittings pipes accessories including the refilling the trench 50 cm around the pipe with gravel or selected earth available from the excavation and all other ancillary operations complete. 100mm dia		2,541	389.40	989465
31.10	Supplying, filling, spreading & leveling stone boulders of size range 5 cm to 20 cm, in recharge pit, in the required thickness, for all leads & lifts, all complete as per direction of Engineer-in-charge.	CUM	109	1,102.20	119981

Item no.	Description of items	Unit	Quantity	Rate	Amount
31.11	Supplying, filling, spreading &leveling gravels of size range 5 mm to 10 mm, in the recharge pit, over the existing layer of boulders, in required thickness, for all leads & lifts, all complete as per direction of Engineerin- charge.	CUM	82	1,304.60	106510
31.12	Supplying, filling, spreading &leveling coarse sand of size range 1.5 mm to 2 mm in recharge pit, in required thickness over gravel layer, for all leads & lifts, all complete as per direction of Engineer -in-charge	CUM	82	1,311.20	107049
			-		
	Total of Schedule-"D"				284539248
			-		
	Grand total (A+B+C+D)-BOQ Items				4259414131

Construction of double-decker rail cum road flyover from Ch. 14+562.903 to Ch. 15+680.447 including Mathikere Station Structural Works

S.No.	Activity Description	UOM	Quantity	Rate	Amount
SCHEDULE-2 (b1): PILE FOUNDATIONS AND OPEN FOUNDATIONS					
1	Providing and installing cast-in-situ vertical bored piles of depth as per drawing with M35/20 grade of reinforced cement concrete using Port land slag cement (Directly from manufacture or blending of OPC+GGBS) including all operations such as mobilization, installation and shifting of piling rig etc., in all soil strata, road, footpath, including boulders and kankar and soft rock/ weathered rock. The Cost shall also include built up of piles up to the required level. The item includes disposal of earth muck, slush released from piles at contractor's dumping ground with all leads and lifts as per the approved methods & specifications. The cost shall also include the cost of empty boring wherever required. Reinforcement steel shall be paid separately under relevant BOQ item.				
1.1	For 1200 mm dia. Pile by using hydraulic rig	RM	858	22,746	1,95,16,469
1.2	Extra over Item No. A-1.3 (For 1200mm dia. pile) for drilling & socketing in hard rock as per specification and as directed by the Engineer. Note: Socket depth shall be paid as per the drawing or actual as recorded whichever is lesser and certified by Engineer at site.	RM	31	25,025	7,80,782
1.3	Extra over Item No A-1.3 (For 1200 mm dia. pile) for providing 6 mm thick mild steel permanent liner including Cost of liner and driving the same wherever required. Note: In case 8mm thick plate is used 30% enhancement over accepted rate will be paid.	RM	0	27,328	0
1.4	For 1500 mm dia. Pile by using hydraulic rig	RM	6,864	29,540	20,27,60,800
1.5	Extra over Item No. A-1.4 (For 1500mm dia. pile) for drilling & socketing in hard rock as per specification and as directed by the Engineer. Note: Socket depth shall be paid as per the drawing or actual as recorded whichever is lesser and certified by Engineer at site.	RM	314	32,826	1,02,91,052
1.6	Extra over Item No A-1.4 (For 1500 mm dia. pile) for providing 6 mm thick mild steel permanent liner including Cost of liner and driving the same wherever required. Note: In case 8mm thick plate is used 30% enhancement over accepted rate will be paid.	RM	224	46,603	1,04,39,159
2	Carrying out initial vertical load test on piles as per relevant IS Codes including all arrangements for measuring settlement / deflections and submitting reports. This includes cost of all the piles (including test pile, and reaction piles, if required), making of pile head ready for testing at the desired level, supporting/reaction arrangement (including reaction piles/soil/rock anchors, if any) for the kentledge load for 2.5 times the theoretical design vertical load capacity. The test arrangements designed shall cater for additional 25% above test load.				
2.1	For 1200mm dia. Pile, having pile capacity of 750 MT	Nos	0	35,20,951	0
2.2	For 1500mm dia. Pile, having pile capacity of 1000 MT	Nos	1	47,44,732	47,44,732
3	Carrying out initial lateral load tests on piles as per relevant IS Codes including all arrangements for measuring deflections and submitting reports. This includes cost of all the piles, making of pile head ready for testing at the desired level, Supporting/reaction arrangement (include reaction piles/soil/rock anchors, if any) for the kentledge load.				
3.1	For 1200mm dia. Pile, having pile capacity of 40 MT	Nos	0	7,90,446	0
3.1	For 1500mm dia. Pile, having pile capacity of 65 MT	Nos	1	11,78,144	11,78,144

Construction of double-decker rail cum road flyover from Ch. 14+562.903 to Ch. 15+680.447 including Mathikere Station Structural Works

S.No.	Activity Description	UOM	Quantity	Rate	Amount
4	Carrying out initial pull-out test on Piles as per Clause 9.0 of IS 2911 (Part IV) 2013 including all arrangements for measuring displacement and submitting report. This includes cost of all piles (Test piles and reaction piles as required), making pile head, and cap for resting the Jack at desired level for supporting/reaction arrangement . the kentledge load for 2.5 times the theoretical design load capacity. The safe uplift load shall be based on the acceptance criteria specified in the codal provision. (The design working uplift load is 100 MT) for 1200mm dia pile	Nos	1	21,03,758	21,03,758
5	Carrying out static routine vertical load tests on working piles as per relevant IS Codes including all arrangements for measuring settlement/deflections and submitting reports. This includes making of pile head ready for testing at the desired level supporting/reaction arrangement (including reaction piles/soil/rock anchors, if any) for the kentledge load. (Cost of piles is paid in item A1) Routine load shall be 1.5 times the theoretical design vertical load capacity. The test arrangements designed shall cater for additional 25% above test load.				
5.1	For 1200mm dia. Pile, having pile capacity of mo re than 500 MT upto 750 MT	Nos	0	14,80,210	0
5.1	For 1500mm dia. Pile, having pile capacity of more than 800 MT upto 1000 MT	Nos	1	22,06,224	22,06,224
6	Conducting dynamic load testing on selected piles all as per specifications and directions of the engineer.				
6.1	For 1200mm dia. Pile as per ASTM 4945 Section 08	Nos	0	1,36,734	0
6.1	For 1500mm dia. Pile as per ASTM 4945 Section 08	Nos	2	1,99,042	3,98,084
7	Non-destructive tests for Integrity testing of Pile of all dia., 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 computerized equipment and high skill trained personal for conducting the test & submission of results, all complete as per direction of Engineer.	Nos	234	4,557	10,66,382
8	Excavation exceeding 4m depth , for open foundations, combined footing, underground water tank, etc. in all types of soil, soft rock, hard rock, boulders, old structures below ground as encountered of all types & thickness, including dismantling of other structures, dead utilities and backfilling using good earth including watering, compacting with a vibratory plate compactor complete as per specifications and loading, leading and disposal of surplus excavated material using covered trucks to contractor's dumping yard and as directed by the Engineer so as to ensure that during transportation, the carried material does not spill out with all leads and lifts, including all supports (by sheet pile/ shoring/ strutting to retain and support the soil/ Sloped Excavation or other methods) for stability including dewatering, pumping and bailing out of water. Note: This item shall be measured on basis of area of PCC for pile cap/foundation multiplied by the excavation depth beyond 4m.	Cum	0	3,994	0
8	Providing & laying plain cement concrete M20/20 grade in open foundation, stepped foundation, combined footing, raft foundation, retaining walls, return walls, walls, U/G water tank, culverts, below pile cap, drains, slab on grade, tie beams, basements, levelling course or any other works as directed by the Engineer, etc. rate is inclusive of required dosage of admixture in concrete for obtaining required workability and as per specifications, approved drawings, laid in layers not exceeding 15cms thick layers, as per drawing including cost of all material, formwork/shuttering, dewatering during concreting, vibrating, compacting, curing, hire charges of machinery, all lead and lift, loading, unloading, transporting, stacking, finishing the exposed faces etc., complete.	Cum	194	9,212	17,84,501

Construction of double-decker rail cum road flyover from Ch. 14+562.903 to Ch. 15+680.447 including Mathikere Station Structural Works

S.No.	Activity Description	UOM	Quantity	Rate	Amount
9	Providing & laying M35/20 grade, reinforced cement concrete using Portland slag cement (Directly from manufacturer or blending of OPC+GGBS) for following concrete works: Pile cap , Open Foundation/ Stepped Foundation/ Raft, Combined Footing, Columns, Grade beam, monopile pedestals, U/G water tank and Structures of road widening works such as foundation, substructures and superstructures of culverts, retaining walls, return walls, precast/cast -in-situ culvert deck slabs, road median, drains, etc. including excavation up to 4.0 m from lowest ground level through existing water bound macadam road/ bituminous road/ concrete road/ soil/ murrum/ hard rock/ soft rock old structures below ground as encountered of all thicknesses, dismantling other structures, dead utilities, dewatering, pumping and bailing out water, strutting and shoring, formwork, backfillingin foundation with good earth/quarry dust/sand watering, compacting with a vibratory plate compactor complete as per specifications. The Cost shall also include cutting/chipping of pile up to cut off level or up to good concrete and built up of pile up to required level. The cost includes loading, unloading and disposal of surplus excavated material along with pile heads using covered trucks to contractor's dumping yard with all leads and lifts and as directed by the Engineer. The contractor has to ensure that during transportation, the carried material does not spill out. Reinforcement steel shall be paid separately under relevant item. Rate shall include cost of using required dosage of admixture in concrete for obtaining required workability as per approval of Engineer, curing of concrete.	Cum	5,055	15,340	7,75,38,407
SCHEDULE-2 (b2): CAST-IN-SITU/PRECAST WORK					
10	Providing and laying grade M50/ 20 reinforced cement concrete at all levels for Viaduct & station piers of all size, shapes & heights (standard pier, portal pier & cantilever pier), pier head, shear key, portal beams, pier-arms, corbels, pier-ledge, diaphragms, pedestals, deck slab of all shapes etc. including centering, shuttering, propping, staging, scaffolding, curing, necessary tools, plants, machinery and all related operations etc. using steel shuttering & steel props. Formwork to be designed in such a way that traffic on road is allowed during the work at all times. Rate shall include cost of providing grooves, chamfers, mouldings, cut-outs, necessary fixtures, insert plates, sleeves for various purposes, shear connectors etc. complete as per drawings, specifications and as directed by the Engineer. The rate shall also include preparation of construction joints as per specification and providing approved wire mesh/weld mesh at such locations as approved by Engineer or as shown in drawings. Reinforcement steel shall be paid separately under relevant BOQ item. Rate shall also include cost of using required dosage of admixture in concrete for obtaining required workability as per specification & approval of Engineer.	Cum	5,516	17,794	9,81,53,377
11	Providing and laying grade M50/ 20 reinforced cement concrete at all levels for Viaduct & station piers of all size, shapes & heights (standard pier, portal pier & cantilever pier), pier head, shear key, portal beams, pier-arms, corbels, pier-ledge, diaphragms, pedestals, deck slab of all shapes etc. including centering, shuttering, propping, staging, scaffolding, curing, necessary tools, plants, machinery and all related operations etc. using steel shuttering & steel props. Formwork to be designed in such a way that traffic on road is allowed during the work at all times. Rate shall include cost of providing grooves, chamfers, mouldings, cut-outs, necessary fixtures, insert plates, sleeves for various purposes, shear connectors etc. complete as per drawings, specifications and as directed by the Engineer. The rate shall also include preparation of construction joints as per specification and providing approved wire mesh/weld mesh at such locations as approved by Engineer or as shown in drawings. Reinforcement steel shall be paid separately under relevant BOQ item. Rate shall also include cost of using required dosage of admixture in concrete for obtaining required workability as per specification & approval of Engineer.	Cum	1,449	17,794	2,57,84,875

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S.No.	Activity Description	UOM	Quantity	Rate	Amount
12	Pre-Cast Concrete: Providing M55/20 grade reinforced cement concrete for Providing, casting, pre-stressing and curing precast Standard Pier Caps supporting superstructure, including shear key, pedestals, in-situ connection with pier. The item includes lifting the pier caps from the mould and shifting the same to the stacking yard. The item includes provision of holes for lifting and filling of holes after erection using non-shrink grout. Pre-stressing strand/system, Reinforcement steel, anchorages and sheathing shall be paid separately. Rate shall include cost of using required dosage of admixture in concrete for obtaining required workability as per approval of Engineer and all related operations as required to complete the work as per drawing & specifications. The cost shall be inclusive of the cost of centering, shuttering, scaffolding, providing cut-outs where specified, curing arrangements as required, steam curing arrangement if deemed necessary, all handling etc. complete Cast insitu Pier cap/arm concrete shall be paid as per the rate for item B.1	Cum	3,083	19,167	5,90,95,082
13	Pre-Cast Concrete: Providing M55/20 grade reinforced cement concrete for Providing, casting, pre-stressing and curing precast Standard Pier Caps supporting superstructure, including shear key, pedestals, in-situ connection with pier. The item includes lifting the pier caps from the mould and shifting the same to the stacking yard. The item includes provision of holes for lifting and filling of holes after erection using non-shrink grout. Pre-stressing strand/system, Reinforcement steel, anchorages and sheathing shall be paid separately. Rate shall include cost of using required dosage of admixture in concrete for obtaining required workability as per approval of Engineer and all related operations as required to complete the work as per drawing & specifications. The cost shall be inclusive of the cost of centering, shuttering, scaffolding, providing cut-outs where specified, curing arrangements as required, steam curing arrangement if deemed necessary, all handling etc. complete Cast insitu Pier cap/arm concrete shall be paid as per the rate for item B.1	Cum	1,913	19,167	3,66,61,687
14	Providing and laying grade M50/ 20 reinforced cement concrete at all levels for Viaduct & station piers of all size, shapes & heights (standard pier, portal pier & cantilever pier), pier head, shear key, portal beams, pier-arms, corbels, pier-ledge, diaphragms, pedestals, deck slab of all shapes etc. including centering, shuttering, propping, staging, scaffolding, curing, necessary tools, plants, machinery and all related operations etc. using steel shuttering & steel props. Formwork to be designed in such a way that traffic on road is allowed during the work at all times. Rate shall include cost of providing grooves, chamfers, mouldings, cut-outs, necessary fixtures, insert plates, sleeves for various purposes, shear connectors etc. complete as per drawings, specifications and as directed by the Engineer. The rate shall also include preparation of construction joints as per specification and providing approved wire mesh/weld mesh at such locations as approved by Engineer or as shown in drawings. Reinforcement steel shall be paid separately under relevant BOQ item. Rate shall also include cost of using required dosage of admixture in concrete for obtaining required workability as per specification & approval of Engineer.	Cum	122	17,794	21,77,419

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S.No.	Activity Description	UOM	Quantity	Rate	Amount
15	Providing and laying grade M50/ 20 reinforced cement concrete at all levels for Viaduct & station piers of all size, shapes & heights (standard pier, portal pier & cantilever pier), pier head, shear key, portal beams, pier-arms, corbels, pier-ledge, diaphragms, pedestals, deck slab of all shapes etc. including centering, shuttering, propping, staging, scaffolding, curing, necessary tools, plants, machinery and all related operations etc. using steel shuttering & steel props. Formwork to be designed in such a way that traffic on road is allowed during the work at all times. Rate shall include cost of providing grooves, chamfers, mouldings, cut-outs, necessary fixtures, insert plates, sleeves for various purposes, shear connectors etc. complete as per drawings, specifications and as directed by the Engineer. The rate shall also include preparation of construction joints as per specification and providing approved wire mesh/weld mesh at such locations as approved by Engineer or as shown in drawings. Reinforcement steel shall be paid separately under relevant BOQ item. Rate shall also include cost of using required dosage of admixture in concrete for obtaining required workability as per specification & approval of Engineer.	Cum	197	17,794	35,07,643
16	Providing and laying grade M50/ 20 reinforced cement concrete at all levels for Viaduct & station piers of all size, shapes & heights (standard pier, portal pier & cantilever pier), pier head, shear key, portal beams, pier-arms, corbels, pier-ledge, diaphragms, pedestals, deck slab of all shapes etc. including centering, shuttering, propping, staging, scaffolding, curing, necessary tools, plants, machinery and all related operations etc. using steel shuttering & steel props. Formwork to be designed in such a way that traffic on road is allowed during the work at all times. Rate shall include cost of providing grooves, chamfers, mouldings, cut-outs, necessary fixtures, insert plates, sleeves for various purposes, shear connectors etc. complete as per drawings, specifications and as directed by the Engineer. The rate shall also include preparation of construction joints as per specification and providing approved wire mesh/weld mesh at such locations as approved by Engineer or as shown in drawings. Reinforcement steel shall be paid separately under relevant BOQ item. Rate shall also include cost of using required dosage of admixture in concrete for obtaining required workability as per specification & approval of Engineer.	Cum	3,987	17,794	7,09,47,446
17	Providing M55/20 grade Reinforced cement concrete for pre-cast pre-stressed U-girder of all simply supported spans (straight or tapered) in the casting yard including provision of shear connector for secondary pour concrete (rail plinths), dowels to be provided as per the approved track geometry, including for third rail, additional bars for earthling, bars/strands/hooks for lifting of U-Girder, cutting of bars/strands/hooks after transportation and sealing of lifting recess as specified in drawings, lifting the full spans from the mould and shifting the same to the stacking yard. HOPE debonding pipes to be provided as per GFC. Rate shall include all inserts. Cost shall be inclusive of the cost of centering, shuttering, scaffolding, providing cut- outs where specified, curing arrangements as required, steam curing arrangement if deemed necessary, all handling etc. complete. Pre-stressing strand/system and Reinforcement steel shall be paid separately. Rate shall include cost of using required dosage of admixture in concrete for obtaining required workability as per approval of Engineer, anti-corrosive paints for lifting hooks, insert plates and exposed steel surfaces and all other related operations as required to complete the work as per drawings and specifications. Contractor to provide shop drawing based on approved GAD for dowel alignment, fixtures for cable trays (Electrical and Signals).	Cum	4,288	19,167	8,21,94,621

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S.No.	Activity Description	UOM	Quantity	Rate	Amount
18	Providing and laying M50/20 Grade reinforced cement concrete for precast PSC I-Girder, (pi)/ T-girder (Pre-Tensioned) , for standard/special spans of all types (straight as per approved GAD) in the casting yard including provision of lifting the girders from the mould and shifting the same to the stacking yard. Quoted rate shall be inclusive of all infrastructure in the casting yard, gantry cranes, moulds, casting beds, mobile cranes, stores, concrete batching plant, testing labs, bulk heads, approved curing arrangements as required, all handling etc. complete, 2mm teflon sheet at the end for placing on portal/arrangement for placing bearing with suitable downstand etc. as required and shown in drawing etc. complete. Pre-stressing strand and Reinforcement shall be paid separately under respective BOQ items. Rate shall include cost of lifting hooks and using required dosage of admixture in concrete for obtaining required workability as per approval of Engineer. Note: Type, Size and number of shutter moulds and debonding pipes (HDPE) as per requirement shall be as per the GFC drawings. Rate shall include all inserts.	Cum	237	20,003	47,35,323
19	Providing and laying M50/20 Grade reinforced cement concrete for precast PSC I-Girder, (pi)/ T-Girder, portal beams and pier-arm etc. (Post-Tensioned) , for standard/special spans of all types (straight or curved as per approved GAD), in the casting yard including provision of lifting the girders from the mould and shifting the same to the stacking yard. Quoted rate shall be inclusive of all infrastructure in the casting yard, gantry cranes, moulds, shuttering, casting beds, mobile cranes, stores, concrete batching plant, testing labs, bulk heads, approved curing arrangements as required, all handling etc. complete, 2mm Teflon sheet at the end for placing on portal / arrangement for placing bearing with suitable downstrand etc., as required and shown in drawing etc. complete. Rates shall include Pre-stressing system (Anchorage, sheathing, vent pipe and other accessories) and cost of lifting hooks and using required dosage of admixture in concrete for obtaining required workability as per approval of Engineer.	Cum	6,688	18,540	12,39,99,854

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S.No.	Activity Description	UOM	Quantity	Rate	Amount
20	Providing and laying M40/20 grade reinforced cement concrete for precast parapet , over Deck slab on both side of viaduct, including transition span as per the drawing in all spans (straight or curved), in the casting yard including provision of lifting the parapet from the mould and shifting the same to the stacking yard. Quoted rate shall be inclusive of all infrastructures in the casting yard, gantry cranes, moulds, shuttering, casting beds, mobile cranes, stores, concrete batching plant, testing labs, approved curing arrangements as required. The cost shall be inclusive of shuttering, scaffolding, special adjustable props for alignment of units, moulds, providing cutouts, required dosage of admixture for concrete. Quoted rate shall also inclusive of Loading, transporting precast parapets from casting yard to work site, launching and erection in position using gantry or crane complete with cast in situ stitch concrete of same grade. Bolts & inserts for fixing hand rails will be paid separately under relevant BOQ item. Reinforcement Steel shall be paid separately under relevant BOQ Items.	Cum	54	17,041	9,20,227
21	Providing and laying M35/20 grade reinforced cement concrete for Viaduct and Station structures of all size, shape & heights for crash barrier, Median, entry structure columns, beam, plinth beam, staircase of Stations, lift walls, shell wall, parapets in stations, diaphragms, cross-girder, deck slab of all shapes, curved/shell roofs including centering, shuttering, propping, staging, scaffolding, curing, necessary tools, plants, machinery and all related operations etc. using steel shuttering & steel props. Formwork to be designed in such a way that traffic on road is allowed during the work at all times. Rate shall include cost of providing grooves, chamfers, mouldings, cut-outs, necessary fixtures, insert plates, sleeves for various purposes, shear connectors etc. complete as per drawings, specifications and as directed by the Engineer. The rate shall also include preparation of construction joints as per specification and providing approved wire mesh / weld mesh at such location as approved by Engineer or as shown in drawings. Reinforcement shall be paid separately under relevant BOQ item. Rate shall also include cost of using required dosage of admixture in concrete for obtaining required workability as per specification & approval of Engineer.	Cum	1,889	16,833	3,17,97,460
22	Transporting precast Standard Pier-Caps from the casting yard / storage yard to the work site, erection in position including the cost of all temporary supports, erection equipment, lifting cranes, transporting etc, positioning and fixing on pier with cement concrete of M55/20 grade along with post tensioning as required. The weight shall be calculated assuming concrete density of 2.4t/m3. Shifting within the site/yard is the responsibility of the contractor and shall not be paid separately. Cast insitu connection concrete shall be paid as per the rate for item B.1	MT	12,490	3,444	4,30,18,328

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S.No.	Activity Description	UOM	Quantity	Rate	Amount
23	Transporting precast full spans U-Girder (in Viaduct/Station) of simply supported span from the casting yard to worksite, erection in position including the cost of all temporary supports, erection equipment, lifting cranes (Using Mobile crane having capacity 500MT as per Site requirement), transporting etc, and positioning on bearings etc for viaduct into completed structures conforming to required lines, grades and dimensions complete as per drawings and specifications. The weight shall be calculated assuming concrete density of 2.4t/m3. Shifting within the site/yard is the responsibility of the contractor and shall not be included for payment.	MT	10,721	3,444	3,69,25,590
24	Transporting precast full spans U-Girder (in Viaduct Split flyover/Critical location) of simply supported span from the casting yard to work site, erection in position including the cost of all temporary supports, erection equipment, lifting cranes (using GOLIATH Crane or launching girder as required in Split flyover/Critical location), transporting etc, and positioning on bearings etc for viaduct into completed structures conforming to required lines, grades and dimensions complete as per drawings and specifications. The weight shall be calculated assuming concrete density of 2.4t/m3. Shifting within the site/yard is the responsibility of the contractor and shall not be included for payment.	MT	0	5,226	0
24	Loading, transporting precast I-Girders, (pi)/T-Girder , pier-arm and portal beams (PSC & RCC) from casting yard to work site, launching and erection in position with cranes, including the erection and shifting of launching girder/crane, cost of all temporary supports, erection equipment, transporting, and positioning on bearings etc. The weight shall be calculated assuming concrete density of 2.4t/m3.	MT	17,313	3,672	6,35,77,615
SCHEDULE-2 (b3): STEEL WORKS					

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S.No.	Activity Description	UOM	Quantity	Rate	Amount
25	<p>Providing TMT-500 D grade steel bar reinforcement (conforming to IS:1786, HYSD Fe 500 grade) at all heights & depth including straightening bars, cutting, bending, hooking binding with approved quality 18 gauge G.I binding wire, after placing in position tying, lapping and/or welding wherever required and anchoring to the adjoining members wherever necessary as per drawings (Laps, Hooks, and Wastages shall not be measured and paid) including cost of all materials, bar bending charges, labour, lead & lifts etc., Complete as per specifications and as directed including welding involved towards stray current protection effects as per the system approved by Engineer.</p> <p>Note: (i) 18 gauge GI binding wire (2 ply) in diamond form at each reinforcement junction. (ii) Splices (Laps, couplers, welds etc.) not payable. (iii) Only mechanical coupler to be used for bars dia 20mm and above, couplers are to be used without extra cost. (iv) The cost quoted should cover all types of splices including stiffeners hooks, spacer bar, U- bar, chair, bend deduction as required and nothing extra is payable on this account.</p>	MT	5,875	97,913	57,52,20,398
26	<p>Supplying and threading uncoated stress-relieved low relaxation steel conforming to IS:14268, class-2 in already positioned Precast Pier-arm, precast I-girder,(pi)/T--Girder, portal beams including Providing corrugated 2.3mm (Tolerances + 0.3mm) thick HDPE duct 107mm ID (Tolerances + 1mm), OD 124mm (Tolerances + 1mm) for 19K15 & 90mm ID (Tolerances + 1mm), OD 104mm (Tolerances + 1 mm) for 12K15 with couplers & vent pipes, spacers, anchorages, stressing using 19K15 or 12K15 system or any other approved pre-stressing system and grouting as per approved methodology including water testing, epoxy protection of anchorages, related operations to complete the work, with all lead and lift and as per specifications. This item shall include Providing and fixing all Strands, Corrugated HDPE Duct (including blister portion) for Laying the Strands, Required Anchorages for live & dead end and at blister portion for future pre-stressing, Stressing up to required level using all tools and equipment's & consumables. After stressing is completed, the voids in all ducts are to be grouted with non-shrink cement grout, and filling of all recess with concrete with adequate reinforcement as per drawing & specifications, all complete, as directed by the engineer.</p>	MT	460	2,01,640	9,26,87,277
27	<p>High Tensile Prestressing Steel(viaduct) Supplying of uncoated stress-relieved low relaxation steel strands conforming to IS:14268, class-2 for pretension of precast full span U-girders, I, (pi)/T Girders (all types of spans including spacers, stressing of strands, protection of exposed cut-strands, anti-corrosive paints, HDPE debonding tubes at ends of strands if required, and all related operations to complete the work for viaduct. HDPE debonding tubes for prestressing strands (to be cut-off flush to concrete after casting), epoxy based sealing compound at edges of strand and epoxy putty to avoid slurry ingress during concreting. The quantity given is the net length of tubes without extra tube length required during construction. Rate includes supply, fixing and filling of HOPE tube with grease as specified in ASTM.</p>	MT	158	2,11,976	3,35,73,092

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S.No.	Activity Description	UOM	Quantity	Rate	Amount
28	<p>Providing, fabricating and erecting structural steel for hand railing and other structural members for viaduct including transition span consisting of tubular and rolled sections profiled to require shape, base plates, strips and flats for structural and general engineering purposes with welded hold fasts for walk-way, earth terminal plates, insert plates with welded hold-fasts, internal threaded sleeves including MS bolts Confirming to IS-3757:1985 (Reaffirmed:2008)& IS-4000:1992 (reaffirmed:2013) (Code of practice for high strength bolts in steel structures) tightened by Torque wrench and primer coat and aluminium paint as per specification and drawing, with all lead and lifts and as per the directions of engineer.</p> <p>The rate shall also include required surface preparation (sand blasting). Painting of steel sections shall be done as below.</p> <p>(a). First coat- Primer to IS:5666.</p> <p>(b) Second coat- Zinc chromium paint to IS:104</p> <p>(c) Third & fourth coat- Aluminium paint to IS:2339</p>	MT	31	1,27,726	39,51,919
29	<p>Supply, fabrication, transportation and erection of fabricated steel girder work of Grade E450BR confirming to IS 2062-2011 (with all latest amendments) including, painting, fully killed and fully normalized at appropriate location using various structural steel sections including MS-plates, etc. as per approved drawing for composite girders including cutting, bending, drilling holes with necessary field rivets welding HSFG bolts tightened by Torque wrench as per drawings supply of necessary templates etc. complete for fixing accessories such as bolts and nuts, etc. Complete duly providing necessary scaffoldings arrangements, temporary staging and metalizing the girders in accordance with the Indian Railway Bridge manual and any other incidental work as required with all leads and lifts, etc. compete and as directed.</p>	MT	759	2,11,376	16,03,92,397
SCHEDULE-2 (b4): OTHER WORKS					
30	<p>Providing temporary barricade of 2m height of plain MS sheet 16 Gauge fixed with steel frame as per drawing, painting (including primer of approved quality) with synthetic enamel paint of approved colour, quality and brand, writing lettering and logo of Metro including maintenance of the same duly cleaning the same on fortnightly basis and painting if required, arrangement for blinker lights on barricades during night as per requirement and as per the instruction of the engineer. Barricading should be rugged. During the construction, barricading has to be kept continuously. Nothing extra will be paid for dismantling and re-erecting the barricades anywhere on the stretch. There should not be any opening at the end of barricade except at locations approved by Engineer</p>	Rm	2,809	5,424	1,52,35,097
31	<p>Deployment of adequate manpower (Traffic marshals) for management of traffic at intersection, junctions, traffic diversions etc. at various levels to the complete satisfaction of local traffic police and as directed by engineer. Marshals daily shift wise attendance will be maintained and checked by Engineer, will be basis for the payment.</p>	Man Day	4,264	761	32,46,288

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S.No.	Activity Description	UOM	Quantity	Rate	Amount
32	Boring of 150 mm dia. (confirmatory bore holes), in all types of soil at selected Pier locations (Locations to be decided by the Engineer) up to 3m in hard rock or 30m boring whichever is earlier and collecting core samples in rock for determination of core recovery, RQD and carrying out compressive strength test on rock samples . The rate inclusive of boring in soil, conducting SPT and collecting samples at 3m depth intervals and submitting bore log reports with soil classifications/SPT, Drilling 3m in hard rock with double barrel core for obtaining samples for testing of core recovery, RQD and compressive strength as per standard practice, Preparation and submission of report containing core recovery, RQD, Compressive strength at Hard Rock Locations with all lead and lifts and as per the directives of Engineer with in three to six months of possession of site by Contractor.	Rm	2,145	2,538	54,44,540
33	Diagonal Cross trenching works for identifying underground utility at every Pier locations to the required length, width and depth, as per drawing, which includes excavation in all types of soil, hard soil, rock, footpath, bitumen road, concrete road, medians etc. cutting of all types road surfaces and backfilling the same with available excavated earth. The rate includes surveying and taking coordinates of the existing utility and submitting the reports (hard & soft copy) of the same as per the directions of the Engineer.	Cum	3,128	639	19,98,068
34	Design, manufacture, supply & installation of the approved expansion joint (Omega Seal) at the site at track level under the supervision of manufacturer's representative as per specification and expected movement (25 to 50 mm) as mentioned in relevant GFC drgs.	Rm	0	12,135	0
34	Providing and Fixing the Sealing Gasket for Gap Between U girders , With EPDM Material, Hard Wearing, Temperature resistant (-30deg to +120 deg), Easy installation and Secure fixing and the Joint shall be Water tight. All as per Drawings and Specifications. Cost inclusive of testing and fixing with all necessary fixtures and epoxy Adhesive etc Complete.	Rm	542	2,991	16,20,769
35	Design, manufacture, supply & installation of the approved expansion joint (Strip Seal) at the site at track level under the supervision of manufacturer's representative as per specification and expected movement (25 to 50 mm) as mentioned in relevant GFC drgs	Rm	677	17,745	1,20,18,888
36	Supply and fixing in position true in line & level, Elastomeric bearing both horizontal & vertical type of approved make, placing and fixing in location as per specification/drawings certifying to EN1337 and as directed by the engineer with CE Certification.	Cucm	1,22,36,800	1.50	1,83,02,902
37	Supplying to site and placing of POT Cum PTFE Bearing and its components in position during casting of pier/ pedestal and superstructure, including, grouting of holes for anchor bolts and underside of base plate with approved non-shrink cementitious grout as per specification and drawings. Note: Quoted price shall hold good for forces and movements varying by +/- 25% for those minimum loads/ forces indicated.				
	Free POT Bearing: V = 426 MT (normal) 460 MT (seismic). Longitudinal Translation +50mm / -25mm.Trans Translation +10mm/-10mm		28	1,31,954.14	36,94,716
	Fixed POT Bearing : V =425 MT, Hr= 45 MT (Normal) V = 460 MT, Hr=120MT (seismic)				

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S.No.	Activity Description	UOM	Quantity	Rate	Amount
	Longitudinal Guide POT Bearing: V = 425 MT, Hr= 45 MT (Normal) . V = 460 MT, Hr=120MT (seismic) . Longitudinal Translation +50mm/-25mm				
	Transverse Guide POT Bearing: V = 426 MT, Hr= 45 MT (normal). V = 460 MT, Hr= 120 MT (seismic). Trans Translation +10mm/-10mm				
38	Providing & fixing UPVC pipes outside the piers and pier cap/pier arm/ portal of OD 200mm, 6.00kg/Sqcm working pressure, approved make with pipe fittings (door bend, door tee, plain tee, plain bend, end cap, reducer, collar, etc.), including cost of fixing arrangement, such as clamp, anchor fasteners etc. with concrete structure, cost of scaffolding, cost of all materials, labour charges, HOM of equipment and testing complete as per drawings & specifications.	Rm	539	2,161	11,65,680
39	Providing & fixing PVC pipes of OD 200mm, 6.00kg/ Sq cm working pressure, approved make with pipe fittings (door bend, door tee, plain tee, plain bend, end cap, reducer, collar, etc.), Including cost of fixing arrangement with concrete structure, cost of all materials, labor charges, HOM of equipment and testing complete as per drawings & specifications.	Rm	0	1,372	0
39	Fabrication & Supply of drainage spout hot dip galvanized of dimension 300mm x180mm with MS Flat 50mmx6mmx100mm long with gratings of MS Flat 25mmx6mm with spacing of 50mm c/c and MS pipe 122mm dia. verticals as per drawing including installation of the spout with all tools, plants, leads and lifts and in position in complete and as directed by the Engineer.	Nos	108	1,850	1,99,823
40	Clearing and grubbing road land including uprooting rank vegetation, grass, bushes, shrubs, saplings and trees girth upto 300mm. Removal of stumps of trees cut earlier and disposal of unserviceable materials and stacking of serviceable material to be used or auctioned, with all lead and lifts including removal and disposal of top organic soil not exceeding 150mm in thickness including all labour, hire charges of all machineries etc., complete with all lead & lifts. By Mechanical Means or any other means.	Ha	0.48	29,373	13,963
41	Excavation for roadwork in all types of soil by mechanical means including cutting and loading to tippers, trimming bottom and side slopes, in accordance with requirements of lines, grades and cross section, and transportation with all & lift lead complete as per specifications.	Cum	1,451	187	2,71,317
42	Construction of sub grade and earthen shoulder with approved material Gravel/Murum with all lifts & lead, transporting to site, Spreading, grading to required slope and compacted to meet requirement of table No.300-2 complete as per specification, including cost of earth, watering charges & compaction by vibratory roller to 97% of modified proctors density MORTH Specification No .305.	Cum	10,485	553	58,02,419
43	Compaction of original ground by mechanical means including filling in depression occurring during rolling including cost of all labour, HOM complete as per specifications. MORTH/Chapters 3.	Sqm	4,754	9	42,662
44	Construction of granular sub-base Grading-V as Sub-base and drainage layer by providing coarse graded crushed stone aggregates of granite/trap/basalt material, mixing in a mechanical mix plant at OMC, Carriage of mixed material to work site, spreading in uniform layers with motor grader on prepared surface and compacting with vibratory power roller to achieve the 98% proctor density, complete as per specifications. Clause 401 of MORTH V revision	Cum	713	2,984	21,27,782

Construction of double-decker rail cum road flyover from Ch. 14+562.903 to Ch. 15+680.447 including Mathikere Station Structural Works

S.No.	Activity Description	UOM	Quantity	Rate	Amount
45	Providing, laying, spreading and compacting crushed stone aggregates of granite/trap/basalt to Wet Mix Macadam specifications including pre mixing the material with water at OMC in mechanical mix plant carriage of mixed materials by tipper to site, laying in uniform layers with paver in sub-base/base course on well prepared surface and compacting with vibratory roller to achieve the desired density complete as per specifications, MORTH specification No.406	Cum	1,188	2,993	35,56,969
46	Providing and applying primer coat with S.S bitumen emulsion on prepared surface of granular base such as WMM including cleaning of road surface and spraying primer at the rate of 0.60kg per sqm using mechanical means complete as per specifications. Clause 502 of MORTH V revision	Sqm	4,754	54	2,55,974
47	Providing and applying tack Coat using 80/100 grade bitumen (VGIO) on the bituminous surface at the rate of 0.25Kg per Sqm, heating bitumen in boiler fitted with spray set (excluding cleaning of Road Surface) as per Specifications. Clause 503 of MORTH V revision.	Sqm	5,894	22	1,32,233
48	Providing and laying 25 mm thick mastic asphalt wearing course with paving grade bitumen meeting the requirements given in table 500-29, prepared by using mastic cooker and laid to required level and slope after cleaning the surface, including providing antiskid surface with bitumen precoated fine grained hard stone chipping of 13.2 mm nominal size at the rate of 0.005 m3 per 10 m2 and at an approximate spacing of 100 mm c/c in both directions, pressed into surface when the temperature of surfaces is not less than 1000 degrees Centigrade, protruding 1 mm to 4 mm over mastic surface, all complete as per clause 516	Sqm	5,687	1,391	79,08,167

Construction of double-decker rail cum road flyover from Ch. 14+562.903 to Ch. 15+680.447 including Mathikere Station Structural Works

S.No.	Activity Description	UOM	Quantity	Rate	Amount
49	Providing and laying bituminous concrete using crushed aggregates of specified grading, premixed with bituminous binder and filler, transporting the hot mix to work site, laying with a paver finisher to the required grade, level and alignment, rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction in all respects as per specifications . Clause 507 of MORTH V revision. Using 40/60 TPH capacity H.M .P with sensor paver Gr-II with 5.4% VG-30 Bitumen. (In case Mechanical Paver is used, Rs.46.00/cum in the unit rate shall be deducted)	Cum	227	13,505	30,72,097
50	RE WALL - Levelling Pad - PCC	Cum	50	9,212	4,60,945
51	RE WALL - Levelling Pad - RCC	Cum	175	15,340	26,86,630
52	Reinforced earth structure: Assembling, joining and laying of reinforcing elements of steel/ aluminium strips/ polymeric strips as per cl.3102 (MORTH specification) and facing elements of RCC of cl. 3104 (MoRTH specification) including M25 concrete for foundation, reinforcement for the foundation, excavation, filter media behind REwalls, including loading, unloading, transportation, leads, lift, complete. (Payment shall be - made on the basis of facing elements of RCC in Sqm).	Sqm	2,790	7,936	2,21,42,654
	Total Amount (Sch A+B+C+D)				1,99,55,30,709

SUMMARY BILL OF QUANTITIES (BOQ) FOR ELEVATED STATION BUILDING AT MATHIKERE @ Km -15.700

SL. No.	Schedule / DESCRIPTION	Total amount (In Rs.)
2 (c1)	SCHEDULE-A: PRELIMINARIES AND GENERAL	₹ 15,35,159
2 (c2)	SCHEDULE-B: EARTHWORK	₹ 23,28,586
2 (c3)	SCHEDULE-C: PILE FOUNDATION / OPEN FOUNDATION (Pile Cap, Entry Exit Footing, Staircase, Escalator, FOB)	₹ 3,31,53,309
2 (c4)	SCHEDULE-D: CAST-IN-SITU/ PRECAST WORKS/ REINFORCED CONCRETE WORKS	₹ 3,14,35,017
2 (c5)	SCHEDULE-E: STEEL WORKS (RCC STEEL REINFORCEMENT , PRESTRESSING STEEL & STRUCTURAL STEEL including FOB)	₹ 12,06,55,086
2 (c6)	SCHEDULE-F	
2 (c6-1)	Other Works	₹ 78,10,279
2 (c6-2)	Miscellaneous works of station building	₹ 2,74,982
2 (c6-3)	Sheeting works of station Roof and FOB	₹ 1,04,17,292
	Sub Total A-F	₹ 20,76,09,712
2 (c7)	Architectural Cost	₹ 7,23,17,354
2 (c8)	Façade Works	₹ 1,70,68,389
2 (c9)	Public Health Engineering (Civil)	₹ 33,31,343
2 (c10)	ELECTRICAL WORKS	₹ 7,90,55,742
2 (c11)	FIRE FIGHTING WORKS	₹ 1,72,65,797
2 (c12)	HVAC WORKS	₹ 55,67,809
	Grand Total	₹ 40,22,16,145

Structural Cost Estimation for Mathikere Station (Platform 205 m/concourse 205 m)					
Sl.No.	Description	Units	Quantity	Rate (Excl. GST)	Amount (₹)
	SCHEDULE-A: PRELIMINARIES AND GENERAL				
1	<p>During the contract period including the extended contract period till the final completion of the work, the contractor shall provide Surveying by establishing DGPS control points and TBMs, Marking of alignment and pier locations, vertical & horizontal clearances for the elevated section including modifications, if any, as per drawings. No extra amount will be paid to re- do or to re-establish any of the survey points. The control points are to be fixed using DGPS double frequency and the accuracy of 1 in 50,000 or better are to be assured.</p> <p>Note: The payment schedule for the item shall be as follows: (i) Payment at 25% of total cost of the item on checking and verification of all control points and submission of drawings.</p> <p>(ii) Payment at 70% of total cost of the item equally distributed over the duration of the contract period and will be paid on pro-rata basis.</p> <p>(iii) Payment at 5% of total cost of the item on satisfactory completion of work along with the final bill.</p>	Km	0.21	471873.80	99,093.50
2	<p>Providing temporary barricade of 2m height of plain MS sheet 16 Gauge fixed with steel frame as per drawing, painting (including primer of approved quality) with synthetic enamel paint of approved colour, quality and brand, writing lettering and logo of K RIDE including maintenance of the same duly cleaning the same on fortnightly basis and painting if required, arrangement for blinker lights on barricades during night as per requirement and as per the instruction of the engineer. Barricading should be rugged and fixed/anchored in ground firmly during the construction, barricading has to be kept continuously. Nothing extra will be paid for dismantling and re-erecting the barricades at a different location. The barricades has to be relocated as the work progresses and as directed by Engineer.</p> <p>Note: (i) Barricades on either side shall be measured individually.</p> <p>(ii) Once barricade has been provided and work started, removal of barricade is not permitted till completion of pile, pile cap, pier and pier caps, portal beams, segment (U-Girder/BOX segments) erection, I girder erection, till completion of construction.</p> <p>(iii) While erecting barricade, the bottom gap between barricade and road/ground should be plugged with cement concrete from inside.</p> <p>(iv) There should be minimum openings at the end of barricade to allow access of trucks / lorries and machine to site work area.</p> <p>(v) Adequate blinking lights on barricade during night time must be ensured. The cost of this item should include provision for power pack / Generator set etc. so as to ensure the blinking of lights in night time as long as barricades are in position at the work spot.</p> <p>(vi) After completion of the entire work, the barricades shall be the property of the contractor. (vii) Payment shall be made at 70% on erection of barricade and 30% on removal of barricade as per the instructions of Engineer.</p> <p>(viii) If the cleaning is not done including removal of posters regularly, a recovery shall be made at the rate of 0.1% of the accepted rate of item per fortnight on pro-rata basis of length not cleaned.</p>	Rm	277.00	5184.35	14,36,065.46
			Total Schedule-A		15,35,159
	SCHEDULE-B: EARTHWORK				

Structural Cost Estimation for Mathikere Station (Platform 205 m/concourse 205 m)					
Sl.No.	Description	Units	Quantity	Rate (Excl. GST)	Amount (₹)
1	Clearing and grubbing land , embankment/cutting area, existing slope and clearing of garbage from the existing slope, drain before starting the earthwork including uprooting rank vegetation, grass, bushes, shrubs, saplings and trees girth upto 300mm. Removal of stumps of trees cut earlier and disposal of unserviceable materials and stacking of serviceable material to be used or auctioned, with all lead and lifts including removal and disposal of top organic soil not exceeding 150mm in thickness including all labour, hire charges of all machineries etc., complete with all lead & lifts. By Mechanical Means or any other means.	Sqm	2736.00	3.27	8,946.72
2	Excavation exceeding 4 m depth, for open foundations, combined footing, underground water tank. etc., in all types of soil, soft rock, hard rock, boulders, old structures below ground as encountered of all types & thickness, dismantling of the other structures ,dead utilities and backfilling using good earth including watering ,compacting with a vibratory plate compactor complete as per specifications and loading, leading and disposal of surplus excavated material using covered trucks to contractor's dumping yard and as directed by the Engineer so as to ensure that during transportation, the carried material does not spill out with all leads and lifts, including all supports (by sheet pile/shoring/strutting to retain and support the soil/slopped Excavation or other methods) for stability including dewatering, pumping and bailing out of water. Note: This item shall be measured on basis of area of PCC for pile cap /foundation multiplied by the excavation depth beyond 4m.	Cum	216.19	2457.13	5,31,202.18
3	Providing and laying 300mm thick (average) Dry Stone flooring with boulders of not less than 35kg each in weight, hand packed with surface levelled off to the correct section with hammer dressing as necessary on the ground including filling the gaps with quarry spalls and ordinary sand complete including cost of supply of all materials, labour, lead, lift, tools, plants, crossing of tracks and the like as per drawing and technical specification as directed by Engineer in Charge.	Cum	556.80	2432.44	13,54,382.97
4	Supply and laying of coarse sand including consolidation with all labour, lead,lift, tools, plants, crossing of tracks as per drawing and technicalspecification as directed by the Engineer in charge in case loose slush is encountered at site of foundation before casting the foundation or laying the filtering media.	Cum	278.40	1559.10	4,34,053.91
			Total Schedule-B		23,28,586
	SCHEDULE-C: RCC WORK FOR PILE FOUNDATION / OPEN FOUNDATION				
1	Providing & laying plain cement concrete M20 grade using 20mm maximum nominal size aggregates in open foundation, stepped foundation, combined footing, raft foundation, retaining walls, return walls, walls, U/G water tank, culverts, drains, slab on grade, tie beams, basements, leveling course or any other works as directed by the Engineer, etc. rate is inclusive of required dosage of admixture in concrete for obtaining required workability and as per specifications, approved drawings, laid in layers not exceeding 15cms thick layers, as per drawing including cost of all material, form work/ shuttering, dewatering during concreting, vibrating, compacting, curing, hire charges of machinery, all lead and lift, loading, unloading, transporting, stacking, finishing the exposed faces etc., complete. For PCC	Cum	92.80	7904.64	7,33,550.59

Structural Cost Estimation for Mathikere Station (Platform 205 m/concourse 205 m)					
Sl.No.	Description	Units	Quantity	Rate (Excl. GST)	Amount (₹)
2	Providing & laying M35/20 grade, reinforced cement concrete using Portland slag cement (Directley from manufacture or blending of OPC+GGBS) for following concrete works: Pile cap, Open Foundation /stepped foundation /Raft, Combined Footing, Columns, Grade beam, monopile pedestals, U/G water tank and Structures of road widening works such as foundation, substructures and superstructures of culverts, retaining walls, return walls, precast/cast-in-situ culvert deck slabs, road median, drains, etc. including excavation up to 4.0 m from lowest ground level through existing water bound macadam road / bituminous road / concrete road /soil/murrum/ hard rock /soft rock old structures below ground as encountered of all thicknesses ,dismantling other structures, dead utilities, dewatering, pumping and bailing out water, strutting and shoring, formwork, backfilling in foundation with good earth/quarry dust/sand watering, compacting with a vibratory plate compactor complete as per specifications. The Cost shall also include cutting/chipping of pile up to cut off level or up to good concrete and built up of pile up to required level. The cost includes loading, unloading and disposal of surplus excavated material along with pile heads using covered trucks to contractor's dumping yard with all leads and lifts and as directed by the Engineer. The contractor has to ensure that during transportation, the carried material does not spill out. Reinforcement steel shall be paid separately under relevant item. Rate shall include cost of using required dosage of admixture in concrete for obtaining required workability as per approval of Engineer, curing of concrete. Note: 10% of the amount shall be withheld. Out of this, 5 % of the amount shall be released after disposal of excavated material including pile heads at contractor's dumping yard and 5% of the amount shall be released after completing road restoration works on pile caps. Payment for road restoration works will be paid under relevant items of BOQ.	Cum	2517.29	12878.83	3,24,19,758.89
	Entry & Exit-2				
			Total Schedule-C		3,31,53,309
	SCHEDULE-D: CAST-IN-SITU/ PRECAST WORKS/ REINFORCED CONCRETE WORKS				

Structural Cost Estimation for Mathikere Station (Platform 205 m/concourse 205 m)					
Sl.No.	Description	Units	Quantity	Rate (Excl. GST)	Amount (₹)
1	<p>Providing and laying grade M50/20 of reinforced cement concrete at all levels including the cost of cement, fine aggregates, coarse aggregates for Viaduct & piers of all size, shapes & heights (standard pier, portal pier & cantilever pier), pier head/Cap, shear key, portal beams, pier-arms, corbels, pier-ledge, diaphragms, pedestals,deckslabs over pre-cast I girders/steel girders and cross girdrs and stich concrete, parapet, etc., including centering, shuttering, propping, staging, scaffolding, curing, necessary tools, plants, machinery and all related operations etc. using steel shuttering & steel props. Form work to be designed using of shutter vibrators & traffic on road and IR track is allowed during the work at all times. Rate shall include cost of providing grooves, chamfers, mouldings, cut-outs, necessary fixtures, insert plates, sleeves for various purposes, shear connectors & providing of K-RIDE logo on every pier etc., complete as per drawings, specifications and as directed by the Engineer. The rate shall also include preparation of construction joints as per specification and providing approved wire mesh/weld mesh at such locations as approved by Engineer or as shown in drawings. Reinforcement steel shall be paid separately under relevant BOQ item. Rate shall also include cost of using required dosage of admixture in concrete for obtaining required workability as per specification & approval of Engineer.</p> <p>Note:(i) No cold joints are permitted. However cold joint at the junction of “pile cap-pier" and at the top surface of the starter of pier (which is normally less than 2m height), cold joints are unavoidable. In that case old concrete surface should have adequate shear key depressions, reinforced dowels and a layer of concrete bonding compound. Concrete retarder compound may also have to be used at the concrete surface of starter pier above the pile cap. The rate is inclusive of all above bonding agents/methods. However, if any additional cold joints are unavoidable due to the reasons not beyond the control of contractor, all above bonding measures shall be on account of the contractor.</p> <p>(ii) The cost is included for provision of HDPE pipes for pre-stressing system in piers as per drawings complete.</p>	Cum	156.38	14,439	22,58,042.65
2	<p>Providing and laying M50/20 Grade reinforced cement concrete for precast PSC I-Girder, portal beams and pier-arm etc. (Post-Tensioned), simply supported standard/special spans of all types (straight or curved as per approved GAD), in the casting yard including provision of lifting the girders from the mould and shifting the same to the stacking yard. Quoted rate shall be inclusive of all infrastructure in the casting yard, gantry cranes, moulds, shuttering, casting beds, mobile cranes, stores, concrete batching plant, testing labs, bulk heads, approved curing arrangements as required, all handling etc. complete, 2mm Teflon sheet at the end for placing on portal / arrangement for placing bearing with suitable downstrand etc. complete. Rate shall include Pre-stressing system (Anchorages, sheathing, vent pipe and other accessories) and cost of lifting hooks and using required dosage of admixture in concrete for obtaining required workability as per approval of Engineer.Note: (i) Type, Size and number of shutter moulds shall be as per the GFC drawings and nothing extra is payable.</p> <p>(ii) As per the drawing, necessary fixtures for pre-stressing system are to be embedded in concrete while casting of Girder.</p> <p>(iii) Reinforcement shall be paid separately under respective BOQ items.</p>	Cum	702.36	16,443	1,15,49,152.72
3	<p>Loading, transporting precast I-Girders / T-Girder, pier-arm and portal beams (PSC & RCC) from casting yard to work site, launching and erection in position with cranes, including the erection and shifting of launching girder/crane, cost of all temporary supports, erection equipment, transporting, and positioning on bearings etc. The weight shall be calculated assuming concrete density of 2.5 t/m³.</p>	MT	1755.9	3349.06	58,80,584.15

Structural Cost Estimation for Mathikere Station (Platform 205 m/concourse 205 m)					
Sl.No.	Description	Units	Quantity	Rate (Excl. GST)	Amount (₹)
4	Providing and laying M35/20 grade reinforced cement concrete, using sacrificial shuttering for all heights, concourse level slab, Rail level slab, platform slab, in between pretensioned and post tensioned I-girders in al stations, viaduct portals , steel portals, composite Girders etc. transition span and viaduct line including desing of sacrificial shuttering along with method statment, desing shall be approved by engineer, supplying, fixing, positioning pre embaded studs in concrete, structural decking panel (sacrificial shuttering of approved make) with yield strength of 500MPA galvanized steel (min 275gm/sqm Zinc coated) as per IS 277 or equivalent standard and all related operation. The structural decking panel shall have nominal effective cover width, nominal 51mm deep ribs with at nominal 316mm center to center with the embossment (Shear grove) on top and side of ribs for better composite action. Including the shear stud, universal beam, edge form, steel bracket, screws and fasteners, sealant, insulation, closures, edge angles, hoop iron and labor and machinery cost for erection and placing in position etc. complete as per the drawing and specification and as directed by the engineer. Rate shall include cost of providing grooves, chamfers, mouldings, cutouts necessary fixtures, inserts plates, sleeves for various purposes, shear connectors etc. complete as per drawings, specifications and as directed by the Engineer. The rate shall also include prepration of construction joints as per specifications and providing approved wire mesh/weld mesh at such location as approved by Engineer or as shown in drawing. reinforcement shall be paid seprately under relavent BOQ item. Rate shall also include cost of using required dosage of admixture in concrete for obtaining required workability as per specification and approval of Engineer.	Cum	578.80	20295.85	1,17,47,237.98
			Total Schedule-D		3,14,35,017
	SCHEDULE-E: STEEL WORKS (RCC STEEL REINFORCEMENT , PRESTREESING STEEL & STRUCTURAL STEEL)				
1	Providing TMT-500 D grade steel bar reinforcement (conforming to IS:1786, HYSD Fe 500 grade) at all heights & depth including straightening bars, cutting, bending, hooking binding with approved quality 18gauge G.I binding wire, after placing in position tying, lapping and /or welding wherever required and anchoring to the adjoining members wherever necessary as per drawings (Laps , Hooks and Wastages shall not be measured and paid) including cost of all materials, bar bending charges, labour, lead & lifts etc., Complete as per specifications and as directed including welding involved towards stray current protection effects as per the system approved by Engineer. Note:(i) 18 gauge GI binding wire (2 ply) in diamond form at each reinforcement junction. (ii) Splices (Laps, couplers, welds etc.) not payable. (iii) Only mechanical couplers to be used for bars dia 20mm andd above, couplers are to be used without extra cost. (iv) The cost coated should cover all types of splices including stiffners hooks, spacer bar , U bar, chair, bend deduction as required and nothing extra is payable on this account.	MT	382.45	92582.17	3,54,08,140.35

Structural Cost Estimation for Mathikere Station (Platform 205 m/concourse 205 m)					
Sl.No.	Description	Units	Quantity	Rate (Excl. GST)	Amount (₹)
2	Supplying, placing and threading uncoated stress-relieved low relaxation steel (HTS) conforming to IS :14268 (class -II) in already positioned pre-cast pier-arm, pier cap, precast I girder, portal beams including Providing corrugated 2.3 mm (Tolerances + 0.3 mm) thick HDPE duct 107 mm ID (Tolerances + 1 mm), OD 124 mm (Tolerances + 1 mm) for 19K15 & 90 mm ID (Tolerances + 1 mm), OD 104 mm (Tolerances + 1 mm) for 12K15 with couplers & vent pipes, spacers, anchorages, stressing using 19K15 or 12K15 system or any other approved pre-stressing system and grouting as per approved methodology including water testing, epoxy protection of anchorages, related operations to complete the work, with all lead and lift and as per specifications. This item shall include Providing and fixing all Strands, Corrugated HDPE Duct (including blister portion) for Laying the Strands, Required Anchorages for live & dead end and at blister portion for future pre-stressing, Stressing up to required level using all tools and equipment's & consumables. After stressing is completed, the voids in all ducts are to be grouted with non-shrink cement grout, and filling of all recess with concrete with adequate reinforcement as per drawing & specifications, all complete, as directed by the engineer. Note: For payment, only pre-stressing strand (weight of pre-stressing strand, final in place) will be measured of individual girder average straight length.	MT	35.12	176497.20	61,98,195.49
3	Structural steel work for station: Providing, fabricating to required profile and shape, transporting, erecting and fixing in position all levels of steel works confirming to IS:2062 grade E350 A including procurment and testing of all raw steel materials, HSFG bolts, all types of nuts and bolts as required (confirming to IS 3757:1985 (Reaffirmed: 2008) & IS 4000:1992 (Code of practise for High strength bolts in steel structures) and washer, fasteners, fabrication, joining, welding (confirming to IS:816:1969 and IS 9595:1996), treading, sleevesetc., including allowance for all types of wastage, straightening, cutting, bending of section wherever specified, drilling holes, bolting provision of necessary tools, testing etc. complete The rate shall aslo include required surface prepration (sand/abrasive blasting as per ISO:8501-1:1998) including application of zinc Epilux or equivalent primers, and two coats of poly siloxane paint as per specifications. The rate shall also include supplying and providing detailed fabrication drawings based on the GFC drawings, required for all permanent and temporary strctures and their Engineers, prior to execution. The rate shall aslo include provisoin and installation of base plate, anchor bolts (for payment measured in tones) etc. All as per relavent drawings, specifications in directions of Engineer using standard plate sections, rolled sections, Like angles, channels, I sections, T sections, C sections, H Sections and light gauge steel sections confirming to IS:811-1987 (Specification for cold formed light gauge structural steel sections), hollow square/ rectangle sections(confirming to IS:4923-1997 (reaffirmed 2009) Hollow steel sections for structural use-specification), Hollow round sections confirming to IS 1161:2014 (steel tubes for structural preposes-specifications) etc., welded and built.	MT	555.45	142314.79	7,90,48,750.11
			Total Schedule-E		12,06,55,086
F1	SCHEDLE-F: OTHERS WORKS				
1	Deployment of adequate manpower (Traffic marshals) for management of traffic at intersection, junctions, traffic diversions etc. at various levels to the complete satisfaction of local traffic police and as directed by engineer. Marshals daily shiftwise attendance will be maintained and checked by Engineer, will be basis for the payment.	Man Day	2340.00	792.97	18,55,552.45

Structural Cost Estimation for Mathikere Station (Platform 205 m/concourse 205 m)					
Sl.No.	Description	Units	Quantity	Rate (Excl. GST)	Amount (₹)
2	Submitting color photographs of the works as directed by the engineer at intervals as instructed by the engineer. One set shall comprise of 25 photographs in 3 copies each of size not less than 225mm x 175mm each in album form duly bound, apart from 3 soft copies of all photographs on DVD. The photographs chosen should cover important activities of the work.	Set	13.00	2278.29	29,617.82
3	Supply of video DVDs of 180 minutes duration comprising one master copy and two extra copies duly edited titled showing the progress of works and methodology and at intervals as directed by the Engineer. One set consists of one master copies and two extra copies.	Set	13.00	10428.09	1,35,565.21
4	Supply and fixing in position true in line & level, Elastomeric bearings both horizontal and vertical type of approved make, placing and fixing in location as per specification/ drawings certifying to EN1337 and as directed by the engineer with CE Certification.	Cucm	1440000	1.43	20,53,674.91
5	Drilling 7 1/2 " and Fixing Borewell at Staion Loaction as approved by Engineer and Employer for upto 1500ft depth with MS Casing pipe and Approved IS Submersible pumpsand other acessories., for Ststion Building	Ft	1500.00	287.01	4,30,521.61
6	Desing, manufacture, supply & installation of the approved expansion joint (Omega Seal) at the site at track level under the supervision of manufacture's representative as per specification and expected movement (25 to 50mm) as mentioned in relevant GFC drawings.	Rm	144	11277.52	16,23,962.44
7	Providing and laying water proofing treatment to the Rafts, Below grade slab, Lift pits, water retaining structures with fully bonded High Density Polyethylene Membrane (HDPE) of 1.2mm composite thickness and having tensile strength of >25 MPa (as per ASTM D 412), elongation of >500% (as per ASTM D 412), puncture resistance of >1000N (as per ASTM E 154), peel adhesion to concrete >1200N/m (as per ASTM D 903), hydrostatic head resistance >70m (as per ASTM D 5385). The system should be fully bonded to the RCC thereby conforming to IS 16471:2017 requirements of UG waterproofing structures. The membrane should be minimum 2.4m wide to reduce the number of joints with minimum 75mm factory made selvedge's and comprising of an HDPE layer and a pressure sensitive adhesive layer which is covered by a weather proof protective and trafficable granular layer to protect selfadhesive polymer layer, etc, including surface preparation completely as per specification & with a 10 years warranty on product & work from certified manufacturers as per the direction of the Engineer In charge.	Sqm	2011.38	789.70	15,88,386.79

Structural Cost Estimation for Mathikere Station (Platform 205 m/concourse 205 m)					
Sl.No.	Description	Units	Quantity	Rate (Excl. GST)	Amount (₹)
8	Providing waterproofing & durability enhancing admixture with approval from MORT&H for use on road & bridge projects with IRC accreditation & shall possess CE approval as per EN934-2. Material must fulfil the requirements of ACI-212-3R-10 Chapter 15 and fall under PRAH (permeability reducing admixtures for hydrostatic conditions) and must reduce coefficient of permeability of concrete by more than 90% when compared to control concrete and tested as per DIN 1048 Part-5 by carrying out 4 cycles each of 5 bar hydrostatic pressure for 72 hours and drying for 48 hours between the cycle and coefficient of permeability calculated as per Darcy's formula / Valenta equation by incorporating penetration values obtained at the end of fourth cycle pressure as per DIN 1048 test. Material must reduce chloride diffusion coefficient by minimum 45% when tested as per ASTM C 1556-4 and compared with the control concrete, thereby prolonging the durability and service of life of the treated concrete structure as well as must demonstrate minimum reduction of 50% in shrinkage cracks as compared to control concrete, as per BS ISO-1920-8:2009. Must demonstrate no internal expansion under sulphate attack, when tested as per ASTM C-1012- 12 & conforming to norms of EPD as per ISO 14025 & EN 15804-A1. The crystalline admixture treated concrete must be able to withstand high hydrostatic pressure of 16 bar (156 m of water head) when tested as per DIN 1048 & must capable of self -healing of cracks up to width of 0.5 mm. The performance of the crystalline admixture must not be restricted by water / cement ratio of the concrete mix. In other words, the crystalline admixture must perform at any water / cement ratio of the concrete mix. Product must possess a third party assurance, such as a U sign certificate or similar, confirming that the product, when use in the concrete, will have no detrimental side effects in terms of Alkali Silica Reaction (ASR), corrosion of steel reinforcement etc., as per the requirements of DIN 18998. The Dosage should be at 0.8% by weight of cement + cementitious material (or such dosage as desired to meet durability criteria) as per technical specification.	Kg	271.24	342.87	92,997.82
					78,10,279.05
F-2 Miscellaneous Works of Station building					
1	Rain Water Harvesting & Recharge Pits at Stations and viaducts of the alignment constructions of recharge pits along the median (Peir line) at peri location along the BSRP alignment and within the depots and ststions to facilitate percolation of runoff water into the ground as per approved design and drawing developed by central water board. (Assuming 2 pits per Station, Size and Number of pits may vary as per the detailed desing by DDC)	No	2.00	137491.21	2,74,982.42
					2,74,982.42
F-3 Roofing Works of Station Platform Area					
1	Providing and fixing standing seam (Crimp curved) profiled sheeting 1000-1020 mm cover width, 28-30 mm crests @200-250 mm c/c manufactured out of 0.50 mm TCT (Total coated thickness) Hi- tensile galvalume steel. The sheets shall have wide pans with 2-3 nos. stiffening ribs for effective water shedding and special male/female ends with full return legs on side laps for purlins support and anti- capillary flute in side lap. The sheets shall have clamp rail roof fastening with the provision for fixing solar panels, clamp rail is fastened to standing seam metal roofs via clamp without roof penetration (No damage shall be done to the roof or puncturing of roof sheets shall not be allowed). The sheets shall have a hot-dip metallic coating of ZINC and Aluminium (150 gms/sqm. zinc/alum. Coating mass total on both sides. AZ-150 as per AS 1397), 330Mpa to 550 Mpa yield stress, providing PVDF coating of approved colour of total thickness of 35 microns comprising of 20 microns exterior coat of PVDF over 5 microns PU back coat over 5 micron primer coats on both surfaces including side and end laps and using 8mm galvalume hex self drilling. Item to include curved sheets and crimping also. Rate shall include providing fasteners on each crest of sheets for connection with purlins and seam bolts etc. measured per unit of laid areas.	Sqm	4060.00	1425.45	57,87,333.04

Structural Cost Estimation for Mathikere Station (Platform 205 m/concourse 205 m)					
Sl.No.	Description	Units	Quantity	Rate (Excl. GST)	Amount (₹)
2	Providing and fixing polycarbonate sheet manufactured out of 2 mm thick(lexan) from GE plastics material or equivalent of same profile of galvalume sheeting fixed over steel structure with self drilling fasteners.	Sqm	1015.00	3312.64	33,62,326.60
3	Providing and fixing in position GI Gutter of 2mm thick sheet of approved quality including fabrication and erection with self tapping screws EPDM washers with necessary laps and stiffeners, application of sealant, making provision for drainage spout with all leads and lifts etc. Complete as per drawing and specifications.	Sqm	449.50	2820.10	12,67,632.71
					1,04,17,292.36

Architectural Cost Estimation for Mathikere Station					
Sl.No.	Description	Units	Quantity	Rate (Excl. GST)	Amount (₹)
	Schedule-G (Architectural Finishes)				
1	<p>Providing and constructing wall with cement concrete solids blocks having compressive strength not less than 5N/Sqmm confirming to IS 2185 (Part-1)- 2005 with cement mortar 1:4 as per IS 2572-2005 including cost of materials. Labour charges, scaffolding, lead & lifts, curing, hire charges of machineries etc. of specified size mentioned in the drawing/as directed by the engineer and at all levels, complete as per specification & drawing.</p> <p>With 400 x 200 x 200mm size blocks</p> <p>Note: Stage payment at 50% of the accepted rate of receipt of material at site and its certification by the Engineer. Balance payment shall be payable on completion of item work.</p>	Cum	1311.21	6,377.99	83,62,884.27
2	<p>Providing and Laying screed Concrete, with M-20 grade with cement concrete, cement content as per approved design mix using 20mm downsize aggregate. Cleaning of floor, providing slurry, placing of concrete, compaction with surface vibrators, floating and toweling, laying the surface to slope ail incidental work etc. complete. Rate includes cost of all materials (including wastages) labor, curing, hire charges of machineries, with all leads & lift at all levels complete as per specifications & drawings.</p>	Cum	337.81	8258.41	27,89,791.65
3	<p>Providing rough cement plastering 15mm thick in single coat with cement mortar 1:4 on brick / AAC masonry/ concrete block masonry/ concrete works with sand of approved quality. Rate includes cost of all materials, curing, labour, hire charges of machineries, scaffolding, with all leads & lift at all levels.Wherever required smooth rendering & grinding, complete as per specifications.</p>	Sqm	5180.42	436.27	22,60,061.83
4	<p>Providing 12 mm thick cement plaster in single coat with cement mortar 1:3 to ceiling including rounding off corners wherever required smooth rendering. Rate includes cost of all materials, curing, labour, hire charges of machineries, scaffolding, with all leads & lift at all levels. Wherever required smooth rendering & grinding, complete as per specifications.</p>	Sqm	3232.54	421.51	13,62,547.94
5	<p>Providing 18mm thick cement plaster in single coat with cement mortar 1:4 including rounding off corners wherever required smooth rendering & grinding providing and removing scaffolding, including cost of materials, labour, curing complete as per specification for all heights in an even shade, cleaning the surface of all dirt, dust and foreign materials, sand preparing. Rate includes cost of all materials, curing, labour, hire charges of machineries, scaffolding, with all leads & lift, at all levels complete as per specifications.</p>	Sqm	4492.60	444.25	19,95,837.55
6	<p>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 liter 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.</p>	Sqm	250.00	933.26	2,33,315.00

Architectural Cost Estimation for Mathikere Station

Sl.No.	Description	Units	Quantity	Rate (Excl. GST)	Amount (₹)
7	Providing and laying pre polished/ honed finish of uniform shade and texture granite of 20mm thick (+ or -1mm) of length not less than 1200mm and width not less than 600mm in flooring of required design and patterns and as per approved in one or more types of stone and direction by the engineer laid over 3 beds of up to 25mm thick 1:4 cement mortar (1cement: 4 coarse sand with paper joint finished with white cement mixed with matching pigment including all finishing as required, including cut-out / repair in floors, laying, POP on finished surface (minimum thickness 10mm) and cleaning the surface by removing POP as per directions for floors etc. Rate includes cost of all materials (including wastages), dry matching, curing, labor, hire charges of machineries, with all leads & lift at all levels complete as per specifications. (colour of granite as approved by engineer). Note: Stage payment at 50% of the accepted rate of receipt of material at site and its certification by the Engineer. Balance payment shall be payable on completion of item work.	Sqm	6601.18	3246.51	2,14,30,796.88
8	Providing and fixing 450mm high cavity unitile raised access flooring system or equivalent conforming to PSA MOB standard as per the following specifications. Unitile USF - 1500 access floor panel of size 600 x 600 mm shall be all steel welded construction, with an enclosed bottom pan of 49 hemispherical and 36 reverse cones and top plain sheet, which are fuse welded at 124 locations to form a panel of an overall depth of 35mm. the inner empty core of the panel is injected with a light weight for retardant noncombustible cementitious compound at high pressure to fill in all the crevices of the panel and ensure support of not less than 85 % of the top surface area of the panel. The panel after cleaning, degreasing, phosphating by 7-tank process is coated with 40–60-micron epoxy coat and is heated to achieve maximum adhesion and surface resistance. the panel is then laminated with 1.5mm thick fire-retardant floor grade antistatic laminate (Electrical resistance shall be in the range of 1.0 x 10 x 6 ohms to 2.0 x 10 x10 ohms) on a semi- automatic lamination line to ensure maximum bonding to the steel surface. the edges of the laminated is protected with a conductive PVC edge profile of the same range of the electrical resistivity as the laminate, which is 5 mm wide on all sides this edge trim is mechanically locked and sealed in place to avoid detachment. Other details as per technical specification and manufacturer's instructions including all necessary support systems like pedestals, base plates, stringers with necessary fixing arrangements etc. complete. Note: Stage payment at 60% of the accepted rate of receipt of material at site and its certification by the Engineer. Balance payment shall be payable on Completion of item work.	Sqm	297.00	7243.47	21,51,310.59
9	Providing and Laying Foam concrete for raised flooring as/of density 1200kg/Cum	Cum	8.55	5445.85	46,562.02
10	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 dado/skirting on 12 mm thick mortar 1:4 (1 acid proof cement: 4 coarse sand)	Sqm	140.00	1433.83	2,00,736.20
11	Providing & laying in position on floor, skirting and in bands, full body/uniform vitrified unglazed anti-skid/uni colour series floor tiles of specified size and of approved make specification and approved colour laid over upto 30 mm thick bed of cement mortar 1:4 (1 cement: 4 coarse sand) to the pattern as called for including finishing the joints with matching pigment and approved grouting materials. Rate includes cost of all materials (including wastages), curing, labour, hire charges of machineries, with all leads & lift at all levels complete as per specifications. 300X300X7.3 mm thick	Sqm	114.50	1772.2	2,02,916.90

Architectural Cost Estimation for Mathikere Station

Sl.No.	Description	Units	Quantity	Rate (Excl. GST)	Amount (₹)
12	Providing skirting, dadoing, risers of steps with coloured glazed tiles in 10 mm thick cement plaster 1:3 and jointed with white cement slurry over existing rough plaster surface using glazed tiles of approved make and size. Coloured glazed tiles 30 x 45 cms 6 mm thick with border of size 30 x 10 cms. Rate includes cost of all materials (including wastages) curing, labour, hire charges of machineries, with all leads & lift at all levels complete as per specifications.	Sqm	85.50	1451.6	1,24,111.80
13	Providing and fixing uniform vitrified glazed tiles of approved make, quality and color of specified size with 3-4 mm thick PVC spacers and filling with epoxy grout contrasting colour of tile fixed on bed of 12mm thick cement mortar for flooring, skirting and jointed with neat cement slurry mixed with pigment to match shade of tiles, including Providing spacers at required interval and removing stains, including cost of all materials mortar, labour etc. complete as per specification and directed by engineer. 600x600x10mm thick	Sqm	374.86	1333.77	4,99,977.02
14	Providing and painting acrylic emulsion paint of approved make, colour and shade on new work (plaster, RCC, wood or metal etc.)in two coats to give an even shade / pattern, including primer, preparation of surface using two or more coats of wall putty, etc. surface duly emery papered to give a perfectly smooth and even prepared surface before painting. Rate includes cost of all materials, labour, hire charges of machineries, scaffolding, with all leads & lift, at all levels complete as per specifications. Note:Stage payment at 80% of the accepted Rate after applying of first coat and balance 20% of the accepted Rate after applying of second coat.	Sqm	8891.46	218.16	19,39,760.91
15	Providing and finishing two coats with waterproof cement paint of approved brand and shade to give an even shade after thoroughly brooming the surface to remove all dirt and loose powdered material, free from mortar drops and other foreign materials. Rate includes cost of all materials, curing, labour, hire charges of machineries, scaffolding, with all leads & lift, at all levels complete as per specifications.	Sqm	4492.60	129.04	5,79,725.10
16	Providing & installing fixed glazed wall assembly with specified fixing & finish using of 2 sheets 6mm thick toughened glass with nominal gap silicon sealant joint. Glass shall be clear, toughened and laminated with 1.52mm thick polyvinyl butyl layer, Glass held with SS patch fittings - all complete as per relevant architectural drawings and specification with cut out & holes.	Sqm	1085.50	11090.28	1,20,38,498.94
17	Supply and install colored suspended false ceiling Aluminum corrosion proof - Open Cell Ceiling System, the price includes all the needed Aluminum profiles and suspension system, decorative cornish , shop drawing, and all accessories needed for fixation and all materials needed to finish the works according to specifications , drawings and engineer's instructions. Rate includes the cost of scaffolding, anchor bolts, anchor fasteners, substructure of MS/Aluminium framing, freight, storage at site, security, brackets for supports, unloading at site or additional accessories.	Sqm	207.50	2323.07	4,82,037.03

Architectural Cost Estimation for Mathikere Station

Sl.No.	Description	Units	Quantity	Rate (Excl. GST)	Amount (₹)
18	Providing and fixing stainless steel (Grade 304) railing including SS sheets of perforated or any other pattern or Design laser cut of matt/glossy finish 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, including 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, or fixing the rail with core cutting method including grouting. Rate includes cost of all materials, labour, HOM, with all leads and lifts at all levels complete including cost of Fabrication and welding/soldering as per specifications and drawings (for payment purpose only weight of stainless steel members shall be considered excluding fixing accessories such as nuts, bolts, fasteners etc.).Note: Stage payment at 50% of the accepted rate of receipt of material at site and its certification by the Engineer. Balance payment shall be payable on Completion.	Kg	3821.13	782.92	29,91,639.10
19	Providing and fixing M.S Steel Hand Railing as per the design and drawings and specifications to staircase approximately 1200mm high comprising of 32mm dia 10 Gauge M.S hollow tube vertically fixed to every 4th step welded to 50 mm dia 10 gauge M.S pipe on top for Hand rail and 20mm dia M.S pipe vertically in between welds 2 nos of 20mm dia M.S Pipe all as per the drawings. The vertical balusters are fixed in position with molten lead poured into 40mm dia GI Sleeve with 80X80X3mm G.I Plate and embedded in RCC including necessary steel cover and completed as shown in the drawings or any other method of fixing as approved by the Engineer like epoxy grout fixing etc. complete. All M.S members will be painted with 23 coats of synthetic enamel paint of approved make and color over one coat of primer all as per manufacturer's instructions and with the Engineer's approval. Rate includes cost of all materials, Labor, hire charges of Machines, with all leads and lift at all levels complete as per the specification and drawings.	Kg	1197.90	175.51	2,10,243.43
20	Providing and fixing mirror polished wall cladding using 18 mm thick (+ or - 1 mm) jet black granite gang saw water cut granite in cm 1:3 proportion cut to required shape colour pigments to match the colour of slab making through jointing with sealant, making holes 25 mm x 12 mm grooves in joints. Rate includes nosing/edge finishing, cost of all materials (including wastages) dry matching, curing, labour, hire charges of machineries, with all leads & lift at all levels complete as per specifications. Note: Stage payment at 50% of the accepted rate of receipt of material at site and its certification by the Engineer. Balance payment shall be payable on Completion.	Sqm	1934.45	3983.47	77,05,823.54
21	Providing and laying mirror polished jet black granite stones of 20mm thick (+ or - 1mm) and joints matching to floor joint and heights upto 150-300mm all required as per approved shop drawings, specifications and direction by the engineer, laid over a bed of 18mm thick 1:4 cement mortar (1cement : 4 coarser sand) or with approved epoxy and tile adhesive as required at site with paper joint, finished with white cement mixed with matching pigment including all finishing as required. including laying as per directions for risers, skirting, coping etc. including half or full nosing/edge finishing. Rate includes cost of all materials (including wastages), dry matching. curing, labour, hire charges of machineries, with all leads & lift at all levels complete as per specifications. Note: Stage payment at 50% of the accepted rate of receipt of material at site and its certification by the Engineer. Balance payment shall be payable on	Sqm	118.08	4560.68	5,38,525.09

Architectural Cost Estimation for Mathikere Station					
Sl.No.	Description	Units	Quantity	Rate (Excl. GST)	Amount (₹)
22	Providing and fixing aluminium works for door, windows,louvers,ventilators, and partitions with extruded builtup standards 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, 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 the engineer (Glazing, paneling to be paid for separately) for fixed portion. Polyester powder coated aluminium (minimum thickness of polyester powder coating 50 micron).	Kg	870.00	545.96	4,74,988.16
23	Providing and fixing Extruded aluminium works for louvers and fixed glazing with extruded builtup sections of size 61.85 x 31.75mm with 1.2mm thick bottom section weight 0.695kg/m sides and top sections 1.3mm thick weight 0.659kg/m and providing and fixing 6mm thick plain glass with rubber beading aluminium sections of approved make, fixed with rawl pugs and screws or with fixing clips or with expansion hold fasteners including necessary filling up of gaps at junctions at top, bottom and sides with required PVC/Neoprene frlt 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, stainless steel hinges all complete as per drawings, specifications and the directions by the engineer with all lead & lift at all levels. Using Aluminium section powder coated to a minimum of 60-70 microns with exterior durable pure polyester grade powder of approved quality.	Sqm	55.00	4945.09	2,71,979.84
24	Providing and fixing glazing in aluminium doors, window, ventilator shutters and partitions etc. with EPDM rubber / Neoprene gasket etc. complete as per the architectural drawings and the directions of engineer. (With toughened glass of 5mm thick)	Sqm	165.00	2095.65	3,45,782.77

Architectural Cost Estimation for Mathikere Station

Sl.No.	Description	Units	Quantity	Rate (Excl. GST)	Amount (₹)
25	<p>Providing and fixing of hollow metal fire door at all levels from ISO 9001-2000 certified manufacture (2 hours). 3 criteria fire rated door, fabricated and successfully tested CBRI, in both direction (outside and inside opening) satisfying the three performance criteria of stability, integrity and insulation as per BS 476 part 22 and IS: 3614 Part II. Fire door should be as per NEPA 80 and NEPA 252. All fire door should be tested at UL for maximum rating of (2 hours) and shall be both UL 10B and UL 10C. Pressed Galvanized sheet single/double leaf of required rating and approved equivalent which consist of frame, shutter, infill and finish as per detail below. Door shall be supplied with appropriate level confirming labels confirming the rating. Door frame shall be double rebate profile of size 143x57mm made out of 1.60mm (16guage) thick galvanized steel sheet. Frame shall be mitred and filed assembled with self tabs. All provision shall be mortised, drilled and tapped for receiving appropriate ANSIVUL labeled hardware. Rubber door silencers should be provided on the striking jamb. Frames should be provided with back plate bracket and anchor fasteners for installation on the finished plaster masonry wall opening. Once frame installed should be grounded with cement & sand slurry necessary for fire doors on the clean masonry opening. Door leaf shall be 60mm thick fully flush double skin door with or without vision lite. Door leaf shall be manufactured from 1.2mm (18guage) thick galvanized steel sheet. In addition, the door should have continuous vertical steel stiffeners of 0.8mm sheet at an interval of 150mm spot-welded and smoothened. The gap should be filled with suitable infill material for required rating. All doors should be factory prepared for receiving appropriate hardware and provided necessary reinforcement for hinges, locks, and door closers as per ASNI standard. For temperature rise doors the average temperature on the unexposed side should not exceed 232 Degree C for hallow metal doors for the first 30 minutes. The edge should be interlocked with bending radius of 1.4mm. For pair of doors astragals has to be provided on the meeting of size 200x300 provided as per manufactures recommendation with the clip on the arrangement. The glass should be 6mm boro silicate fire rated glass of coating, stove zinc phosphate prime and thermosetting polyurethane aliphatic minimum 250 hours of salt spray test vision panel - providing 250 x 150 mm panels with 6mm thick 2 hours fire rated heat resistant glass of borosilicate float glass with 5mm ceramic fiber glass.</p> <p>Note: Stage payment at 50% of the accepted rate of receipt of material at site and its certification by the Engineer. Balance payment shall be payable on Completion.</p>	Sqm	38.64	20229.82	7,81,680.24
26	<p>Providing and fixing pull and push type Rolling Shutters of approved make out of 18 gauge, 75 mm wide cold rolled steel laths of convex corrugations, with side guides and bottom rail, with interlocking arrangements for steel laths by means of alternate clips, suspension shaft with high tension coil type springs two numbers, mounted on specially designed pipe shaft, with bracket plates, guide channels ,ball bearing arrangements, for inside and outside locking with push and pull operations complete including pulling hooks 4Nos, handles with all fittings and accessories, painted with a coat of red lead paint (without top over). Rate include cost of all materials, labour, hire charges of machineries, complete as per specification & drawing.</p>	Sqm	136.50	4581.02	6,25,309.23
27	<p>Providing and fixing top covers made out of 18mm gauge MS sheet over pull and push rolling shutter bent to shape including the cost of red/zinc lead primer, coat of painting material, labour, hire charges of machinery complete as per specification.</p>	Rmt	39	2280.94	88,956.66
28	<p>Providing & fixing single/double leaf GI door of approved make at all levels formed by 1.6mm galvanized iron sheet for the frame with holdfasts provided for grouting and installation. The shutter shall have overall thickness of 46mm, material of honeycomb craft core, including having lock seam joints for locking, with reinforcement provided at locking/ hardware area including painting with approved make along with primer. The sheet metal used for both the frames and shutters shall confirm to IS 277:1992 all complete as per vendor shop drawings, specification and direction by the Engineer. Note: Stage payment at 50% of the accepted rate of receipt of material at site and its certification by the Engineer. Balance payment shall be payable on Completion</p>	Sqm	34.02	9575.02	3,25,742.32

Architectural Cost Estimation for Mathikere Station

Sl.No.	Description	Units	Quantity	Rate (Excl. GST)	Amount (₹)
29	Supply, delivery and installation of vitrified tactile tiles (directional & hazardous) of approved makes as per control sample in 300 x 300 x 12 mm thick, size with pigmented grout to match the colour and shade of tactile tile. Tiles shall be laid over 20mm thick bed of cement mortar 1:4 (1 cement: 4 coarse sand) and installation to be carefully coordinated with adjacent flooring modules i.e. tiles shall be in same level with the nearby floor with uniform joints. All tactile guide path shall be in strict accordance to relevant drawings for barrier free movement by visually impaired persons. Rate includes cost of all materials (including wastages) curing, labour, hire charges of machineries, with all leads & lift at all levels complete as per specifications.	Sqm	198.00	2234.26	4,42,383.72
31	Providing & fixing Toilet cubicle (of following standard dimension which includes 750mm door size width) made of heat, bacteria, water, chemical, scratch, impact and anti bacterial resistant 12mm thick solid compact laminate panels tested in approved laboratory. Finish of the compact laminate should be suede, Raw silk model includes doors, pilasters & intermediate panels finished with approved texture/shade as per the detail drawings & as per IS 2046 (Indian Standard) and as per fire retardant BS-476/97 standards. This also includes providing and fixing in position necessary hardware made out of stainless steel (Grade 304) as per manufacturer's specifications & Architects instructions like (1) Door Knob, (2) HGravity Hinges, (3) YThumb turn lokset with Occupancy indicator, (4) coat hooks, (5) Door stopper, (6) U-Channels, (7) Adjustable foot/pedestal, (8) Top rail (9) Rubber noise deafening tape, (10) Screws & wall Plugs. All screws will be of 304 Grade in Stainless steel with satin finish. All pilasters are supported by stainless steel Bottom Cladding. The base of the stainless steel bottom cladding will be anchored to the floor with a clearance height upto 150mm. The top fitting should consists of SS round top rail which will get fixed with pilasters SS wall fixing is used only on the wall which will hold the SS top rail. Note: All works as per approved manufacturer's specifications. (Toilet Cubicle with standard dimesnion of 2100mm Height x 1000mm Width x 1600mm Depth, which includes 7500mm wide door.)	No.	12.00	47488.19	5,69,858.22
32	Providing and placing on terrace polyethylene water storage tank, as per IS 12701 : 1996 of of approved make and colour with manhole lid and suitable locking arrangements, making necessary holes for inlet, outlet and overflow, pipes, including cost of all materials, labour, transport charges, HOM and testing complete as per specifications	Liter	20000.00	12.18	2,43,570.19
	Schedule - G			Total	7,23,17,354.16
	Schedule-H FAÇADE WORKS				

Architectural Cost Estimation for Mathikere Station

Sl.No.	Description	Units	Quantity	Rate (Excl. GST)	Amount (₹)
30	Supply & fixing of Luxalon perforated horizontal and vertical panels by Hunter Douglas or equivalent of 2 to 3 mm thick. The panel will consist of single skin of flat Aluminum alloy AA3005/3105, Panel width will be to a maximum of 900 mm and of variable lengths up to maximum of 5000 mm (Manufactured as per the project requirement). The perforation shall be customized as required. The panel will be coated on the exterior/exposed surface with Exterior Architectural Coating. The horizontal joints will have a recessed joint of width of 20mm and will incorporate facilities for allowing adjustment of 1 mm. The panels will be secured to a tailor made rigid support system by means of a fixing side extrusion fixed to the panel fixed at appropriate centers to proprietary metalclamp as per the design. Things to be taken Care by Installer. The panel needs to be fastened to a Suitable Aluminum substructure as per the load requirement. Installer will erect the secondary and primary substructure within the tolerances of span/ 1000 of plumb line and level per support (non-Cumulative to a maximum of 2 mm). Aluminum alloy for substructure will comply with IS 8147. Anodic coating on Aluminum substructure (wherever applicable) and its specified alloy will comply with IS 1968-1996. The substructure will be fixed to the backing wall by means of Aluminum/ MS brackets with wedge type/ RAWL PLUG stainless steel anchor fastener/HILTI or equivalent chemical fastener. The brackets will allow for a vertical and horizontal alignment tolerance of 12.5 mm. A Nylon/Rubber bush will protect joints between any two dissimilar metals.	Sqm	1630	10471.40	1,70,68,389.38
	Schedule - H			Total	1,70,68,389.38
	Schedule-I PUBLIC HEALTH ENGINEERING				
	Sanitary fitting & fixtures				
	Providing and fixing white vitreous china clay, water closet European type (Pedestal type) with P-trap or S- trap with black solid plastic seat and lid, C.P brass hinges, rubber buffers. 10 litre low level, P.V.C flushing cistern (all are approved make) with fittings, C.I / M.S brackets, 40mm diameter flush bend with fittings and clamps, overflow arrangements with special and 25mm mosquito proof coupling of approved design, painting of fittings and brackets, cutting and making good the wall and floor wherever required, including cost of materials, labour complete as per specifications.	Each	7	6198.92	43,392.43
	Providing and fixing white vitreous china clay, flat back, lipped Front urinal basin of 430x260x350mm in the range of two with C.I / M.S brackets, standard flush pipe and C.P. brass spreaders with brass unions and G.I. clamps painting of fittings and brackets, cutting and making good the wall and floor wherever required, including cost of materials, labour complete as per specifications.	Unit	5	3699.57	18,497.86
	Providing and fixing C.P brass towel rail 600mm length, 20 mm dia with C.P brackets, fixed to wooden cleats with C.P brass screws including cost of materials, labour complete as per specification.	Unit	7	1022.66	7,158.63
	Providing and fixing vitreous china toilet paper holder with mortar / white cement with all fittings and fastenings all complete as required.	Nos	7	1096.78	7,677.43
	Providing and fixing of bibcock with health faucet with flexible pipe of appropriate length with a separate stopcock for the health faucet. The cost to include all fittings and fastenings all complete as required.	Nos	7	1828.18	12,797.24
	Providing and fixing wall mounting type push-type liquid soap dispenser with 1000 ml bulk volume, with pump suitable for operation on less than 5 PSI complete in all respects. The cost to include all fittings and fastenings all complete as required.	Nos	5	1926.02	9,630.09
	Providing and fixing of CP grab rail in People with Disability Toilet. The cost to include all fittings and fastenings all complete as required.	Nos	2	947.51	1,895.02

Architectural Cost Estimation for Mathikere Station

Sl.No.	Description	Units	Quantity	Rate (Excl. GST)	Amount (₹)
	Supply and fixing of white vitreous china oval counter bottom fixed wash basin of size 630 x 450mm, installed below granite counter (or as per Engineer approval) and brackets, 32mm dia CP waste coupling, 32mm dia CP brass bottle trap, 15mm dia CP angle stop cock for cold water supply lines with flanges, 375mm Long Copper connectors including nuts & washers and making connection to the mixtures etc,. The work shall include cutting and making good the walls and floors.	Nos	7	5466.25	38,263.76
	Providing and fixing automatically operated Hand Dryer within built Heating unit and twin Blowers of Standard make.	Nos	3	11291.13	33,873.40
	Providing and fixing white vitreous china clay, water closet Orissa pattern of size 580 x 440mm with integral type footrests, 100mm S or P trap, 10 litre low level, P.V.C flushing cistern (all are approved make) with fittings, C.I / M.S brackets, 32mm diameter flush pipe fittings and clamps, overflow arrangements with special and 25mm mosquito proof coupling of approved design, painting of fittings and brackets, cutting and making good the wall and floor wherever required, including cost of materials, labour complete as per specifications.	Each	2	5117.33	10,234.67
	Providing and fixing 30 mm thick phenol bonded water proof exterior grade flush door shutter of approved make, including sal wood frame of section 125mmx63mm fixed to wall opening in RCC/block masonry with necessary hold fast as per the directed by the engineer. Note: 1. The door shall be provided with following item, i) 3nos 100 mm long SS butt hinges in single leaf door /6no 100mm long SS butt hinges in double leaf door shutter. ii) 1nos. mortise lock with handle @100mm. iii) 2nos. 200mm long Aluminium tower bolt. iv) 1nos 200mm long aluminum drop and handle in place of mortise lock if required. v) Painting with synthetic enamel paint, i/c wood primer of approved brands and shades. 2. The cost of the item is inclusive of all materials, accessories, hardware, labours, tools, plants & machineries, transportation, handling with all lead, lifts and working all level & heights. Finishes of all materials shall be got approved by the engineer. Providing and Laying of cinder or equivalent material concrete 1:5:10 mix on terraced roof or sunken slab, laid to slope compacting, including cost of material, labour, complete as per drawings, specifications and as directed by Engineer.	Sqm	17	11269.62	1,91,583.55
	Providing and Laying of cinder or equivalent material concrete 1:5:10 mix on terraced roof or sunken slab, laid to slope compacting, including cost of material, labour, complete as per drawings, specifications and as directed by Engineer.	cum	21	3279.32	68,865.70
	Providing and fixing 7.5cms to 15cms dia. NP grating 100mm dia.	Each	14	183.55	2,569.71
	Providing and fixing white vitreous china clay, Indian pattern squatting urinals with white glazed foot rests of approved quality and make confirming to ISI specifications and fixing in position with M-15 of size 50.8 cms x 38 cms x 10.16 cms - A Grade, including cost of materials, labour complete as per specifications.	Each	2	1149.22	2,298.44
	Water supply works				
	Providing and fixing CPVC pipes confirming to IS 15778 having thermal stability for hot and cold water supply including all CPVC plain and brass-threaded fittings including fixing the pipes with clamps at 1.00 mt spacing. This includes jointing of pipes and fitting with one step CPVC solvent cement and testing of joints complete (internal works exposed on wall)				
	15 mm nominal OD Pipe	Metre	120	143.53	17,223.92
	20 mm nominal OD Pipe	Metre	38	181.52	6,897.93
	25 mm nominal OD Pipe	Metre	20	240.89	4,817.75
	32 mm nominal OD Pipe	Metre	105	329.86	34,635.82
	40 mm nominal OD Pipe	Metre	103	446.23	45,961.48

Architectural Cost Estimation for Mathikere Station

Sl.No.	Description	Units	Quantity	Rate (Excl. GST)	Amount (₹)
	Providing and fixing CPVC pipes confirming to IS 15778 having thermal stability for hot and cold water supply including all CPVC plain and brass threaded fittings including fixing the pipes with clamps at 1.00 mt spacing. This includes jointing of pipes and fitting with one step CPVC solvent cement & the cost of cutting chases & make good the same including testing of joints complete (Concealed work including cutting chases and make good the walls)				
	15 mm nominal OD Pipe	Metre	100	158.99	15,899.03
	20 mm nominal OD Pipe	Metre	100	258.96	25,895.67
	25 mm nominal OD Pipe	Metre	20	315.43	6,308.68
	32 mm nominal OD Pipe	Metre	50	483.64	24,182.02
	Providing and fixing CPVC pipes confirming to IS 15778 having thermal stability for hot and cold water supply including all CPVC plain and brass threaded fittings. This includes jointing of pipes and fitting with one step CPVC solvent cement, trenching , refilling and testing of joints complete (external works)				
	25 mm dia	Rmt	20	235.09	4,701.82
	32 mm dia	Rmt	20	319.35	6,387.04
	40 mm dioa	Rmt	136	446.04	60,661.08
	50 mm nominal OD Pipe	Metre	150	694.57	1,04,185.92
	Providing and fixing in position brass bib cock of approved quality nominal bore including cock of all materials, labour and HOM with all leads complete as per specifications. -15 mm dia nominal bore	Each	3	372.57	1,117.71
	Providing and fixing in position brass stop cock of approved quality of nominal bore including cost of all materials, labour and HOM with all leads complete as per specifications				
	15 mm nominal bore	Each	6	250.42	1,502.51
	20 mm nominal bore	Each	6	256.30	1,537.83
	Providing and fixing in position brass gate valve with C.I wheel of approved quality (screwed end) nominal bore including cost of all materials, labour and HOM with all leads complete as per specifications.				
	15 mm nominal bore	Each	1	513.28	513.28
	20 mm nominal bore	Each	3	624.41	1,873.22
	25 mm nominal bore	Each	2	905.48	1,810.97
	32 mm nominal bore.	Each	2	1458.87	2,917.74
	40 mm nominal bore	Each	2	1963.03	3,926.07
	Providing and fixing unplasticised PVC connection pipe with brass union 15mm nominal bore 450mm length of PVC connection including cost of all materials, labour and HOM of equipments with all leads complete as per specifications	Set	2	456.11	912.22
	Fixing water meter with stop cock, jam nut, socket in G.I pipe line including cutting and threading the pipe and making long screws including cost of all materials, labour, HOM and testing complete as per specifications.	Set	2	821.51	1,643.01

Architectural Cost Estimation for Mathikere Station

Sl.No.	Description	Units	Quantitv	Rate (Excl. GST)	Amount (₹)
	Making connection of G.I distribution branch with G.I main of 50 to 85mm and 100 to 150 nominal bore, including cutting and threading the pipes, providing and fixing Tee, nuts, labour for all items of works, testing and HOM complete as per specifications.	Nos	9	559.81	5,038.30
	Constructing brick masonry inspection chamber 500 x 700 mm, and 450mm depth for water supply valve chamber, (clear inside dimension) for pipeline with one or two inlets, using table mounted non-modular bricks of class designation 50 in cement mortar 1:5, CI cover with frame (light duty) 450 x 600mm internal dimensions, total weight of cover 23 kg and weight of frame 15 kg). RCC top slab with cement concrete 1:2:4 mix 20mm and downsize granite metal, foundation concrete 1:5:10 with 40mm and downsize granite metal inside plastering 12mm thick with cement mortar 1:3, finished smooth with a floating coat of cement on walls and bed concrete complete as per standard design including cost of materials, labour charges, curing complete as per specifications.	Nos	6	10672.27	64,033.60
	Supply, installation, testing and commissioning of sight tube of suitable length with isolation valve at top / bottom, demarcation on tube for making the installation of level indication on the RCC water tank complete.	Nos	6	3169.72	19,018.31
	Providing and fixing in position G.I. / D.I. vent with brass mosquito proof coupling and air filter including return bend, complete as required. The entire fitting shall be hot dip galvanized.80 mm dia.	Nos	4	5820.97	23,283.88
	Providing and fixing in position required size of nominal bore gun metal non- return valve horizontal type of approved make including oost of all materials, labour and HOM of equipment with all leads complete as per specification				
	25mm dia	Nos	2	1089.58	2,179.16
	32mm dia	Nos	8	1696.89	13,575.10
	40mm dia	Nos	8	2104.26	16,834.10
	Providing and fixing Y strainer of the following nominal dia conforming of PSI specifications as per direction including all lead and lift charges etc., complete				
	32mm dia	Nos	2	1877.57	3,755.14
	40mm dia	Nos	2	2480.64	4,961.28
	Providing and fixing truck fill point consisting of 150 mm dia water filling paint having 150mm dia brass plug (Truck fill point shall be housed in suitable lockable box)	Nos	2	7553.28	15,106.57
	Providing and fixing in position brass ball valve high or low pressure with plastic float of approved quality to mm nominal bore including cost of materials, labour and HOM of equipments with all leads complete as per specifications	Each	1	557.88	557.88
	Providing GI unions confirming to ISO specifications and fixing them in position as per directions including oost of materials, fixtures and conveyanCe to work spot etc complete.				
	20mm dia	Each	3	447.14	1,341.41
	25mm dia	Each	3	488.52	1,465.56
	32 mm dia	Each	3	611.38	1,834.13
	40mm dia	Each	3	693.11	2,079.33
	Drainage works				

Architectural Cost Estimation for Mathikere Station

Sl.No.	Description	Units	Quantitv	Rate (Excl. GST)	Amount (₹)
	Providing and fixing to wall, ceiling and floor unplasticised PVC 6 kgs/sqcm working pressure with pipe fittings, wall clips etc., and making good the wall, ceiling and floor for sanitary pipelines including cost of all materials, labour charges, HOM and testing complete as per specifications.				
	40 mm dia	Metre	16	158.90	2,542.47
	50 mm dia	Metre	30	238.66	7,159.77
	75 mm dia	Metre	57	481.68	27,455.84
	110 mm dia	Metre	282	727.53	2,05,163.85
	160 mm dia	Metre	30	1381.06	41,431.70
	Supply & fixing S.S. hinged grating of 2mm thick 125mm dia with rim including setting in floor with cement mortar (Approved type)	Each	42	169.98	7,139.27
	Providing & fixing of UPVC clean out plug with suitable insert keys for opening, male threaded joint with threaded G.I socket fixed to PVC soil pipe pipe joints as required complete in all respects.				
	75 mm dia	Each	15	389.82	5,847.31
	110 mm dia	Each	3	487.90	1,463.71
	Providing orange colour safety foot rest of minimum 6 mm thick plastic encapsulated as per IS : 10910 on 12mm dia steel bar conforming to IS : 1786 having minimum cross section as 23 mmx25mm and over all minimum length 263 mm and width as 165mm with minimum 112 mm space between protruded legs having 2 mm tread on top surface by ribbing or chequering besides necessary and adequate anchoring projections on tail 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 manufacture's permanent identification mark to be visible even after fixing, including fixing in manholes with 30x20x15 cm cement concrete block 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size) complete as per design.	Nos.	20	368.70	7,374.02
	Making connection of drain or sewer line with existing manhole including breaking into and making good the walls, floors with cement concrete 1:2:4 mix (1 cement: 2 coarse sand: 4 graded stone aggregate 20 mm nominal size) Cement plastered on both sides with cement mortar 1:3 (1 cement : 3 coarse sand), finished with a floating coat of neat cement and making necessary channels for the drain etc. complete : For pipes 100 to 250 mm diameter	Each	2	439.55	879.09
	Supplying & Fixing special PVC floor trap 125 x 75mm self cleansing design with or without vent arm, inlet receiving cap for inlet dia 50 & 40 FOITI Complete, including cutting and making good the walls & floors.	Each	42	379.71	15,948.03
	Providing and Fix ng of porcelain trap of 'P' or 'S' type with CP grating and 100mm dia outlet with necessary cement EonCrete chamber, water proofing the internal surface of chamber, etc., complete.	Each	3	598.46	1,795.38
	Providing and laying non-pressure NP2 class (light duty) RCC pipes with collars jointed with stiff mixture of cement mortar in the proportion of 1:2 (1 cement: 2 line sand) including testing of joints etc. complete				
	200mm dia	Rmt	50	489.00	24,449.99
	300mm dia	Rmt	300	688.30	2,06,489.24
	400mm dia	Rmt	10	999.40	9,993.97
	500mm dia	Rmt	100	1197.27	1,19,726.95

Architectural Cost Estimation for Mathikere Station

Sl.No.	Description	Units	Quantity	Rate (Excl. GST)	Amount (₹)
	Supply of materials & Construction brick masonry manholes / inspection chambers with 'A' class Table Moulded bricks 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), foundation concrete with 1:4:8 concrete (1 cement 4 coarse sand : 8 graded stone aggregate) inside plastering 12mm thick with CM 1:3 (1 cement : 3 fine sand) finished with floating coat of neat & making channel in cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate) and external plastering in 1:3 and sponge finished neatly finished complete as per standard design and as per drawing.				
	With inside size of 600 x 600 depth of 900mm with MD CI cover	Each	8	9169.36	73,354.90
	Earth work excavation for trenches in all types of soil (width of trench shall be as shown in the detailed drawing) including soft rock and disintegrated rock for laying sewerage pipes. The soil shall be deposited on banks with all lead, lift, including necessary wooden / steel form work where ever required. Depositing of the surplus earth after backfilling to a initial lead of 30 meters. Refilling of the pipe line trenches and foundation with selected earth available from the trench excavation in compacting watering consolidation in layers of 15cm thickness complete as per specifications. The back fill soil shall be graded soil free from stones, pebbles, clay lumps and vegetation etc., complete as per the specifications, drawings and the direction of the engineer.				
	Depth upto 1.65 meters	Cum	75	452.48	33,936.04
	Depth upto 1.65 meters to 2.3 meters	Cum	10	443.80	4,438.01
	Making core cutting 200mm dia in 200mm thick RCC wall/slab at all levels as per direction of engineer. NOTE: The cost of the item is inclusive of all materials, accessories, labours, tools, plants & machineries, handling with all lead, lifts, and working all level & heights.	Nos.	50	1006.54	50,327.13
	100 x 200 mm	Nos.	50	646.95	32,347.53
	Rain water pipes and fittings and other				
	Boring/drilling bore well of required dia for casing/ strainer pipe, by suitable method prescribed in IS: 2800 (part I), including collecting samples from different strata, preparing and submitting strata chart/ bore log, including hire & running charges of all equipments, tools, plants & machineries required for the job, all complete as per direction of Engineer-in-charge, upto 90 metre depth below ground level.				
	All types of soil- 300 mm dia	Metre	48	660.41	31,699.72
	Supplying, assembling, lowering and fixing in vertical position in bore well unplasticized PVC medium well screen (RMS) pipes with ribs, conforming to IS: 12818, including hire & labour charges, fittings & accessories etc. all complete, for all depths, as per direction of Engineer-in-charge.				
	200 mm nominal size dia	Metre	12	1241.89	14,902.66
	Constructing brick masonry Rain Water Chambers with 'A' class Table Moulded bricks 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), foundation concrete with 1:4:8 concrete (1 cement 4 coarse sand : 8 graded stone aggregate). Inside plastering 12mm thick with CM 1:3 (1 cement 3 fine sand) finished with floating coat of neat & making channel in cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate) external plastering in 1:3 and sponge finished neatly, complete as per standard design and as per drawing.				
	With size of Dia 900 mm (top level) and 900 dia at bottom level in case of depth exceeds 1200mm with RCC perforated cover having concrete of strength not less than M-25, of size 1000 x 450x50 mm, reinforced with 8 mm dia four nos. longitudinal & 9 nos, cross sectional T.M.T. hoop bars, including providing 50 mm dia perforations at 100 to 125 mm c/c, including providing edge binding with M.S. flats of size 50 mm x 1.6 mm complete, all as per direction of Engineer.	Each	3	13300.98	39,902.93

Architectural Cost Estimation for Mathikere Station

Sl.No.	Description	Units	Quantity	Rate (Excl. GST)	Amount (₹)
	With size of Dia 1200 mm (top level) and 1200 dia at bottom level in case of depth exceeds 1650mm with RCC perforated cover having concrete of strength not less than M-25, of size 1000 x 450x50 mm, reinforced with 8 mm dia four nos longitudinal & 9 nos cross sectional T.M.T. hoop bars, including providing 50 mm dia perforations @ 100 to 125 mm cic, including providing edge binding with M.S. flats of size 50 mm x 1.6 mm complete, all as per direction of Engineer	Each	4	16541.89	66,167.54
	Excavating trenches of required width for pipes etc., including excavation for sockets and dressing of sides, ramming of bottom including getting out the excavated soil and then returning the soil as required in layers including consolidating each deposited layer by ramming, watering, etc., and deposited of surplus excavated soil as directed with in a lead of COM.	Cum	200	188.35	37,669.30
	Supplying, filling, spreading & leveling stone boulders of size range 5 cm to 20 cm, in recharge pit, in the required thickness, for all leads & lifts, all complete as per direction of Engineer.	Cum	6	1516.46	9,098.77
	Supplying, filling, spreading & leveling gravels of size range 5 mm to 10 mm, in the recharge pit, over the existing layer of boulders, in required thickness, for all leads & lifts, all complete as per direction of Engineer.	Cum	6	1464.50	8,786.97
	Supplying, filling, spreading & leveling coarse sand of size range 1.5 mm to 2 mm in recharge pit, in required thickness over gravel layer, for all leads & lifts, all complete as per direction of Engineer.	Cum	6	2774.03	16,644.19
	Supply & fixing of 6 kg / Sq mm UPVC Rain water pipes including all fittings, bends supports, etc., with solvent cement joints				
	110 mm dia	Rmt	159	630.93	1,00,317.82
	150 mm dia	Rmt	334	1185.29	3,95,885.35
	200 mm dia	Rmt	332	1705.51	5,66,229.95
	Constructing brick masonry inspection chamber for single pipe line, using table moulded non-modular bricks Of Class designation 50 in cement mortar 1:5, CI cover with frame (light duty) 450 x 450 total weight of cover with frame to be not less than 38 Kgs (weight of cover 23 Kgs and wt. of frame 15 Kgs) RCC top slab with cement concrete M15 with 20 mm down size aggregate and foundation concrete of M15 with 40 mm aggregate inside plastering 12 mm thick with cement mortar 1:3 finish smooth with a floating coat of cement on walls and bed concrete complete as per standard design including cost of materials, labour charges, curing complete as per specifications				
	450 x 450 x 450 mm	Nos.	15	6314.91	94,723.65
	450 x 300 x 450 mm	Nos.	10	4896.74	48,967.36
	Extra for above item 9.1 & 9.2 depth beyond 450 mm and brick masonry chamber with table moulded non modular bricks of class designation 50 in cement mortar 1:5 for every 150 mm depth or part thereof including cost of materials, labour charges, curing complete as per specifications	Each	25	870.75	21,768.65
	Schedule-I			Total	33,31,343.46

Summary of Bill of Quantities Mathikere Station		
ELECTRICAL AND MECHANICAL (E&M) WORKS COMPRISING OF L.T. PANELS, L.T. CABLE DISTRIBUTION, LIGHTING, HYDRAULICS, FIRE SAFETY SYSTEMS, UPS, DG SETS, HVAC & BMS FOR ELEVATED STATION / AT GRADE STATION OF BSRP		
Sub Head No.	ITEMS	Total Amount in INR (Including GST)
PART- J : ELECTRICAL WORKS		
J.01	Conduit Wiring	1,21,41,175.02
J.02	Distribution Boards	39,76,537.37
J.03	MV Cabling & Busducts	2,69,38,628.22
J.04	MV Switchgear	91,28,223.15
J.05	Indoor Lighting and Fans	1,04,34,349.30
J.06	Protective Earthing	60,14,183.29
J.07	Lightning Protection	6,91,339.45
J.08	Uninterrupted Power supply System	18,55,151.08
J.09	DG Set	27,74,186.43
J.10	Addition Deletion	16,84,981.58
J.11	Building Management System	34,16,986.72
SUB-TOTAL (PART-J)		7,90,55,741.62
PART- K : FIRE FIGHTING WORKS		
K.01	Fire Fighting System	
K.01 .1	Fire Hydrant System	39,45,920.16
K.01 .2	Piping for Fire Fighting System	20,25,461.57
K.01 .3	Internal Piping	43,61,787.68

Sub Head No.	ITEMS	Total Amount in INR (Including GST)
K.01 .4	Sprinkler System	10,71,705.56
K.01 .5	Portable Fire Extinguisher	2,83,929.81
K.01 .6	Panel Flooding Tube System	16,20,635.29
K.01 .7	Water Cooler	-
K.02	Fire Detection and Alarm System	39,56,356.43
SUB-TOTAL (PART-K)		1,72,65,796.50
PART- L : HVAC WORKS		
L.01	HVAC System	55,67,808.75
SUB-TOTAL (PART-L)		55,67,808.75

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
	PART - A : ELECTRICAL WORKS				
J.00	General				
1	The BOQ shall be read in conjunction with the Instruction to Tenderers, Conditions of Contract, Notice Inviting Tender, Technical Specifications, Tender Drawings, Schedules, Annexures, Addendums and the latest relevant standards and its sub clauses. All the samples/ material intended to be used in the works shall be subject to approval of Engineer/KRIDE.				
2	Sub-letting of work by the contractor shall be permitted in accordance with relevant clause of Special Conditions of Contract.				
3	Quantity estimated here in BOQ are tentative, the quantity may vary according to the actual site conditions. Any such variation in quantity due to these changes will be confined under stipulated variation clause of GCC/SCC.				
4	Calculation details for selection of equipment/materials shall be subject to approval of Engineer/KRIDE in charge.				
5	The Tender is percentage tender. The tenderer should quote the percentage (above/below/At par) and amount in "Summary of Bill of Quantities" considering this as a Turn-key contract.				
6	Likely approved list of manufacturer/OEMs are provided as a part of General specifications.				
7	In case of any contradiction between BOQ / Specifications and Drawings, the most stringent conditions of the above will apply.				
J.01	CONDUIT WIRING				
1.0	Conduit Laying & Wiring				
1.1	Providing conduit embedment or surface laying on the roof slab / wall / structure including supply of heavy-duty GI conduit pipe with minimum 20 micron thick galvanizing along with all required GI conduit accessories like bends, elbows, junction boxes, PVC bushes for conduit ends, etc. as per wiring specification. The conduit shall be installed and GI fish wire shall be provided along the conduit and terminated at all junction boxes as required wherever it is necessary. Surface laying conduit shall be used with spacer type saddle clamp with brass screw.				
a)	32mm Dia, 1.6mm thick, GI conduit pipe for Lighting and Power circuits.	M.	4000.00	289.44	11,57,743.67
b)	25mm Dia, 1.6mm thick, GI conduit pipe for Lighting and Power circuits.	M.	21429.00	239.72	51,36,971.50
1.2	Providing and concealing of GI Industrial heavy duty modular control boxes of approved make including PVC bushes for conduit ends and chrome plated brass screws, suitable for receiving cables and fixing of modular switches / sockets / fan regulators, as required. Technical specification for electrical works under section-1 wiring shall be followed, including supply of all necessary associated items.				
a)	3 Module Metal Box - Size 75mm x 75mm x 60mm	Nos	286.00	106.14	30,355.01
b)	4 Module Metal Box - Size 125mm x 75mm x 60mm	Nos	63.00	127.51	8,032.87
c)	6 Module Metal Box - Size 200mm x 75mm x 60mm	Nos	57.00	193.80	11,046.37
d)	8 Module Metal Box - Size 225mm x 75mm x 60mm	Nos	14.00	232.95	3,261.27
1.3	Supply& installation of approved make flush type modular switch/es, socket/s fan regulator/s as required with modular plate, switch sockets, blank plates and cover plates etc. on a suitable size mild steel electrogalvanized switch boxes complete with the connections, earthing and testing as per specifications and as required.				
a)	1 no. 6A modular switch	Nos	172.00	117.57	20,221.58
b)	1 no. Blank plate	Nos	86.00	74.67	6,421.84
c)	1 no. 6A switch & 1 no. 6A, 5 Pin socket	Nos	114.00	239.15	27,262.61
d)	Electronic stepped fan Regulator	Nos	12.00	467.35	5,608.24
e)	6/16 A, 6 Pin Universal socket with 16 amp modular with switch having indication of power ON/OFF.	Nos	344.00	554.55	1,90,766.84

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
1.4	Wiring for circuit mains				
	Supply and Installation with all materials, accessories and labour for Wiring circuit mains in the existing conduit for Lighting Circuits/ Single phase sockets from DB to first light/ switch/socket control box with 3 Runs of (P+N+E) PVC FRLSZH insulated Copper conductor, 450/750 V grade wires to connect all lights, switches sockets etc. All wires shall be terminated with pin type lugs and provided with non erasable ferules for identification.				
a)	Single circuit consisting 3 Runs of 2.5 Sq. mm wires.	M.	23572.00	101.92	24,02,457.73
b)	Single circuit consisting 2 Runs of 4.0 Sq. mm and 1 Run of 2.5 Sq. mm wires.	M.	4372.00	137.47	6,01,020.53
1.5	Primary Points				
	Switch controlled Primary Points				
	Supply & laying of 1.6 mm thick GI conduit with all accessories, labour and wiring from switch box to first light / Ceiling Fan/ Exhaust Fan / wall mount fan point / 6A socket with 3 Runs (P+N+E) of 2.5 Sq.mm PVC insulated FRLSZH copper conductor, 450/750 Volt grade wires in surface run with GI saddles or concealed including cost of cutting & filling chases for recessed conduiting and complete with earthing of switch boxes. 6A, socket located within the control box (SB) is not accounted as a separate point. Cost of switches/sockets and switch boxes shall be paid separately.				
a)	First point controlled by one 6A switch up to 10 Meter length.	Nos.	86.00	2,360.46	2,02,999.26
b)	First point controlled by one 6A switch above 10 Meter and up to 20 Meter length.	Nos.	14.00	3,783.23	52,965.24
c)	First point controlled by one 6A switch above 20 Meter length.	Nos.	9.00	6,386.85	57,481.62
1.6	Secondary Points				
	MCB/Switch controlled Secondary Points				
1.6.1	Supply & laying of 1.6 mm thick GI conduit with all accessories, labour and wiring from first light / Ceiling Fan/ Exhaust Fan / wall mount fan point/ 6A socket to subsequent points with 3 Runs (P+N+E) of 2.5 Sq. mm PVC insulated FRLSZH, 450/750 Volt grade, copper conductor wires in surface run with GI saddles or concealed or in GI raceway including cost of cutting & filling chases for recessed conduiting and complete with earthing of switch boxes. Cost of switches/sockets and switch boxes shall be paid separately.				
a)	Secondary point up to 10 Meter length.	Nos.	572.00	2,134.69	12,21,043.21
b)	Secondary point above 10 Meter and up to 20 Meter length.	Nos.	72.00	3,611.07	2,59,997.01
c)	Secondary point above 20 Meter length.	Nos.	22.00	6,002.42	1,32,053.24
1.6.2	Supply & laying of 1.6 mm thick GI conduit with all accessories, labour and wiring from first light / Ceiling Fan / Exhaust Fan / wall mount fan point / 6/16A socket to subsequent points with 2 Runs of 4.0 Sq.mm and 1 Run of 2.5 Sq.mm, PVC insulated FRLSZH, 450/750 Volt grade, copper conductor wires in surface run with GI saddles or concealed or in GI raceway including cost of cutting & filling chases for recessed conduiting and complete with earthing of switch boxes. Cost of switches/sockets and switch boxes shall be paid separately.				
a)	Secondary point up to 10 Meter length.	Nos.	74.00	2,463.91	1,82,329.69
b)	Secondary point above 10 Meter and up to 20 Meter length.	Nos.	72.00	4,014.54	2,89,046.74

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
c)	Secondary point above 20 Meter length.	Nos.	12.00	6,812.66	81,751.90
1.7	Supplying installation testing and commissioning of Industrial Socket with 3 Pin, controlled by 16A DP MCB in IP 54 rated surface/recessed box with the total unit having IP 54 ingress protection with incoming & outgoing cable box complete as required.	Nos.	3.00	4,695.70	14,087.10
1.8	Supplying installation testing and commissioning of Industrial Socket with 5 Pin, controlled by 32A FP MCB in IP 54 rated surface/recessed box with the total unit having IP 54 ingress protection with incoming & outgoing cable box complete as required.	Nos.	3.00	6,998.03	20,994.08
1.9	Supplying installation testing and commissioning of Industrial Socket with 5 Pin, controlled by 63A FP MCB in IP 54 rated surface/recessed box with the total unit having IP 54 ingress protection with incoming & outgoing cable box complete as required.	Nos.	3.00	8,418.63	25,255.88
	Sub-total for J.01				1,21,41,175.02
J.02	DISTRIBUTION BOARDS				
2	Design, supply, installation, testing & commissioning of front operated, front access cubicle type indoor duty, dead front, wall / recess/ surface mounted as per drawings and specifications. The distribution boards shall be of sheet steel enclosure with copper bus bars suitable for single or three phase MCBs. The MCB DB shall have sheet steel hinged lockable door top with Triangular key lock to prevent access to MCBs from outside. The DB Shall have suitable phase segregating barriers, LED indicating lamps for incoming feeders, knockouts, gland plates for entry of cables & conduits, all internal wiring using PVC FRLSZH wires, independent Neutral & earthing terminals for each phase, bonding of earth to all removable parts etc. complete as per specification, drawings as required.				
a)	The rate shall include the MS powder coated raceway system of matching colour of DB to route the wires dropping from the ceiling or rising from the floor into the DBs.				
b)	MCBs shall conform to IEC 60898 (latest) and, with breaking capacity 10 kA at 415 V AC, current limiting type lower power loss appx 40 - 70% of the stipulated value and suitable for magnetic releases operating between 3 to 5 times rated current for normal power distribution application and 5 to 10 times rated current for motor application duty, with minimum Electrical endurance of the order of 20000 operation cycles.				
c)	RCBO conforming to IEC 61009-1, IS 12640-2 shall be provided with 100mA sensitivity and electrically connected rated current capacity MCB for short circuit and over load protection as required				
d)	All incoming & outgoing feeders of DB shall be terminated on terminal blocks in the upper compartment including Internal wiring by manufacturer.				
e)	Class-B SPDs shall be provided in all DB incomers.				
2.1	Distribution Boards(Type-1) as per specification and Drawing as per following details. (LPDB, ULDB &ULPDB)	Nos.	14.00	54,778.31	7,66,896.34
	Distribution board unit for lighting combined with Small Power consisting of one compartments and upper compartment for terminal block with respective incoming 4 pole MCCBs having indications for incoming feeder status as per specifications and as shown on Drawing and as under:				
	INCOMER				
a)	1 no. 63 A, 16kA, 4P, MCCB				

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
b)	3 no. 32A DP RCBO for phase segregation.				
c)	80A, rated Cu., interconnection Busbar individually for all phases				
d)	1 set of (R,Y,B, ON, OFF, TRIP) indicating lamps.				
	OUTGOINGS with feeder.				
e)	12 nos. 10A/16A SP MCB arranged in sets of 4 nos. per phase.				
2.2	Distribution Boards (Type-2) as per specification and Drawing as per following details.(LDB, LPDB & ULPDB)	Nos.	18.00	63,911.11	11,50,399.97
	Distribution board unit for lighting combined with Small Power consisting of one compartments and upper compartment for terminal block with respective incoming 4 pole MCCBs having indications for incoming feeder status as per specifications and as shown on Drawing and as under:				
	INCOMER				
a)	1 no. 63 A, 16kA, 4P, MCCB				
b)	3 no. 32A DP RCBO for phase segregation.				
c)	80A, rated Cu., interconnection Busbar individually for all phases				
d)	1 set of (R,Y,B, ON, OFF, TRIP) indicating lamps.				
	OUTGOINGS with feeder.				
e)	18 nos. 10A/16A/20A SP MCB arranged in sets of 6 nos. per phase.				
2.3	Distribution Boards(Type-3) as per specification and Drawing as per following details.(LDB,PDB, ULDB & ULPDB)	Nos.	14.00	65,725.25	9,20,153.55
	Distribution board unit for lighting combined with Small Power consisting of one compartments and upper compartment for terminal block with respective incoming 4 pole MCCBs having indications for incoming feeder status as per specifications and as shown on Drawing and as under:				
	INCOMER				
a)	1 no. 63 A, 16kA, 4P, MCCB				
b)	3 no. 32A DP RCBO for phase segregation.				
c)	80A, rated Cu., interconnection Busbar individually for all phases				
d)	1 set of (R,Y,B, ON, OFF, TRIP) indicating lamps.				
	OUTGOINGS with feeder.				
e)	24 nos. 10A/16A/20A SP MCB arranged in sets of 8 nos. per phase.				
2.4	Lighting Distribution Boards (LDB) as per specification and Drawing as per following details.	Nos.	1.00	68,279.67	68,279.67
	Distribution board unit for lighting combined with Small Power consisting of one compartments and upper compartment for terminal block with respective incoming 4 pole MCCBs having indications for incoming feeder status as per specifications and as shown on Drawing and as under:				
	INCOMER				
a)	1 no. 63 A, 16kA, 4P, MCCB				
b)	3 no. 40A DP RCBO for phase segregation.				
c)	80A, rated Cu., interconnection Busbar individually for all phases				
d)	1 set of (R,Y,B, ON, OFF, TRIP) indicating lamps.				
	OUTGOINGS with feeder.				
e)	36 Nos. of 10A/16A/20A SP MCB arranged in sets of 12 nos. per phase.				

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
2.5	Lighting Distribution Boards (LDB) as per specification and Drawing as per following details.(Advertisement)	Nos.	6.00	50,157.91	3,00,947.46
	Distribution board unit for lighting combined with Small Power consisting of one compartments and upper compartment for terminal block with respective incoming 4 pole MCCBs having indications for incoming feeder status as per specifications and as shown on Drawing and as under:				
	INCOMER				
a)	1 no. 63 A, 16kA, 4P, MCCB				
b)	3 no. 40A DP RCBO for phase segregation.				
c)	80A, rated Cu., interconnection Busbar individually for all phases				
d)	1 set of (R,Y,B, ON, OFF, TRIP) indicating lamps.				
	OUTGOINGS with feeder.				
e)	3 nos. 32A TP MCBs				
f)	9 Nos. of 20A/32A SP MCB arranged in sets of 3 nos. per phase.				
2.6	HVAC Distribution Board as per specification & Drawing as per following details.				
2.6.1	HVAC Distribution Board	Nos.	2.00	55,643.90	1,11,287.80
	Distribution board (HVAC-DB) unit with respective incoming 4P MCCBs having R,Y,B, ON,OFF TRIP indications for incoming feeder status as per specifications and as under:				
	INCOMER				
a)	1 no. 160A, 16kA, 4P MCCB set at 125A.				
b)	200A, rated Cu., interconnection Busbar individually for all phases				
c)	3 no. 63A DP RCBO for phase segregation.				
d)	1 set of (R,Y,B, ON, OFF, TRIP) indicating lamps.				
	OUTGOINGS with feeder.				
e)	15 Nos of 16 A SP MCB arranged in sets of 5 nos. per phase.				
f)	2 Nos of 63 A, 4P, MCCB.				
2.6.2	HVAC Distribution Board.(Type-2)	Nos.			
	Distribution board (HVAC-DB) unit with respective incoming 4P MCCBs having R,Y,B, ON,OFF TRIP indications for incoming feeder status as per specifications and as under:				
	INCOMER				
a)	1 no. 160A, 16kA, 4P MCCB set at 125A.				
b)	200A, rated Cu, interconnection Busbar individually for all phases				
c)	3 no. 63A DP RCBO for phase segregation.				
d)	1 set of (R,Y,B, ON, OFF, TRIP) indicating lamps.				
	OUTGOINGS with feeder.				
e)	21 Nos of 16 A SP MCB arranged in sets of 7 nos. per phase.				
f)	5 Nos of 63 A, 4P, MCCB.				
2.7	Enclosure Box				

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
	Design, Supply, Installation, Testing and Commissioning of Enclosure/Isolator Box fabricated using CRCA Sheet Steel of 2mm. thick and powder coated (65 Micron Minimum) surface/recess mountable unit having IP 54 with suitable current rated 4P MCCB with external 300 mA earth leakage module, spreaders & shrouds at all terminals, gland plate for incoming & outgoing cables and with suitably rated MCB controlled multiple LED lamps (Red, Yellow, Blue) for Phase indication and (Red, Green, Amber) for ON, OFF & Trip status with all required accessories suitable for 230 VAC operation complete as required and approved.				
2.7.1	63A, 4P MCCB with external 300 mA earth leakage module & 10A, DP MCB for Lift, complete as required.	Nos.	6.00	25,234.49	1,51,406.92
2.7.2	100A, 4P MCCB with external 300 mA earth leakage module for Escalator, complete as required.	Nos.	12.00	28,038.58	3,36,463.02
2.7.3	125A, 4P MCCB with external 300 mA earth leakage module for S&T UPS, complete as required.	Nos.	2.00	33,054.52	66,109.05
2.7.4	250A, 4P MCCB with external 300 mA earth leakage module for Fire panel, complete as required.	Nos.	1.00	44,989.63	44,989.63
2.7.5	400A, 4P MCCB with external 300 mA earth leakage module for MDB-2 panel, complete as required.	Nos.	1.00	59,603.96	59,603.96
	Sub-total for J.02				39,76,537.37
J.03	MV CABLING & BUSDUCTS				
3.1	Power Cables				
3.1.1	Supply, laying, testing and commissioning of 1100 V grade, XLPE insulated, PVC extruded, armoured, FRLSZH, Copper (Cu) Conductor cables as per Technical specification on existing trays/ walls/ columns /indoor /trenches including the cost of supports with suitable clamps, saddles, hooks, Anchor fasteners, bolts etc. including proper dressing of cables, Route markers, providing identification tags, earthing of glands armouring etc. complete as per specifications and as required. The cost of cable trays or ladders, excavation and back filling of trenches will be measured separate. The cost shall include Heat Shrinkable cable jointing kits for joining cables wherever joints are unavoidable due to unavailability of required length of cable in standard drum length.				
a)	3.5 core 300 sq. mm Cu Conductor	M	207.00	10,674.68	22,09,658.67
b)	3.5 core 240 sq. mm Cu Conductor	M	20.00	8,537.17	1,70,743.40
c)	3.5 core 185 sq. mm Cu Conductor	M	217.00	6,621.72	14,36,912.64
d)	3.5 core 150 sq. mm Cu Conductor	M	142.00	5,327.44	7,56,496.22
e)	3.5 core 120 sq. mm Cu Conductor	M	157.00	4,358.34	6,84,259.27
f)	3.5 core 95 sq. mm Cu Conductor	M	64.00	3,365.00	2,15,360.05
g)	3.5 core 70 sq. mm Cu Conductor	M	36.00	2,501.21	90,043.65
h)	3.5 core 50 sq. mm Cu Conductor	M	786.00	1,714.49	13,47,590.90
i)	3.5 core 35 sq. mm Cu Conductor	M	214.00	1,327.94	2,84,179.07
j)	3.5 core 25 sq. mm Cu Conductor	M	143.00	1,183.82	1,69,286.30
k)	4 core 35 sq. mm Cu Conductor	M	1429.00	1,503.48	21,48,469.76
l)	4 core 25 sq. mm Cu Conductor	M	2791.00	1,130.49	31,55,195.38
m)	4 core 16 sq. mm Cu Conductor	M	1754.00	756.86	13,27,533.44
n)	4 core 10 sq. mm Cu Conductor	M	29.00	519.86	15,076.04
o)	4 core 6 sq. mm Cu Conductor	M	29.00	364.62	10,573.95
p)	4 core 4 sq. mm Cu Conductor	M	1714.00	269.50	4,61,923.27
q)	3 core 50 sq. mm Cu Conductor	M	214.00	1,504.45	3,21,952.94
r)	3 core 16 sq. mm Cu Conductor	M	29.00	614.76	17,828.15
s)	3 core 10 sq. mm Cu Conductor	M	100.00	419.83	41,983.37
t)	3 core 6 sq. mm Cu Conductor	M	72.00	271.04	19,514.91
u)	3 core 4 sq. mm Cu Conductor	M	572.00	206.35	1,18,031.84
v)	3 core 2.5 sq. mm Cu Conductor	M	500.00	167.04	83,522.47
w)	2 core 16 sq. mm Cu Conductor	M	143.00	434.10	62,075.66

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
3.1.2	Cable end termination of cables detailed in item 3.1.1 above - including cost of supplying and fixing of tinned copper Crimping type lugs, double compression brass glands including earthing, insulation tape etc. Gland should be earthed individually with gland ring copper strip and copper wire, complete as per specifications and as required.				
a)	3.5 core 300 sq. mm Cu Conductor	Nos.	7.00	5,139.94	35,979.60
b)	3.5 core 240 sq. mm Cu Conductor	Nos.	2.00	4,300.27	8,600.54
c)	3.5 core 185 sq. mm Cu Conductor	Nos.	14.00	3,413.62	47,790.66
d)	3.5 core 150 sq. mm Cu Conductor	Nos.	4.00	2,310.95	9,243.81
e)	3.5 core 120 sq. mm Cu Conductor	Nos.	6.00	1,824.58	10,947.51
f)	3.5 core 95 sq. mm Cu Conductor	Nos.	3.00	1,410.35	4,231.06
g)	3.5 core 70 sq. mm Cu Conductor	Nos.	3.00	1,257.56	3,772.67
h)	3.5 core 50 sq. mm Cu Conductor	Nos.	19.00	951.44	18,077.37
i)	3.5 core 35 sq. mm Cu Conductor	Nos.	3.00	1,212.30	3,636.90
j)	3.5 core 25 sq. mm Cu Conductor	Nos.	3.00	1,176.14	3,528.41
k)	4 core 35 sq. mm Cu Conductor	Nos.	29.00	731.74	21,220.33
l)	4 core 25 sq. mm Cu Conductor	Nos.	43.00	675.18	29,032.74
m)	4 core 16 sq. mm Cu Conductor	Nos.	86.00	573.61	49,330.41
n)	4 core 10 sq. mm Cu Conductor	Nos.	9.00	483.96	4,355.68
o)	4 core 6 sq. mm Cu Conductor	Nos.	3.00	444.48	1,333.45
p)	4 core 4 sq. mm Cu Conductor	Nos.	43.00	408.54	17,567.11
q)	3 core 50 sq. mm Cu Conductor	Nos.	3.00	802.30	2,406.91
r)	3 core 16 sq. mm Cu Conductor	Nos.	3.00	543.74	1,631.21
s)	3 core 10 sq. mm Cu Conductor	Nos.	9.00	475.84	4,282.59
t)	3 core 6 sq. mm Cu Conductor	Nos.	7.00	394.86	2,764.03
u)	3 core 4 sq. mm Cu Conductor	Nos.	4.00	361.21	1,444.85
v)	3 core 2.5 sq. mm Cu Conductor	Nos.	14.00	394.84	5,527.74
w)	2 core 16 sq. mm Cu Conductor	Nos.	57.00	463.06	26,394.50
3.2	Control cables				
3.2.1	Supply, laying, testing and commissioning of Control cables of following size cables as per List of approved makes including the cost of jointing & termination with required accessories.				
a)	4 C x 1.5 sq. mm Cu Conductor	M	36.00	80.45	2,896.19
b)	5 C x 1.5 sq. mm Cu Conductor	M	36.00	103.56	3,728.12
c)	7 C x 1.5 sq. mm Cu Conductor	M	36.00	137.97	4,966.86
d)	8 C x 1.5 sq. mm Cu Conductor	M	286.00	168.19	48,102.54
e)	10 C x 1.5 sq. mm Cu Conductor	M	214.00	199.38	42,667.43
f)	12 C x 1.5 sq. mm Cu Conductor	M	286.00	229.47	65,628.54
g)	24 C x 1.5 sq. mm Cu Conductor	M	214.00	443.37	94,880.69
3.3	Cable Trays				

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
3.3.1	Supply, installation of factory fabricated, perforated , hot dip galvanized, double bended cable trays from 2 mm thick sheet steel continuously connected including inward, outward, horizontal & vertical bends, reducers, tees, flexible earth connector and other accessories. Trays shall be dully suspended from the ceiling with suitable approved make anchor fasteners, vertical GI rods of 12 mm dia / GI rigid angle supports, etc. or installed on suitable wall supported brackets as required complete as per specifications. All the cable tray accessories shall be factory pre-fabricated, until otherwise specific approval is obtained to fabricate at site.				
	Note: Trays shall be supported adequately using galvanized structural members. This support should be capable of withstanding the weight of the cables laid over it. Rigid ISA / ISMC / ISMB / flats support should be provided at every 3m length and also at diversions, crossings, bends and multi layered locations. Cost for additional supports shall be paid separately.				
a)	600 mm wide x 50 mm depth	M	457.00	1,803.54	8,24,219.48
b)	450 mm wide x 50 mm depth	M	357.00	1,470.71	5,25,044.68
c)	300 mm wide x 50 mm depth	M	922.00	1,130.21	10,42,054.73
d)	150 mm wide x 50mm depth	M	2843.00	697.66	19,83,444.65
e)	100 mm wide x 50mm depth	M	286.00	566.44	1,62,003.14
3.3.2	Supply, installation of factory fabricated, LADDER type , hot dip galvanized, double bended cable trays from 2.5 mm thick sheet steel continuously connected including inward, outward, horizontal & vertical bends, reducers, tees, flexible earth connector and other accessories. Trays shall be dully suspended from the ceiling with suitable approved make anchor fasteners, vertical GI rods of 12 mm dia / GI rigid angle supports, etc. or installed on suitable wall supported brackets as required complete as per specifications. All the cable tray accessories shall be factory pre-fabricated, until otherwise specific approval is obtained to fabricate at site.				
	Note: Trays shall be supported adequately using galvanized structural members. This support should be capable of withstanding the weight of the cables laid over it. Rigid ISA / ISMC / ISMB / flats support should be provided at every 3m length and also at diversions, crossings, bends and multi layered locations. Cost for additional supports shall be paid separately.				
a)	600 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 1000 mm (C/C)	M	143.00	1,443.28	2,06,388.50
b)	450 mm wide Runners 20 x 75 x 20 x 2.5 mm Rungs 20 x 30 x 20 x 2.5 mm 250 mm Centre to Centre (C/C) Suspenders 25 x 25 x 4 mm angle 1000 mm (C/C)	M	86.00	1,316.16	1,13,189.60
c)	300 mm wide Runners 20 x 75 x 20 x 2.5 mm Rungs 20 x 30 x 20 x 2.5 mm 250 mm Centre to Centre (C/C) Suspenders 25 x 25 x 4 mm angle 1000 mm (C/C)	M	57.00	1,177.80	67,134.80
3.3.3	Supply and installation of factory fabricated GI raceways with cover fabricated from 2.0 mm thick GI sheet with minimum zinc coating thickness as per IS-277 on both sides including removable cover plate of 3 mm. thick complete with all accessories like counter sunk cadmium plated brass screws, bends, tee-junctions, cross junction, Suitable size Tap off Boxes etc. rendered electrically continuous as approved and as per site conditions in following sizes				
a)	300 mm wide & 50 mm depth	M	22.00	1,324.38	29,136.46
b)	200 mm wide & 50 mm depth	M	857.00	1,173.80	10,05,942.54

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
c)	150 mm wide & 50 mm depth	M	72.00	798.88	57,519.64
d)	100 mm wide & 50 mm depth	M	23.00	628.48	14,455.09
3.3.4	Supply, installation and testing of raceways junction box in floor, fabricated from 2.0 mm thick GI with minimum coating thickness as per IS-277 on both sides with removable cover plate with 3 mm thickness complete with counter sunk cadmium plated brass screws, bends etc. rendered electrically continuous as approved and of following sizes				
a)	500 x 500 x 110 mm depth	No's	7.00	1,095.15	7,666.08
b)	500 x 150 x 110 mm depth	No's	14.00	797.15	11,160.07
c)	350 x 150 x 110 mm depth	No's	29.00	742.89	21,543.71
d)	150 x 145 x 110 mm depth	No's	43.00	686.71	29,528.43
e)	100 mm wide & 50 mm depth	No's	16.00	487.29	7,796.69
f)	250 x 250 x 50 mm depth	No's	43.00	3,554.27	1,52,833.40
3.3.5	Supply, fabrication & installation of hot dipped galvanized cable tray covers made out of 2.0 mm thick suitable for perforated & ladder trays including accessories like clamp, bolt nut etc. complete as per specifications, as required and as below.				
a)	600 mm wide	M	214.00	1,304.70	2,79,205.95
b)	450 mm wide	M	286.00	1,049.91	3,00,274.42
c)	300 mm wide	M	143.00	788.56	1,12,764.46
d)	150 mm wide	M	686.00	462.78	3,17,468.11
e)	100 mm wide	M	43.00	362.15	15,572.25
3.3.6	supply, fabrication and erection of cable tray supports made out of Hot dip galvanized (65 micron) GI angle / channels / flats fabricated to the required size and shape falling in the category of standard GI sections. Rate shall include cost of Anchor Fasteners and other accessories required for Installation of supports.	Kg	10982.00	163.97	18,00,771.50
a)	GI channel section of 100 x 65 mm				
b)	GI channel section of 75 x 75x 50 mm				
c)	GI channel section of 50 x 50 x 40 mm				
d)	GI L-Angle section of 75 x 75 x 8 mm				
e)	GI L-Angle section of 50 x 50 x 6 mm				
f)	GI L-Angle section of 40 x 40 x 5 mm				
g)	GI L-Angle section of 25 x 25 x 5 mm				
h)	GI L-Angle section of 25 x 25 x 3 mm				
i)	GI flat section of 75 x 10 mm				
j)	GI flat section of 65 x 10 mm				
k)	GI flat section of 65 x 8 mm				
l)	GI flat section of 50 x 6 mm				
m)	GI flat section of 40 x 5 mm				
n)	GI flat section of 25 x 5 mm				
o)	GI flat section of 25 x 3 mm				
3.4	Bus Trunking				

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
3.4.1	Supply, installation, testing and Commissioning of 25A, Copper, Lighting Bus Trunking System in easy detachable and convenient assembly suitable for 415 +-10% Volts, 3 Phase & Single Phase, 8 Wire, 50 Hz AC System with Cu Bus Conductors of minimum 2.5 sq. mm section in an extruded Aluminium enclosure, with tap off provision at every 1Mtr. The Lighting Bus Trunking shall be confirming to latest IEC Standards. It shall be with IP-55 Protection, halogen free and Fault Level withstand Capacity of 2.5 kA min for 0.1 Sec (Icw) and 9.6 kA (Ipk). The Bus Trunking shall be complete with accessories like supporting clamps for Installation at Site, Fixing Clamps for luminaries and cable & one run of Cu earthing of 25x3 Sq.mm minimum or equal to phase whichever is of higher size as required.				
a)	Straight Feeder with End feed, Cover with flexible Joint 25A	M	314.00	6,504.45	20,42,398.52
b)	10/16 A Single Phase Tap Off Boxes with fuse and indication.	Nos	126.00	674.04	84,929.54
	Sub-total for J.03				2,69,38,628.22
J.04	M V SWITCHGEAR				
4	Switch Boards/panels				
	Design, Fabrication, Assembling, Wiring, Supply, installation, testing & commissioning of LT Panels fabricated out of CRCA sheet steel 2 mm thick for structural members and 1.6 mm thick for doors and covers in cubical compartmentalized free standing floor mounted, dust and vermin proof with reinforcement of suitable size ISA / ISMC / ISMB / flats wherever necessary. Panels shall be treated with all anticorrosive process and powder coated (Minimum thickness 80 micron) with approved shade. Panels shall be suitable for 415V, 3 phase, 4 wire, 50 Hz power supply system to withstand rated symmetrical fault level at 415 V including interconnections, bonding to earth etc. Panels shall be provided with 25% spare space, space heaters, compartmental lights, lifting hooks as required and 2 Nos of Earthing Terminals. All internal wiring in the panels shall be carried out using high temperature FRLSZH wires. The panels shall confirm to IP-54. Galvanized hardwares with Zinc passivation shall be used.				
a)	All panels shall be of Totally Type Tested Assemblies (TTTA) with Form 4B Type 6 of construction confirming to IEC 61439 including Earth fault protection complete as per specification.				
b)	The panels shall be provided with detachable gland plates of 3mm thickness for entry of cables from the top/bottom as required.				
c)	All live accessible parts shall be shrouded and all equipment shall be finger touch proof. SMC/DMC shrouds and busbars supports shall be suitably spaced.				
d)	The tinned copper bus bars including neutral shall be of 100% current rating and shall be insulated through out with colour coded heat shrinkable sleeves. Bus Bar Sizing calculations shall be submitted for approval of Engineer/KRIDE.				
e)	All components shall be connected to a common internal copper earth bus bar of minimum size 50mm x 6mm.				
f)	Hinged doors with Neoprene type gaskets & Triangle key lock facility shall be provided on Doors and all outgoing feeders with switch handles lockable in OFF position.				
g)	Each incomer and outgoing feeder shall be provided with suitably rated MCB controlled multiple LED lamps (Red, Yellow, Blue) for Phase indication and (Red, Green, Amber) for ON, OFF & Trip status with all required accessories suitable for 230 VAC operation as approved.				
h)	The makes of components and accessories shall be unique for all the panels under this contract in order to have uniformity and standardization				

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
i)	All MCCBs shall be current limiting type microprocessor based releases having continuously adjustable current setting in the range of 0.4 to 1.0 and 2-10 times of short circuit, rated for requisite specified Service short circuit breaking capacity (Ics) suitable for isolation conforming to latest IS/IEC60947-2 duly marked on MCCB, at operating voltage (Ue) of 415 V, insulation voltage (Ui) 1100 V and with trip free mechanism, handle indicating ON/OFF/tripped position. The breaking capacity as mentioned in items of BOQ below. Breakers must have Ics = Icu = Icw.				
j)	All MCCB's shall be 4 pole with Over Load Protection and Earth Fault sensing. MCCBs shall be suitably designed to provide protection of motors, cables, busbars to suit rated current, unbalanced power distribution as required and with front adjustable overload and short circuit releases and minimum electrical endurance shall be of the order of suitable operation cycles as specified in the Technical Specification.				
k)	All the Panels shall be equipped with required accessories for establishing BMS connectivity through open protocol like Modbus and shall be able to remotely read the parameters.				
l)	MCBs shall conform to IEC898/IS 8828 (latest) and, with breaking capacity 10 kA at 415 VAC, current limiting type lower power loss appx 40 - 70% of the stipulated value and suitable for magnetic releases operating between 3 to 5 times rated current for normal power distribution application and 5 to 10 times rated current for motor application duty, with minimum Electrical endurance of the order of 20000 operation cycles.				
m)	Panel design shall be compact to economies the room space available.				
n)	All incomer ACB's shall be provided with minimum 6 NO + 6 NC contacts and there should be provision to add min. 6 NO+ 6 NC Auxiliary contacts.				
o)	All 4-pole ACBs, MCCBs & MCBs shall have fully rated neutral pole. Class "B" SPDs shall be provided in all DBs and Panels.				
p)	The panels shall be provided with polymer based fire trace tube system. Scheme of fire trace tube system shall be got approved by Engineer/KRIDE before proceeding with manufacturing and assembly. Cost for this item shall be paid under suitable Item of Fire fighting works. Contractor shall interface with OEM of panel and Panel flooding system and ensure that the provision is made during fabrication of panel itself.				
q)	Internal control wiring in the Starters shall be done with FRLSZH PVC insulated cables of adequate size. Internal wiring, contactors, relay contacts, push button contacts should be rated not less than 2.5 sq. mm. All MCCB shall be motorized with RS 485 type communication port for BMS/SCADA functioning				
r)	All switch boards/ panels shall be provided with necessary Surge Protection for Transient Over Voltages due to Lightning and switching surges shall be incorporated with suitable rating Surge Arresters under Class-1, Class-2, Class-3 of IEC 61643.				
s)	All panel shall have IP 54 protection for indoor application and IP 65 for outdoor application.				
t)	The load demand, cable size and route length are indicative only and contractor shall evaluate the adequacy of the switch gear and voltage drop norms.				
u)	Class-B SPDs shall be provided in all panels and Distribution Boards to meet all functional requirement as per IEC 61643-12 or latest.				
4.1	Main Distribution Board (MDB) complete as per specifications & Drawing with following:				
4.1.1	Main Distribution Board (MDB-1)	Nos.	1.00	22,21,491.65	22,21,491.65
A	Transformer - I Incoming				

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
	1 No. of 1000 A, 415V, 50kA, 4P draw out Electrically operated (Motorized) fully draw out (EODO) type ACB with built in Microprocessor based release unit for Over Current, Short circuit and earth fault protection with adjustable setting and time log facility for each of the fault for achieving discrimination along with distinct fault indication through LED's. ACB shall be provided with continuous rated shut trip release suitable for 230 VAC operation, suitable handles to operate ACB manually and spring charging device suitable for 1 phase, 240VAC operation. ACB shall have in built compatibility through open protocol like Modbus for SCADA/BMS connectivity (RS485) along with following accessories.				
i)	1 No. of Multi Function Meter of accuracy class-0.5s with all required to measure and display the Electrical quantities like, Current, Voltage, Active Energy-KWA, Reactive Energy-kVAH, frequency, Maximum Demand-KVA/KW, Total Harmonic Distortion & power factor etc. with facility conforming to specifications and latest IEC standards& suitable size summing CTs for metering supporting SCADA/BMS connectivity				
ii)	1 No. of Digital Ammeter with selector switch and Required set of CTs, MCBs and Accessories				
iii)	1 No. of Digital Voltmeter with selector switch and Required set of MCBs and Accessories				
iv)	1 set of MCB controlled Breaker ON/OFF/TRIP indicating lamps and ON/OFF push buttons.				
v)	1 set of MCB controlled phase indicating lamps for all three phases.				
vi)	4 Nos. of cast resin current transformers of 1000/5 ratio with 15 VA Burden & Class 5P10 for protection				
vii)	3 Nos. of cast resin current transformers of 1000/5 ratio with 15VA burden and Class 0.2s for measurement				
viii)	3 nos. cast resin current transformers of 1000/5 ratio with 15VA burden and Class 0.5 for APFC relay /AHF				
ix)	1 set of Under Voltage Relay with complete accessories.				
x)	1 set of Over Voltage Relay with complete accessories.				
	1 set of Instantaneous Over Current Relay (50)				
	1 set of IDMT Over Current Relay (51)				
	1 set of Earth Fault protection relay (51N)				
	1 set of Ground fault protection relay (50N)				
	1 set of reverse power protection and phase sequence protection				
xi)	Auxiliary contacts required for necessary interlocking of Transformers, HT< breakers.				
xii)	Class-B, SPDs shall be provided in all panels and Distribution Boards as per IEC 61643-12 or latest.				
xiii)	Contractor shall provide an earmarked potential free terminals for SCADA signals as per specification & requirements.				
B	Transformer - II Incoming				

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
	1 No. of 1000 A, 415V, 50kA, 4P draw out Electrically operated (Motorized) fully draw out (EODO) type ACB with built in Microprocessor based release unit for Over Current, Short circuit and earth fault protection with adjustable setting and time log facility for each of the fault for achieving discrimination along with distinct fault indication through LED's. ACB shall be provided with continuous rated shut trip release suitable for 230 VAC operation, suitable handles to operate ACB manually and spring charging device suitable for 1 phase, 240VAC operation. ACB shall have in built compatibility through open protocol like Modbus for SCADA/BMS connectivity (RS485) along with following accessories.				
i)	1 No. of Multi Function Meter of accuracy class-0.5s with all required to measure and display the Electrical quantities like, Current, Voltage, Active Energy-KWA, Reactive Energy-kVAH, frequency, Maximum Demand-KVA/KW, Total Harmonic Distortion & power factor etc. with facility conforming to specifications and latest IEC standards & suitable size summing CTs for metering supporting SCADA/BMS connectivity				
ii)	1 No. of Digital Ammeter with selector switch and Required set of CTs, MCBs and Accessories				
iii)	1 No. of Digital Voltmeter with selector switch and Required set of MCBs and Accessories				
iv)	1 set of MCB controlled Breaker ON/OFF/TRIP indicating lamps and ON/OFF push buttons.				
v)	1 set of MCB controlled phase indicating lamps for all three phases.				
vi)	4 Nos. of cast resin current transformers of 1000/5 ratio with 15 VA Burden & Class 5P10 for protection				
vii)	3 Nos. of cast resin current transformers of 1000/5 ratio with 15VA burden and Class 0.2s for measurement				
viii)	3 nos. cast resin current transformers of 1000/5 ratio with 15VA burden and Class 0.5 for APFC relay /AHF				
ix)	1 set of Under Voltage Relay with complete accessories.				
x)	1 set of Over Voltage Relay with complete accessories.				
	1 set of Instantaneous Over Current Relay (50)				
	1 set of IDMT Over Current Relay (51)				
	1 set of Earth Fault protection relay (51N)				
	1 set of Ground fault protection relay (50N)				
	1 set of reverse power protection and phase sequence protection				
xi)	Auxiliary contacts required for necessary interlocking of Transformers, HT< breakers.				
xii)	Class-B, SPDs shall be provided in all panels and Distribution Boards as per IEC 61643-12 or latest.				
xiii)	Contractor shall provide an earmarked potential free terminals for SCADA signals as per specification & requirements.				
C	Bus Coupler				

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
	1 No. of 1000 A, 415V, 50kA, 4P draw out Electrically operated (Motorized) fully draw out (EODO) type ACB with built in Microprocessor based release unit for Over Current, Short circuit and earth fault protection with adjustable setting and time log facility for each of the fault for achieving discrimination along with distinct fault indication through LED's. ACB shall be provided with continuous rated shut trip release suitable for 230 VAC operation, suitable handles to operate ACB manually and spring charging device suitable for 1 phase, 240VAC operation. ACB shall have in built compatibility through open protocol like Modbus for SCADA/BMS connectivity (RS485) along with following accessories.				
i)	1 set of MCB controlled Breaker ON/OFF/TRIP indicating lamps and ON/OFF push buttons.				
ii)	Auxiliary contacts required for necessary interlocking of Transformers, HT< breakers.				
iii)	Contractor shall provide an earmarked potential free terminals for SCADA signals as per specification & requirements.				
iv)	Two incomers shall be interlocked electrically & mechanically, so as only any 02 out of 03 ACBs can be closed at any time.				
D	Busbar				
	Electrolytic high conductivity tinned copper three phase and neutral busbars rated at 1200 A as per specification, suitable to withstand symmetrical fault level of 50 kA at 415 V with 100% rated neutral busbar.				
E	Outgoing-1				
a)	1 no. 630 A, 415V, $I_{cs}=35$ kA, FP MCCB's with variable overcurrent and short circuit and earth fault releases & 3 nos. cast resin current transformers of 630/5 ratio with 15 VA Burden & Class 1.0 for Ammeter with Ammeter selector Switch & suitably rated MCB controlled multiple LED lamps (Red, Green, Amber) for ON, OFF & Trip status with all required accessories suitable for 230 VAC operation as approved.				
b)	1 no. 400 A, 415V, $I_{cs}=35$ kA, FP MCCB's with variable overcurrent and short circuit and earth fault releases & 3 nos. cast resin current transformers of 400/5 ratio with 15 VA Burden & Class 1.0 for Ammeter with Ammeter selector Switch suitably rated MCB controlled multiple LED lamps (Red, Green, Amber) for ON, OFF & Trip status with all required accessories suitable for 230 VAC operation as approved.				
c)	2 no. 160 A, 415V, $I_{cs}=35$ kA, FP MCCB's with variable overcurrent and short circuit and earth fault releases & 3 nos. cast resin current transformers of 160/5 ratio with 15 VA Burden & Class 1.0 for Ammeter with Ammeter selector Switch suitably rated MCB controlled multiple LED lamps (Red, Green, Amber) for ON, OFF & Trip status with all required accessories suitable for 230 VAC operation as approved.				
d)	2 no. 160/125 A, 415V, $I_{cs}=35$ kA, FP MCCB's and with variable overcurrent and short circuit and earth fault releases & 3 nos. cast resin current transformers of 160/5 ratio with 15 VA Burden & Class 1.0 for Ammeter with Ammeter selector Switch suitably rated MCB controlled multiple LED lamps (Red, Green, Amber) for ON, OFF & Trip status with all required accessories suitable for 230 VAC operation as approved.				
F	Outgoing-2				

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
e)	1 no. 630 A, 415V, $I_{cs}=35$ kA, FP MCCB's with LSIG Protection variable overcurrent and short circuit earth fault releases & 3 nos. cast resin current transformers of 630/5 ratio with 15 VA Burden & Class 1.0 for Ammeter with Ammeter selector Switch suitably rated MCB controlled multiple LED lamps (Red, Yellow, Blue) for Phase indication and (Red, Green, Amber) for ON, OFF & Trip status with all required accessories suitable for 230 VAC operation as approved.				
f)	2 no. 400 A, 415V, $I_{cs}=35$ kA, FP MCCB's with variable overcurrent and short circuit and earth fault releases & 3 nos. cast resin current transformers of 400/5 ratio with 15 VA Burden & Class 1.0 for Ammeter with Ammeter selector Switch suitably rated MCB controlled multiple LED lamps (Red, Green, Amber) for ON, OFF & Trip status with all required accessories suitable for 230 VAC operation as approved.				
g)	1 no. 250 A, 415V, $I_{cs}=35$ kA, FP MCCB's with variable overcurrent and short circuit and earth fault releases & 3 nos. cast resin current transformers of 250/5 ratio with 15 VA Burden & Class 1.0 for Ammeter with Ammeter selector Switch suitably rated MCB controlled multiple LED lamps (Red, Yellow, Blue) for Phase indication and (Red, Green, Amber) for ON, OFF & Trip status with all required accessories suitable for 230 VAC operation as approved.				
h)	2 no. 160 A, 415V, $I_{cs}=35$ kA, FP MCCB's with variable overcurrent and short circuit and earth fault releases & 3 nos. cast resin current transformers of 160/5 ratio with 15 VA Burden & Class 1.0 for Ammeter with Ammeter selector Switch suitably rated MCB controlled multiple LED lamps (Red, Green, Amber) for ON, OFF & Trip status with all required accessories suitable for 230 VAC operation as approved.				
i)	1 no. 160/125 A, 415V, $I_{cs}=35$ kA, FP MCCB's and with variable overcurrent and short circuit and earth fault releases & 3 nos. cast resin current transformers of 160/5 ratio with 15 VA Burden & Class 1.0 for Ammeter with Ammeter selector Switch suitably rated MCB controlled multiple LED lamps (Red, Green, Amber) for ON, OFF & Trip status with all required accessories suitable for 230 VAC operation as approved.				
j)	1 no. 63 A, 415V, $I_{cs}=35$ kA, FP MCCB's and with variable overcurrent and short circuit and earth fault releases & 3 nos. cast resin current transformers of 63/5 ratio with 15 VA Burden & Class 1.0 for Ammeter with Ammeter selector Switch suitably rated MCB controlled multiple LED lamps (Red, Green, Amber) for ON, OFF & Trip status with all required accessories suitable for 230 VAC operation as approved.				
4.2	Design, Supply, installation, testing commissioning of Essential Power Panel (MDB-2) complete with Automatic Transfer System complete as per specifications & Drawing with following:				
4.2.1	Essential Power Panel (MDB-2)	Nos.	1.00	17,17,658.19	17,17,658.19
A	INCOMER				
a)	Automatic Transfer Switch (ATS) with provision for receiving two independent source power supply (one incoming supply from MDB-1 and one incoming supply from DG-AMF panel), with 2 Nos. 630A, 35 kA, 4 pole, motorized MCCBs, electrically and mechanically interlocked on a common base frame and controller having selector switch for automatic & manual operation on both the sources. ATS to be equipped with source power sensing, automatic changeover, 3-phase Under-voltage protection, Phase Sequence Protection and test facility inbuilt in the controller and RS 485 communication port with compatibility for interfacing with BMS/SCADA. The trip unit of MCCB shall be with adjustable Overload protection, Short Circuit protection, shunt trip coil, auxiliary contacts for ON, OFF, TRIP indication etc. as per drawing and specifications along with 02 sets of following accessories.				

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
i)	2 No. of Multi Function Meter of accuracy class-0.5s with all required to measure and display the Electrical quantities like, Current, Voltage, Active Energy-KWA, Reactive Energy-kVAH, frequency, Maximum Demand-KVA/KW, Total Harmonic Distortion & power factor etc. with facility conforming to specifications and latest IEC standards & suitable size summing CTs for metering supporting SCADA/BMS connectivity				
ii)	2 No. of Digital Ammeter with selector switch and Required set of CTs, MCBs and Accessories				
iii)	2 No. of Digital Voltmeter with selector switch and Required set of MCBs and Accessories				
iv)	2 set of MCB controlled Breaker ON/OFF/TRIP indicating lamps.				
v)	2 set of MCB controlled phase indicating lamps for all three phases.				
vi)	Auxiliary contacts required for necessary interlocking of breakers.				
vii)	6 Nos. of cast resin current transformers of 630/5 ratio with 15VA burden and Class 0.2s for measurement.				
viii)	Class-B, SPDs shall be provided in all panels and Distribution Boards.				
ix)	Contractor shall provide an earmarked potential free terminals for SCADA signals as per specification & requirements.				
B	Busbar				
	Electrolytic high conductivity tinned copper three phase and neutral busbars rated at 800 A as per specification, suitable to withstand symmetrical fault level of 35 kA at 415 V with 100% rated neutral busbar.				
C	Outgoing Units				
a)	2 nos. 250 A, 415V, Ics=35 kA, FP MCCB's with fixed neutral and with variable overcurrent and short circuit releases with 1 set each of MCB controlled Breaker ON/OFF/TRIP and phase indicating lamps.				
b)	6 nos. 125 A, 415V, Ics=35 kA, FP MCCB's with fixed neutral and with variable overcurrent and short circuit releases with 1 set each of MCB controlled Breaker ON/OFF/TRIP and phase indicating lamps.				
c)	16 no. 63 A, 415V, Ics=35 kA, FP MCCB's with fixed neutral and with variable overcurrent and short circuit releases with 1 set each of MCB controlled Breaker ON/OFF/TRIP and phase indicating lamps.				
4.3	Design, Supply, installation, testing commissioning of Main lighting & Power panel (MLP) complete as per specifications & Drawing with following:				
4.3.2	Main Lighting & Power panel (MLP)	Nos.	1.00	12,83,793.61	12,83,793.61
A	Incomer (from MDB-1)				
	1 No. of 200 A, 415V, 25kA, 4P MCCB with built in Microprocessor based release unit for Over Current, Short circuit and earth fault protection with adjustable settings. MCCB shall be double braking type with line load reversibility and suitable for positive isolation. the breaking capacity of MCCB shall be Ic=Icu. MCCB shall have in built compatibility through open protocol like Modbus for SCADA/BMS connectivity (RS485) along with following accessories.				
i)	1 No. of Multi Function Meter of accuracy class-0.5s with all required to measure and display the Electrical quantities like, Current, Voltage, Active Energy-KWA, Reactive Energy-kVAH, frequency, Maximum Demand-KVA/KW, Total Harmonic Distortion & power factor etc. with facility conforming to specifications and latest IEC standards. MFM shall have in built compatibility through open protocol like Modbus for SCADA/BMS connectivity (RS485) and all required accessories.				
ii)	Auxiliary contacts required for necessary interlocking.				
iii)	Class-B, SPDs shall be provided in all panels and Distribution Boards.				
iv)	1 set of MCB controlled Breaker ON/OFF/TRIP indicating lamps.				
v)	1 set of MCB controlled phase indicating lamps for all three phases.				
vi)	Contractor shall provide an earmarked potential free terminals for SCADA signals as per specification & requirements.				

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
B	BUSBAR				
	Electrolytic high conductivity tinned copper three phase and neutral busbars rated at 250 A as per specification, suitable to withstand symmetrical fault level of 25 kA at 415 V with 100% rated neutral busbar.				
C	OUTGOING				
	20 Nos. of 63A, 415V, 25kA, FP MCCB, with fixed neutral and variable overcurrent & short circuit releases. Suitably rated AC3 Duty power contactor of with necessary NO & NC auxiliary contacts as required for operation through BMS, Auto/ manual selector switch, 1 set of MCB controlled Breaker ON/OFF/TRIP indicating lamps, complete as required and approved.				
4.4	Design, Supply, installation, testing commissioning of Emergency (UPS) Power panel (EPP) complete as per specifications & Drawing with following:				
4.4.1	Emergency (UPS) Power panel (EPP)	Nos.	1.00	5,70,546.90	5,70,546.90
A	INCOMER				
	1 No. of 160 A, 415V, 35kA, 4P MCCB with built in Microprocessor based release unit for Over Current, Short circuit and earth fault protection with adjustable settings. MCCB shall be double braking type with line load reversibility and suitable for positive isolation. the breaking capacity of MCCB shall be $I_c=I_{cu}$. MCCB shall have in built compatibility through open protocol like Modbus for SCADA/BMS connectivity (RS485) along with following accessories.				
i)	1 No. of Multi Function Meter of accuracy class-0.5s with all required to measure and display the Electrical quantities like, Current, Voltage, Active Energy-KWA, Reactive Energy-kVAH, frequency, Maximum Demand-KVA/KW, Total Harmonic Distortion & power factor etc. with facility conforming to specifications and latest IEC standards. MFM shall have in built compatibility through open protocol like Modbus for SCADA/BMS connectivity (RS485) and all required accessories.				
ii)	Auxiliary contacts required for necessary interlocking.				
iii)	Class-B, SPDs shall be provided in all panels and Distribution Boards.				
iv)	Contractor shall provide an earmarked potential free terminals for SCADA signals as per specification & requirements.				
B	BUSBAR				
	Electrolytic high conductivity tinned copper three phase and neutral busbars rated at 200 A as per specification, suitable to withstand symmetrical fault level of 35 kA at 415 V with 100% rated neutral busbar.				
C	OUTGOING				
	15 Nos. of 63A, 415V, 25kA, FP MCCB, with fixed neutral and variable overcurrent & short circuit releases. Suitably rated AC3 Duty power contactor of with necessary NO & NC auxiliary contacts as required for operation through BMS, Auto / manual selector switch complete as required and approved.				
4.5	Design, Supply, installation, testing commissioning of Fire Pump Panel (FPP) complete as per specifications & Drawing with following:				
4.5.1	Fire Pump Panel (FPP)	Nos.	1.00	6,91,939.95	6,91,939.95
A	INCOMER				

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
	Automatic Transfer Switch (ATS) with provision for receiving two independent source power supply (one incoming supply from MDB-2 and one incoming supply from DG-AMF panel). with 2 Nos. 250A, 35 kA, 4 pole, motorized MCCBs, electrically and mechanically interlocked with common base frame and controller having selector switch for automatic & manual operation on both the sources. ATS to be equipped with source power sensing, automatic changeover, test facility, circuit breaker status indication (On, Off & Trip), 3 phase Under - voltage protection and Phase Sequence Protection inbuilt in the controller and RS 485 communication port with compatibility for interfacing with BMS/SCADA. The trip unit o MCCB shall be with adjustable Overload protection, Short Circuit protection, shunt trip coil, auxiliary contacts for ON, OFF, TRIP indication etc. as per drawing and specifications along with following.				
i)	1 No. of Multi Function Meter of accuracy class-0.5s with all required to measure and display the Electrical quantities like, Current, Voltage, Active Energy-KWA, Reactive Energy-kVAH, frequency, Maximum Demand-KVA/KW, Total Harmonic Distortion & power factor etc. with facility conforming to specifications and latest IEC standards.				
ii)	1 No. of Digital Ammeter with selector switch and Required set of CTs, MCBs and Accessories				
iii)	1 No. of Digital Voltmeter with selector switch and Required set of MCBs and Accessories				
iv)	1 set of MCB controlled Breaker ON/OFF/TRIP indicating lamps and ON/OFF push buttons.				
v)	1 set of MCB controlled phase indicating lamps for all three phases.				
vi)	Auxiliary contacts required for necessary interlocking of breakers.				
vii)	Class-B, SPDs shall be provided in all panels and Distribution Boards.				
viii)	Contractor shall provide an earmarked potential free terminals for SCADA signals as per specification & requirements.				
B	BUSBAR				
a)	Electrolytic high conductivity tinned copper three phase and neutral busbars rated at 400A as per specification, suitable with stand symmetrical fault level of 35kA at 415 V. The neutral busbar is to be of capacity as phases				
b)	Two incomers shall be interlocked electrically & mechanically with Automatic Transfer switch system so that only one supply is switched on at a time.				
C	OUTGOING				
a)	3 nos. 160 A, Ics=35 kA, 415 V, TP MCCB with fixed neutral and with variable overcurrent and short circuit releases				
a1)	3 nos. up to 75 HP, Star-Delta starter comprising 3 Nos. TP contactor AC-3 duty Auto/Manual switch, timer, Start Stop push button, & with potential free contacts for remote monitoring and control.				
	having the following item for each				
i)	1 No. of AC operated, 4 Digit, independent Digital Ammeter with selector switch, similar to Conzerv DM 3110 of Schneider or equivalent with necessary Circuit MCBs and with suitable size, 0.5 Class CTs connections as required for outgoing feeders				
ii)	1 set of start stop push buttons with inbuilt ON/OFF indicating lamps.				
iii)	Auto / Manual selector switch.				
iv)	Amber healthy trip indicating lamps.				
b)	5 no. 63/40A, Ics= 25 kA, 415 V, TP MCCB with fixed neutral and with variable overcurrent and short circuit releases, each with following:				

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
b1)	2 nos. (1 Working +1 Spare) up to 7.5 HP / 5.59 kW pump DOL starter for Jockey with potential free contacts for remote monitoring and control. monitoring and control.				
b2)	3 nos. (2 Working +1 Spare) up to 5 HP / 3.75 kW pump DOL starter with bimetallic over current relay with potential free contacts for remote monitoring and control. monitoring and control.				
	having the following item for each				
i)	1 No. of AC operated, 4 Digit, independent Digital Ammeter with selector switch, similar to Konzerv DM 3110 of Schneider or equivalent with necessary Circuit MCBs and with suitable size, 0.5 Class CTs connections as required for outgoing feeders				
ii)	1 set of start stop push buttons with inbuilt ON / OFF indicating lamps.				
iii)	Auto / Manual selector switch.				
iv)	Amber healthy trip indicating lamps				
c)	3 Nos.16A, Ics = 10kA, 230V, DP MCB (motor duty) each with following:				
c1)	3 nos. up to 2 HP / 1.5 kW pump DOL starter with bimetallic over current relay with potential free contacts for remote monitoring and control.				
	Having the following item for each				
i)	1 No. of AC operated, 4 Digit, independent Digital Ammeter with selector switch, similar to Konzerv DM 3110 of Schneider or equivalent with necessary Circuit MCBs and with suitable size, 0.5 Class CTs connections as required for outgoing feeders				
ii)	1 set of start stop push buttons with inbuilt ON/OFF indicating lamps.				
iii)	Auto / Manual selector switch.				
iv)	Amber healthy trip indicating lamps				
D	Auxiliary relay shall be provided which shall be activated by pressure switch for remote monitoring.				
4.6.2	Escalator Power Panel (ESPP) Type-1	Nos.	1.00	9,58,900.83	9,58,900.83
A	INCOMER				
	1 No. of 630 A, 415V, 35kA, 4P MCCB with built in Microprocessor based release unit for Over Current, Short circuit and earth fault protection with adjustable settings. MCCB shall be double braking type with line load reversibility and suitable for positive isolation. the breaking capacity of MCCB shall be $I_c=I_{cu}$. MCCB shall have in built compatibility through open protocol like Modbus for SCADA/BMS connectivity (RS485) along with following accessories.				
i)	1 No. of Multi Function Meter of accuracy class-0.5s with all required to measure and display the Electrical quantities like, Current, Voltage, Active Energy-KWA, Reactive Energy-kVAH, frequency, Maximum Demand-KVA/KW, Total Harmonic Distortion & power factor etc. with facility conforming to specifications and latest IEC standards. MFM shall have in built compatibility through open protocol like Modbus for SCADA/BMS connectivity (RS485) and all required accessories.				
ii)	Auxiliary contacts required for necessary interlocking.				
iii)	Class-B, SPDs shall be provided in all panels and Distribution Boards.				
iv)	1 set of MCB controlled Breaker ON/OFF/TRIP indicating lamps.				
v)	1 set of MCB controlled phase indicating lamps for all three phases.				
vi)	Contractor shall provide an earmarked potential free terminals for SCADA signals as per specification & requirements.				
B	BUSBAR				

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
	Electrolytic high conductivity tinned copper three phase and neutral busbars rated at 800 A as per specification, suitable to withstand symmetrical fault level of 25 kA at 415 V with 100% rated neutral busbar.				
C	OUTGOING				
a)	17 Nos. of 100A, 415V, 25kA, FP MCCB, with fixed neutral and variable overcurrent & short circuit releases. Suitably rated AC3 Duty power contactor of with necessary NO & NC auxiliary contacts as required for operation through BMS, Auto / manual selector switch, 1 set of MCB controlled Breaker ON/OFF/TRIP indicating lamps, complete as required and approved.				
4.7	Design, Supply, installation, testing commissioning of Commercial Power Panel (CPP) complete as per specifications & Drawing with following:				
4.7.1	Commercial Power Panel(CPP)	Nos.	1.00	6,43,847.37	6,43,847.37
A	INCOMER				
	1 No. of 160 A, 415V, 35kA, 4P MCCB with built in Microprocessor based release unit for Over Current, Short circuit and earth fault protection with adjustable settings. MCCB shall be double braking type with line load reversibility and suitable for positive isolation. the breaking capacity of MCCB shall be $I_c=I_{cu}$. MCCB shall have in built compatibility through open protocol like Modbus for SCADA/BMS connectivity (RS485) along with following accessories.				
i)	1 No. of Multi Function Meter of accuracy class-0.5s with all required to measure and display the Electrical quantities like, Current, Voltage, Active Energy-KWA, Reactive Energy-kVAH, frequency, Maximum Demand-KVA/KW, Total Harmonic Distortion & power factor etc. with facility conforming to specifications and latest IEC standards. MFM shall have in built compatibility through open protocol like Modbus for SCADA/BMS connectivity (RS485) and all required accessories.				
ii)	Auxiliary contacts required for necessary interlocking.				
iii)	Class-B, SPDs shall be provided in all panels and Distribution Boards.				
iv)	Contractor shall provide an earmarked potential free terminals for SCADA signals as per specification & requirements.				
v)	1 set of MCB controlled Breaker ON/OFF/TRIP indicating lamps.				
vi)	1 set of MCB controlled phase indicating lamps for all three phases.				
B	BUSBAR				
	Electrolytic high conductivity tinned copper three phase and neutral busbars rated at 200 A as per specification, suitable with stand symmetrical fault level of 35kA at 415 V. The neutral busbar is to be of same capacity as phases.				
C	OUTGOING				
a)	7 nos.63A $I_{cs}=10$ kA, 415V, FP MCB C-Curve with fixed neutral and with variable overcurrent and short circuit releases each having indication lamps to give ON/OFF/TRIP status				
b)	8 nos.32A $I_{cs}=10$ kA, 415V, FP MCB C-Curve with fixed neutral and with variable overcurrent and short circuit releases each having indication lamps to give ON/OFF/TRIP status				

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
c)	1 No. in each outgoing, Electronic Energy Meter with RS-485 port for measuring Current, Voltage Active and reactive Energy, Maximum Demand & Power factor etc. with TOD facility with suitable size of CT's for each of the outgoing feeder with locking arrangement.				
4.8	Design, Supply, installation, testing commissioning of 60A, Active Harmonics Filter panel complete as per specifications & Drawing with following:	Nos.	2.00	4,73,327.19	9,46,654.39
	Supply installation, testing commissioning of 60A, Active Harmonics Filter as per IEEE 519, CRCA sheet enclosure with copper busbar & earth busbar, Cable chamber, protection relays comprising of specification under Active Harmonic Filter with all accessories and also provide the provision for fire trace tube in panel.				
4.9	Other accessories (Quantity per station)				
	Supply and fixing of the following safety equipments as per detailed descriptions given below and as per relevant IE rules & code of standard practice	Set	1.00	93,390.27	93,390.27
a)	1000 mm wide Insulating mat, confirming to IS 15652-2006 suitable to withstand 11 kV in front of all panels as required.				
b)	Laminated standard shock treatment charts in English & Kanada in ASS, ESR, DG room and Pump room in each station.				
c)	Danger plates as approved for pattern, style & sample written in English & Hindi for MV installations as required as per IE rules, IES and IS 2551 (latest) - 8 nos. per station				
d)	2 nos. per station First Aid Box Complete as approved by St. John ambulance or Indian Red Cross.				
e)	4 nos. per station of 3-fire-buckets set each painted red with 'fire' written complete with sand filling, floor/wall mounting brackets/stand complete as per relevant IS and as required.				
f)	One Tool kit per station comprising 1 set of flat spanner (Taparia / Japan), 1 set of box spanner, 1 no. Hacksaw frame with 10 No. blades, 1 no. large, medium, small screw drivers, 1 no. insulated plier, 1 no nose plier, 1 no. hand crimping tool up to 16 sq.mm, 1 no. digital multimeter, 1 no. test lamp and 1 no. tester. Screw driver set for all types of screw heads also to be provided.				
	Sub-total for J.04				91,28,223.15
J.05	INDOOR LIGHTING AND FANS				
5	Supply, installation, testing & commissioning of LED light fittings including all accessories e.g. Driver, HPF condensers (surge protector), surface/recess mounting arrangement etc. including necessary supports, accessories and hardware as per specifications & as required at site and as below:				
5.1	Luminaries minimum specifications and requirements				
a)	Luminaries should operate at +/- 6% voltage fluctuation for continuous use to comply to IEC. PF > 0.95 for EM circuits PF > 0.85 with capacitor.				
b)	All the components including the internal wiring of the luminaries to be used shall be manufactured of material, which are of FR type. All luminaries shall be manufactured to relevant sections of IEC60598 or other approved international standards and the type tests for all luminaries shall be provided.				
c)	All internal wiring within the lighting fixtures shall be heat-resisting cables.				
	Note: Lamp should have free replacement for one year from the date of Installation. The Date of installation shall be from the date of handing over the work to KRIDE.				
5.1.1	Supply, Installation, Testing & Commissioning of surface/ suspended continuous LED Luminaries, made up of CRCA heatsink with extruded PC diffuser. Luminaries should be with minimum system efficacy of 105Lumen/Watt and minimum system lumen output of 2600lm, maintained at 70% at the end of 50,000 burning hours. The luminaries should have CRI>80 and CCT of 6500K. Luminaries should withstand THD less than 10% and should have power factor > 0.90. Driver efficiency should be 85%. Luminaries should comply with all the required IEC standards and should operate in a voltage range of 140 to 270 volts AC. Similar To Philips SP 780 LED 26S 6500 PSU W7L112 OD CR or approved equivalent Make. (Concourse Area)	Nos.	214.00	5,267.03	11,27,145.34

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
5.1.2	Supply, Installation, Testing & Commissioning of Trunking LED, made up of extruded Aluminium body and acrylic cover. Luminaries should be with minimum system efficacy of 110 Lumen/Watt and minimum system lumen output of 4000, maintained at 70% at the end of 50,000 burning hours. The luminaries should have CRI>80 and CCT of 6500K. Luminaries should withstand THD less than 10% and should have power factor > 0.95 . Driver efficiency should be 85%. The luminaries should be IP 54 protected. Luminaries should comply with all the required IEC standards and should operate in a voltage range of 220 to 240 volts AC. Similar To Philips Optimus LED Trunking LL199X 1XDLED 40S 6500 PSE OD WH IP54 or approved equivalent Make.(ASS/TSS, Platform edge)	Nos.	857.00	4,101.02	35,14,570.94
5.1.3	Supply, Installation, Testing & Commissioning of surface/Conduit LED Batten Luminaries, made up of CRCA sheet with glossy PC diffuser. Luminaries should be with minimum system efficacy of 120Lumen/Watt and minimum system lumen output of 4000 maintained at 70% at the end of 50,000 burning hours. The luminaries should have CRI>80 and CCT of 6500K. Luminaries should withstand THD less than 10% and should have power factor > 0.95 . Driver efficiency should be 85% . Luminaries should comply with all the required IEC standards and should operate in a voltage range of 140 to 270 volts AC. Similar To Philips Endura LED Batten BN308C LED 40S PSU CDL WH or approved equivalent Make. (Non Operational Room, Security Room, Stair Case, Corridor, Store)	Nos.	286.00	2,119.03	6,06,042.31
5.1.4	Supply, Installation, Testing & Commissioning of recessed mounted LED Downlighter, made of pressure die-cast Aluminium body with high quality diffuser. Luminaries should be with minimum system efficacy of 110Lumen/Watt and minimum system lumen output of 2000 maintained at 70% at the end of 50,000 burning hours. The luminaries should have CRI>80 and CCT of 6500K. Luminaries should withstand THD less than 10% and should have power factor > 0.90 . Driver efficiency should be 85%. Luminaries should comply with all the required IEC standards and should operate in a voltage range of 140 to 270 volts AC. Similar To Philips Green Perform Sleek LED Downlighter DN 296B LED 20S-6500 PSU WH or approved equivalent Make.	Nos.	72.00	1,816.31	1,30,774.07
5.1.5	Supply, Installation, Testing & Commissioning of LED Bulkhead Luminaries, made of high pressure die-cast Aluminium body with polycarbonate diffuser. Luminaries should be with minimum system efficacy of 100Lumen/Watt and minimum system lumen output of 1000 maintained at 70% at the end of 50,000 burning hours. The luminaries should have CRI>80 and CCT of 6500K. Luminaries shall meet IP66 and IK09 protection with THD less than 20% and power factor > 0.90 . The total system power should not exceed 10W including driver losses. Driver efficiency should be 85% . Luminaries should comply with all the required IEC standards and should operate in a voltage range of 140 to 270 volts AC. Similar To Philips Endura LED Bulkhead WT202W LED10S CW PSU S3 PC or approved equivalent Make.	Nos.	72.00	1,110.54	79,958.87

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
5.1.6	Supply, Installation, Testing & Commissioning of LED 2X2 recess mounting LED luminaries with soft opal diffuser provides high visual comfort enclosed in a polyester powder coated housing with high efficiency diffuser. It should be system lumen efficacy 115Lumen/Watt with system level luminous flux of 3600 lumens and system wattage of 31W, 50,000 hours burning life for the system at 70% lumen maintenance with a Color rendering index > 80 and Color temperature 6500K. PF > 0.9 and THD<10%. Luminaries must be sealed from bottom and has an inbuilt gear. The luminaries should be IP 20 protected. Luminaries should comply with all the required IEC standards and should operate in a voltage range of 140 to 270 volts AC. Similar to Philips Full Glow RC380B LED36S 6500 PSD OD WH or superior as per approved list. (Operational Rooms)	Nos.	69.00	2,863.18	1,97,559.26
5.1.7	Supply, Installation, Testing & Commissioning of surface mounted LED Luminaries, made up of CRCA sheet steel with toughened Glass diffuser. Luminaries should be with minimum system efficacy of <90Lumen/Watt and minimum system lumen output of 5600 maintained at 70% at the end of 50,000 burning hours. The luminaries should have CRI>80 and CCT of 6500K. Luminaries should withstand THD less than 10% and should have power factor > 0.90. The luminaries should be IP 65 protected. Luminaries should comply with all the required IEC standards and should operate in a voltage range of 140 to 270 volts AC. Similar To Philips Claria CR652B LED56S CR CW GT or approved equivalent Make. (Ground level Under Concourse)	Nos.	200.00	6,285.28	12,57,055.40
5.1.8	Supply, Installation, Testing & Commissioning of surface/Conduit LED Batten Luminaries, made up of CRCA sheet with glossy PC diffuser. Luminaries should be with minimum system efficacy of 120Lumen/Watt and minimum system lumen output of 2000 maintained at 70% at the end of 50,000 burning hours. The luminaries should have CRI>80 and CCT of 6500K. Luminaries should withstand THD less than 10% and should have power factor > 0.95 . Driver efficiency should be 85% . Luminaries should comply with all the required IEC standards and should operate in a voltage range of 140 to 270 volts AC. Similar To Philips Endura LED Batten BN308C LED 20S PSU CDL WH or approved equivalent Make. (Non Operational Room, Toilets)	Nos.	187.00	1,649.58	3,08,470.69
5.1.9	Supply, Installation, Testing & Commissioning of surface mounted LED Luminaries, made up of CRCA sheet steel with toughened Glass diffuser. Luminaries should be with minimum system efficacy of <90Lumen/Watt and minimum system lumen output of 3300 maintained at 70% at the end of 50,000 burning hours. The luminaries should have CRI>80 and CCT of 6500K. Luminaries should withstand THD less than 10% and should have power factor > 0.90. The luminaries should be IP 65 protected. Luminaries should comply with all the required IEC standards and should operate in a voltage range of 140 to 270 volts AC. Similar To Philips Claria CR652B LED33S CR CW GT or approved equivalent Make. (Ground level Entry)	Nos.	72.00	5,064.65	3,64,654.79

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
5.1.10	Supply, Installation, Testing & Commissioning of surface mounted 4ft LED Batten Luminaire, made up of PC housing with PC diffuser. Luminaire should be with minimum system efficacy of 120Lumen/Watt and minimum system lumen output of 4400 maintained at 70% at the end of 50,000 burning hours. The luminaire should have CRI>80 and CCT of 6500K. Luminaire should withstand THD less than 10% and should have power factor > 0.9. The luminaries should be IP 65 protected. Driver efficiency should be 85%. Luminaire should comply with all the required IEC standards and should operate in a voltage range of 140 to 270 volts AC. Similar To Philips Smart Bright Waterproof batten WT201C LED44S 6500 PSU L120 or approved equivalent Make.	Nos.	72.00	3,720.51	2,67,876.90
5.1.11	Supply, Installation, Testing & Commissioning of LED ,made up of extruded Aluminium body and acrylic cover. Luminaries should be with minimum system efficacy of 120 Lumen/Watt and minimum system lumen output of 23500, maintained at 70% at the end of 50,000 burning hours. The luminaries should have CRI>80 and CCT of 6500K. Luminaries should withstand THD less than 10% and should have power factor > 0.95 . The luminaries should be IP 66 protected. Luminaries should comply with all the required IEC standards 154 W and should operate in a voltage range of 220 to 240 volts AC.BVP 483 LED 185 CW SMB PSU GR (Flood Light) for (Double height area).	Nos.	72.00	23,536.05	16,94,595.86
5.2	Fans				
5.2.1	Supply, Installation, Testing and Commissioning of 230 V single phase, 1200 mm sweep ceiling fans with all standard accessories complete and suitable length down rod, duly painted, not exceeding minimum fan height of 2.4 m from floor as required. Fan shall be of Approved Make.	Nos.	12.00	1,352.70	16,232.44
5.2.2	Supply, Installation, Testing and Commissioning of 230 V single phase, 400 mm sweep, pedestal fans with inbuilt electronic regulators including all standard accessories as complete. Fan shall be of Approved Make.	Nos.	12.00	4,567.16	54,805.98
5.3	EXTERNAL LIGHTING				
5.3.1	Trenching				
5.3.1.1	Excavation of trench in all class of soil and back filling of the trench after laying & dressing of the cable (excluding cost for laying of cable)	Cum	114.00	262.73	29,951.33
5.3.1.2	Additional for supply & provision of sand bed of 170mm below the cable & 80mm above the cable with supply & laying of brick by using second Class-Bricks laid perpendicular to cable as per CPWD specifications for full length & cable protection and back filling of the trench after laying& dressing of the cable (cost of cable covered in cable item) - applicable with each cable run in the trench.	M	343.00	228.67	78,434.73
5.3.2	Hume pipes				
5.3.2.1	Supplying and fixing 150 mm dia RCC Hume pipes(Class NP-4) in road crossings and below paved areas complete as required including road cutting and making good the damages etc.	M	12.00	1,302.00	15,624.04
5.3.2.2	Supply, fixing and laying of GI pipes complete with joints and other accessories as required				
a)	150 mm dia , class 'B'	M	23.00	1,353.18	31,123.16
b)	100 mm dia, class 'B'	M	12.00	985.74	11,828.88

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
5.3.2.3	Supplying and laying of GI pipes of 100 mm Nominal Bore 3.65 mm thick as per IS 1239 to accommodate all cables, earthing strips and fuel pipe lines as utility to DG set.	M	14.00	1,021.81	14,305.34
5.3.3	Additional for laying the pipe through push through method where cutting and digging is avoidable or not permitted	M	12.00	866.08	10,393.00
5.3.4	Constructing masonry chamber 90x90x100 cm, inside with 75 class designation brick work in cement mortar 1:5 (1 cement: 5 fine sand) with chained lid and RCC top slab 1:2:4 mix (one cement ratio two coarse sand ratio 4 graded stone aggregate 20mm nominal size) necessary excavation foundation concrete 1:5:10 (one cement ratio 5 fine sand ratio 10 graded stone aggregate 40mm nominal size) and inside plastering with cement mortar 1:3 (1 cement ratio 3 coarse sand) 12mm thick finished with the floating coat of neat cement complete as per standard design with F.P.S. bricks	Nos.	12.00	6,171.79	74,061.54
5.4	Poles				
	General Points				
i)	Entry & exit pipes one for Power Cable and one for ELV cable. ELV cable pipe 35mm dia should go up to 2 meter.				
ii)	Each Pole should have cable pullout hole of 15mm. At every 500mm starting from 4 meter up to 6 meter for monitoring other accessories. Pole switch should also have a terminal box of 75 mm. wide and 210mm. Long for accommodating ELV services connector etc.				
iii)	Bajaj Cat. No. BOP-1030 / Philips / Keselec or equivalent welded base plate, pedestal of specified height to IS:2713 part II-1980 or latest as per specifications and drawings .				
iv)	1:3:6 concrete foundation and pedestal coping 300 dia of height as per specification and relevant IS and as required. Contractor to obtain approval of foundation design before proceeding further.				
v)	6 ways, 20A connector & 6A MCB mounted on 6mm thick painted MS/GI plate, insulated, and accommodated inside the pole with gasketed weather, vermin proof, hinged lockable covered GI/MS box or integral cast box in pedestal as required.				
vi)	Wiring to Luminaries from the 2A, MCB, with 3 x 2.5 copper, stranded Conductor (P+N+PE) double sheathed wire and making connections & earthing of pole.				
vii)	Painting of pole accessories with 2 coats of primer and 2 coats of oil paint of approved color.				
viii)	Luminaries as specified with lamps, necessary cross arm to the luminaries, integral control gear and as under.				
5.4.1	9.0 meter hot dipped galvanized Octagonal with single overhang arm & with foundation bolts, base plate complete with foundation, entry and exit pipes, control JB with connector generally as shown on drawings and as per specifications.	Nos.	1.00	15,905.11	15,905.11
5.4.2	9.0 meter hot dipped galvanized Octagonal with double overhang arm & with foundation bolts, base plate complete with foundation, entry and exit pipes, control JB with connector generally as shown on drawings and as per specifications.	Nos.	1.00	18,308.05	18,308.05
5.4.3	7.0 meter hot dipped galvanized Octagonal multi purpose pole with single overhang arm & with foundation bolts, base plate complete with foundation, entry and exit pipes, control JB with connector generally as shown on drawings and as per specifications.	Nos.	1.00	12,527.38	12,527.38

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
5.4.4	7.0 meter hot dipped galvanized Octagonal multi purpose pole with double overhang arm & with foundation bolts, base plate complete with foundation, entry and exit pipes, control JB with connector generally as shown on drawings and as per specifications.	Nos.	1.00	14,573.48	14,573.48
5.5	Luminaries				
5.5.1	Supply, installation, testing and commissioning of 70 watts, 8400 Lumen output, street light luminaries with aesthetically designed die cast Aluminium housing POT optics reflector and toughened flat glass (IP 65). Similar to Philips Cat. No. BRP 062 LED 84CW SLA SI PSU or equivalent including Lamp.	Nos.	29.00	10,206.76	2,95,996.03
5.5.2	Supply, installation, testing & commissioning of twin dome aviation light of type BJAOL 2 with 2 nos. of 100 watts GLS lamp or equivalent LED type including lamps, mounting bracket, earthing, painting complete with accessories to automatically switch off lights.	Nos.	1.00	4,534.60	4,534.60
5.6	High Mast				
5.6.1	Supply, installation, Testing and Commissioning of 12 m high area lighting High Mast, suitable for 16 nos. 1X240 W LED luminaries with 25000 Lumen output complete with all standard accessories. The mast shall be in two section, hot dip galvanized 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, galvanized lantern carriage arrangement suitable for 16 luminaires symmetrically and its control gear box and lightning finial and including the cost of providing supplying and fixing 16 nos. 1X240 W LED luminaires with die cast / extruded Aluminium body, pre anodized Aluminium asymmetric/symmetric reflector, IP 65 and above, heavy duty control gear housed in a weather proof housing equivalent to Philips cat no. BVP 410 LED 242 CW or equivalent. The price shall include others accessories like foundation bolts manufactured from special high tension steel along with nut, washer anchor plates, templates and control panel housing consisting of 63 A TPN MCB as incomer, digital timer contactor circuit for automatic control of luminaries as required with along with the following as required for complete functionality of the system.	Nos.	1.00	1,87,039.79	1,87,039.79
a)	Earth station of Pipe earthing as per IEEE 80 -2000, and IS 3043 - 1987, including duplicate earth connection to the mast with 25X3 mm size GI flat.				
b)	Suitable neon Twin dome Aviation lights as required.				
c)	Suitable foundation for the Mast considering soil bearing capacity 10 Ton per Sqm, with base pedestal of approve design, incorporating a suitable cable looping box with terminal blocks MCB etc.				
	The mast shall have an external power tool installed inside the base compartment for its operation				
	Sub-total for J.05				1,04,34,349.30
J.06	PROTECTIVE EARTHING				
6	Earth mat				
6.1	Supply, laying, testing and commissioning of 25 mm dia MS round plain rod for earth mat at 1000mm depth as per approved drawing and as directed by engineer Incharge and as per specifications including excavation and refilling and compaction. Lap joint & cross weld joints shall be of not less than 150mm overlapping and bitumen coat at every joint shall be provided as required. Risers from earth mat to be brought out as per approved drawings and specifications using GI strip.	M.	10.00	487.11	4,871.07
6.2	Supply, laying, testing and commissioning of 32 mm dia MS round plain rod for earth mat at 1000mm depth as per approved drawing and as directed by engineer Incharge and as per specifications including excavation and refilling and compaction. Lap joint & cross weld joints shall be of not less than 150mm overlapping and bitumen coat at every joint shall be provided as required. Risers from earth mat to be brought out as per approved drawings and specifications using GI strip.	M.	3.00	666.04	1,998.13

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
6.2.1	Supply, laying, testing and commissioning of 25 mm dia MS rod, laying of vertical earth electrodes(Down Rod) 3 m depth from earth mat including welded joints with earth mat as per approved drawings and specifications. The welded joints to be provided with bitumen coats.	Nos.	28.00	3,095.81	86,682.62
6.3	Note : Detailed Earth Mat BOQ has been provided by considering soil resistivity of 32 ohm-meter, Contractor have to check the value of soil resistivity before execution & in case of deviation in above said value, contractor shall subject to submit detail earth mat calculations for approval to employer/employer representative. After their final approval work shall subject to commenced.				
6.3.1	Supply, laying, testing and commissioning of 25 mm dia Cu bonded MS rod with min 250 microns of copper plating for earth mat at 1000mm depth as per approved drawing and as directed by engineer Incharge and as per specifications including excavation and refilling and compaction. Lap joint & cross weld joints shall be of not less than 150mm overlapping and bitumen coat at every joint shall be provided as required. Risers from earth mat to be brought out as per approved drawings and specifications using GI strip.	RM	256.00	984.85	2,52,122.33
6.3.2	Supply, laying, testing and commissioning of 25 mm dia Cu bonded MS rod with min 250 microns of copper plating. laying of vertical earth electrodes 3 m deep from earth mat including weld joints with earth mat as per approved drawings and specifications. The weld joints to be provided with bitumen coats.	No.	16.00	7,938.98	1,27,023.60
6.3.3	Supply and making of maintenance free earthing of applicable size for earthing. Construction of earth pit with 38m - 76mm, 3mm long, UL listed Copper Bonded Steel Electrode tested to IEC - 62561-2, Ground Enhancement Compund s per IEC-62561-7 standard. And as per IEC 62305 complete as required.	No.	7.00	14,360.39	1,00,522.74
6.4	Supply, laying, termination, Testing and commissioning of PVC insulated, Copper Cables/Strip for Earthing in green colour, for interconnecting the earth station with METs of the following sizes in trenches/surface/wall/ground complete with accessories as per specifications & drawing as required.				
6.4.1	1Cx120 Sq. mm Cu. cable	M	1000.00	1,339.39	13,39,391.04
6.4.2	1Cx95 Sq. mm Cu. cable	M	714.00	1,155.89	8,25,308.38
6.4.3	1Cx70 Sq. mm Cu. cable	M	215.00	882.50	1,89,736.74
6.4.4	1Cx50 Sq. mm Cu. cable	M	23.00	631.37	14,521.50
6.4.5	1Cx35Sq. mm Cu. cable	M	343.00	452.23	1,55,115.42
6.4.6	1Cx16 Sq. mm Cu. cable	M	1572.00	256.11	4,02,611.20
6.4.7	1Cx10Sq. mm Cu. cable	M	184.00	195.84	36,035.14
6.4.8	1Cx6 Sq. mm Cu. cable	M	114.00	154.24	17,583.89
6.4.9	50x6 GI. Strip with PVC insulation	M	857.00	364.65	3,12,507.29
6.4.10	50x6 Cu. Strip with PVC insulation	M	500.00	2,249.88	11,24,939.25
6.4.11	25x6 Cu.Strip with PVC insulation	M	144.00	1,459.88	2,10,223.34
6.4.12	75x10 GI. Strip without PVC insulation	M	29.00	533.21	15,462.96
6.4.13	75x6 GI. Strip without PVC insulation	M	29.00	412.05	11,949.54
6.4.14	50x6 GI. Strip without PVC insulation	M	36.00	297.61	10,714.14
6.4.15	25x6 GI. Strip without PVC insulation	M	145.00	158.71	23,012.97
6.4.16	25x3 GI. Strip without PVC insulation	M	1715.00	106.22	1,82,159.38
6.5	Extra for bituminous coating and hessian tape wrap or polyethylene faced hessian complete with buried strip specified in above item 6.4.12, 6.4.13, 6.4.14, 6.4.15, 6.4.16 as per specifications and drawings as required	M	852.00	80.70	68,760.33
6.6	Extra for Copper & GI Bimetallic test links/ termination between earth station GI strip and copper conductor to METs in side electrical shaft including termination plate, DMC/SMC insulator, nut& bolts, fixing/welding etc. as per specifications and as required.	Nos.	57.00	2,234.13	1,27,345.26

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
6.7	Plate Earthing				
6.7.1	Plate Earthing Station - Cu Plate Electrode				
	Earthing with copper earth plate 600 mm X 600 mm X 3 mm thick including accessories, and providing necessary masonry chamber of size 450x 450x 600mm with ductile iron/fabricated chequered plate hinged cover having locking arrangement and watering pipe of 2.7 meter long etc. with charcoal/ coke and salt as required.(CPWD 5.6)	Nos.	5.00	11,338.57	56,692.84
6.7.2	Plate Earthing Station -GI Plate Electrode				
	Earthing with GI earth plate 600 mm X 600 mm X 6 mm thick including accessories, and providing necessary masonry chamber of size 450x 450x 600mm with ductile iron/fabricated chequered plate hinged cover having locking arrangement and watering pipe of 2.7 meter long etc. with charcoal/ coke and salt as required.(CPWD 5.4)	Nos.	2.00	6,226.05	12,452.09
6.7.3	PIPE Earthing Station -CI Electrode				
	Forming of Earthing with 100mm dia. and 2.7 meter long cast iron pipe electrode earth pit system including supply of all relevant materials and providing necessary masonry chamber of size 450x 450x 600mm with ductile iron/fabricated chequered plate hinged cover having locking arrangement etc. with charcoal/ coke and salt as required.	Nos.	3.00	5,050.23	15,150.70
6.8	Supply, Laying of Copper Main Earth Terminal points including DMC/SMC insulator, anchor fastener, nut, bolts, etc. as required. Necessary fixing arrangement like holes of suitable dia. and number of holes with Nut, bolt spring lock washer for termination of Copper lugs/Strip shall be provided.				
6.8.1	250mm x 50mm x 10mm thick Cu.	Nos.	29.00	1,626.08	47,156.27
6.8.2	500mm x 50mm x 10mm thick Cu.	Nos.	9.00	3,168.73	28,518.54
6.8.3	750mm x 50mm x 10mm thick Cu.	Nos.	29.00	4,709.21	1,36,567.06
6.8.4	1000mm x 50mm x 10mm thick Cu.	Nos.	9.00	6,274.98	56,474.86
6.8.5	1500mm x 50mm x 10mm thick Cu.	Nos.	2.00	10,286.34	20,572.69
	Sub-total for J.06				60,14,183.29
J.07	LIGHTNING PROTECTION				
7.1	Supply and installation of lightning arrestor 25mm dia. Copper, 1.2 meter air terminals with base plate & clamping of down Conductor complete, concrete coping fixing accessories, as per specifications & drawing as required	Nos.	16.00	4,595.69	73,531.07
7.2	Supply and installation of GI strip down Conductor size 25 x 3 on surface/wall / parapet/ shaft complete with joints (riveting /bolting /welding) bimetallic connectors, testing links & other fixing accessories like DMC/SMC insulators, anchor fastener etc. and clamping/ connection with earth terminations as per specifications & drawing as required	M	1829.00	176.64	3,23,067.73
7.3	Supply and installation of 25 x 3mm, GI Earth strip, buried at suitable depth with PVC taping complete as per specifications & drawing as required	M	229.00	241.87	55,387.63
7.4	Forming of Earth pit with 3 meter long, 50 mm dia GI perforated pipe, complete with suitable size funnel covered with wire mesh, and required accessories like, U shape terminal clamps, nuts, bolts etc. all materials and providing necessary masonry chamber of size 450x 450x 600mm with ductile iron/fabricated chequered plate hinged cover having locking arrangement etc. complete as per specification and drawing as required	Nos.	14.00	6,705.85	93,881.85

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
7.5	Supplying and laying of the stainless steel SS-304 strip down Conductor size 25 x 3 on surface/wall / parapet/ shaft complete with joints(reviting/bolting/welding of SS) bimetallic connectors, testing links & other fixing accessories and clamping/ connection with earth terminations as per specifications & drawing as required	RM	429.00	271.34	1,16,405.20
	GMRL BOQ item, A-7.2, page no 58 of 105			#DIV/0!	
7.6	Supplying and laying of the stainless steel SS-304 strip Earth terminations with burried Conductor size 25 x 3 with bituminous coating and covered with PVC taping complete as per specifications & drawing as required	RM	100.00	290.66	29,065.97
	GMRL BOQ item, A-7.3, page no 58 of 105			#DIV/0!	
	Sub-total for J.07				6,91,339.45
J.08	UNINTERRUPTED POWER SUPPLY SYSTEM				
8.1	Supply, Installation, Testing and Commissioning of 2 x 20 kVA, online, UPS system with true parallel and redundant mode of operation, suitable for incoming supply of 415 volts, 3 phase, +10 % - 20%, 50 Hz, and output supply with 415V, 3 phase, variation $\pm 1\%$, including isolation transformer, rectifier/dual converter, static switch, inverter, filter, Bypass & static transfer switch for automatic switch over without interruption of power, maintenance bypass switch, Micro processor/ software controlled annunciation, including phase protection, menu run diagnostic module and associated cabling/connections/ terminations, erection, mounting on base channels etc. complete as per specifications and as required. The price shall include provision of suitable terminal block including gland plate for termination of incoming, outgoing cables and supply of copper synchronizing bus. RS 485 port shall be provided for monitoring various parameters of UPS on BMS work station through MODBUS protocol as per technical specifications.	Set	1.00	18,55,151.08	18,55,151.08
	The unit shall satisfy the following specification:				
	DSP controlled advanced digital technology, IGBT based rectifier for reducing input THDi to <3%, active power factor correction > 0.99, inbuilt isolation transformer, very high operating efficiency $\geq 92.0\%$, pure sine wave output, very high crest factor of 3:1, over load capability of 150% for 1 minute, very high reliability, manual bypass circuit with static switches and load side isolation facility for each parallel path, compact and modular design.				
a)	Supply, Installation, Testing and Commissioning of lead acid sealed maintenance free batteries, suitable for 120-minute-battery backup for each UPS (Total 2Nos. of Battery Bank) including suitable interconnections & earthing. Battery shall comply with relevant regulations/standards & Battery racks shall be made of acid resistant material (For 2x20 KVA UPS) as per technical specifications.				
8.2	Supply, Installation, Testing and Commissioning of 2 x 30 kVA, online, UPS system with true parallel and redundant mode of operation, suitable for incoming supply of 415 volts, 3 phase, +10 % - 20%, 50 Hz, and output supply with 415V, 3 phase, variation $\pm 1\%$, including isolation transformer, rectifier/dual converter, static switch, inverter, filter, Bypass & static transfer switch for automatic switch over without interruption of power, maintenance bypass switch, Micro processor/ software controlled annunciation, including phase protection, menu run diagnostic module and associated cabling/connections/ terminations, erection, mounting on base channels etc. complete as per specifications and as required. The price shall include provision of suitable terminal block including gland plate for termination of incoming, outgoing cables and supply of copper synchronizing bus. RS 485 port shall be provided for monitoring various parameters of UPS on BMS work station through MODBUS protocol as per technical specifications.	Set	0.00	23,86,427.50	-
	The unit shall be provided with isolator for incoming and outgoing. Unit shall be 100% load tested for performance and endurance as a part of commissioning test at site.				

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
	The unit shall satisfy the following specification:				
	DSP controlled advanced digital technology, IGBT based rectifier for reducing input THDi to <3%, active power factor correction > 0.99, inbuilt isolation transformer, very high operating efficiency ≥ 92.0 %, pure sine wave output, very high crest factor of 3:1, over load capability of 150% for 1 minute, very high reliability, manual bypass circuit with static switches and load side isolation facility for each parallel path, compact and modular design.				
a)	Supply, Installation, Testing and Commissioning of lead acid sealed maintenance free batteries, suitable for 120-minute-battery backup for each UPS (Total 2Nos. of Battery Bank) including suitable interconnections & earthing. Battery shall comply with relevant regulations/standards & Battery racks shall be made of acid resistant material (For 2x30 KVA UPS) as per technical specifications.				
	Sub-total for J.08				18,55,151.08
J.09	DG Set				
9.1	Design, Manufacture,(As per latest CPCB standards) Transportation at site, Supply, Installation/Erection, testing and commissioning including Integrated testing & commissioning of 180/200/250KVA capacity, skid mounted, acoustic enclosure housed, stand-alone operation, (Non-synchronizing), with AMF controlled DG sets, suitable for 3-phase, 415 volts, 50 Hz, 1500 RPM, rated output, Radiator cooled, with medium class MS fuel piping, suitable for cold start, suitable for remote starting. The Engine shall include flywheel to suit direct coupling with guard, air cleaner, blower fan, radiator, Silencer, fuel pump, electronics governor, fuel filter, lube oil filter & pump, battery charger, automotive batteries of compatible capacity 24 volt 180AH (minimum) and instrument panel comprising of switch with key, etc. as required. Alternator shall be brushless, self excited, self regulated, drip proof, and continuously rated at 0.8 Power Factor suitable for 3 phase 415 volts 50 cycles, 4 wire system, class 'H' insulation provided with static excitation unit, Protection, micro processor/ software controlled annunciation and self-diagnostic module and shall generally complying to specification and relevant standards . The overload capacity shall be not less than 110% of rated capacity for 1 hour in every 12 hours.				
	The DG sets in sound attenuated enclosure shall be mounted on a fabricated rigid common base frame with resilient anti-vibration mountings including associated foundation / masonry work (if required) to provide 98% vibration isolation efficiency. The DG Sets shall include all accessories, fittings, instruments etc. complete as per specifications and as required. DG sets design temp. will be 50 deg C.				
	Unloading, erection on the prepared plinth in the DG House, complete with all accessories and services, carry-out pre-commissioning checks, no-load testing, commissioning, load testing at different load conditions (at factory & at site), testing for AMF logic requirements and conducting performance test to the fullest satisfaction of client in accordance with Technical specification for electrical works of KRIDE enclosed under Chapter-9, DG sets. The price shall include periodic checks like B,C, etc. till the time of handing over. The sets shall be comprising of the following				
a)	Engine with all auxiliaries coupled with Alternator complete with AVR & accessories				
b)	Electrical control panel with Breakers / Isolators including AMF facility				
c)	Starting Battery, Battery cable, engine driven battery charging, alternator, including stand-alone mains powered battery float charger complete with relays, controls and indicators				
d)	Auxiliary control panel with Relays, Electronic modules to full fill all the logic requirements of auto start-stop, change-over, engine & Alternator protection and alarm system.				
e)	Complete fuel service arrangement with Main tank/990 liters Day tank & Fuel transfer system with level controller				
f)	Common drain pipe connecting the DG sets for draining off refused lubricating oils, spillages, etc., to soak pit to be provided.				

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
g)	Acoustic housing fabricated from high quality steel sheet of minimum 2 mm thickness finished with powder coating shall be of weather proof construction designed to reduce noise level to maximum 75dB at 1 meter distance from the equipment and suitable for thermal and noise level insulation as per relevant code of practices and Technical specification enclosed.				
	DG set comprising of all above items as per specification				
i)	180 KVA	Nos			
ii)	200 KVA	Nos	1.00	22,76,723.20	22,76,723.20
iii)	250 KVA	Nos	0.00	29,46,597.60	
9.2	AMF LOGIC PANEL FOR 180/200/250KVA DG SET				
	Supply, erection, testing and commissioning of floor mounted enclosed sheet steel AMF Panel of 180/200/250 KVA DG set and equipped with automatic gas flooding(Only provision) using linear heat sensing tube type fire trace system or equivalent. The panel shall be suitable for 415 V, 3 phase, 4 wire system, Copper bus bars designation labels as per requirement, continuous earth bus, cable clamping supports, panel illuminating lamps, cable gland plates for incoming and outgoing feeders, controls metering, CTs, PTs, S/C, O/C, E/F protections, indicating lamps etc., AMF starter battery, charging transformer, rectifier etc. as per specification, drawing & details below :	Nos	1.00	3,22,768.60	3,22,768.60
	Incomer:				
	One (1) - 630 A , 4 pole, 50 KA, MCCB . The MCCB shall be indoor, with fully interlocked trip free, microprocessor based, electrically operated, quick make, quick break, having short circuit release, over load release, earth fault release, shunt trip release including no volt, overvoltage, under frequency and reverse power relay. Suitable for 230 V AC, operation with visual indications. Provision shall be available to close the breaker manually. The spring charging motor shall be suitable for operation on 1 phase, 230 V, 50 HZ, AC supply.				
	Three sets (3) each set with 3 CTs one in each phase - 630 / 5A, 5VA, 630/5, 7.5 VA, 630/5, 15 VA VACI 0.5, CTs (for MDM)				
	Outgoing:				
	One (1) - 400 A and one (1), 250 A, 4 pole, 36 KA, motorized MCCB . The MCCB, microprocessor based, electrically operated, quick make, quick break, having short circuit release, over load release, earth fault release, shunt trip release and no volt release, suitable for operation at 230 V AC, with visual indications. Provision shall be available to close the breaker manually also. The spring charging motor shall be suitable for operation on 1 phase, 230 V, 50 HZ, AC supply. The breakers shall act as outgoing feeder breakers from the AMF panel..				
	One set of relays to fulfil the AMF function, including engine and Alternator protection system				
	The panel shall be suitable for Automatic as well as manual overriding gas flooding with fire trace tube system. Also contractor shall arrange for approval of the same, from fire authorities as per relevant NBC clause and as approved by Employer.				
	AMF panel for above 180/200/250 KVA DG set covering the specification as above including the construction features and provision of built-in gas flooding system.				
9.3	EXHAUST PIPING				

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
	Design, Supply, Installation, testing and commissioning of exhaust piping of Class "C" MS(4.85 mm thick as per IS 1239) of suitable size as recommended by the Engine manufacturer including the cost of pipe supports, bends, flexible joints and insulation etc. complete as per tender specifications. The Length will be measured beyond the Exhaust Silencer of the Engine. The extended exhaust piping to collect & expel exhaust gases from engine cylinders, for the DG set, including turbo chargers, flexible connectors, thermal insulated asbestos lagging with chicken mesh, & Aluminium cladding, elbows, horizontal / vertical pipe supports, thimble with spray shield / rain cap etc., Height of stack and other factor shall be as per standards of CPCB & KSPCB norms. Soot sample collection facility for analysis / testing purposes to be provided				
a)	For DG sets up to 250 KVA ratings	M	34.00	4,033.39	1,37,135.11
9.4	FUEL OIL PIPING				
	Design, Supply, installation testing and commissioning of fuel oil piping system of suitable size of Class "C" MS (4.85 mm thick as per IS 1239) pipes, cut to required lengths and installed with all welded joints including providing and fixing in position the necessary fittings like ball valves, elbows, tees, reducers, duly coated with one coat of primer and two coats of approved enamel paint complete as per specifications and as required between Day Oil fuel tank and DG set.				
a)	For DG sets up to 250 KVA ratings	Jobs	1.00	12,495.28	12,495.28
9.5	Supply, Installation and fixing of hot air exhaust duct of 22 SWG GI sheet with DG canopy to remove hot air with square mesh(20mm) cover at one end.	Sqm	12.00	2,088.69	25,064.24
	Note- Original manufacturer certificate shall be provided to KRIDE for Alternator and Engine.				
	AMF panel details will overruled by drawing/boq which one more stringent.				
	Sub-total for J.09				27,74,186.43
J.10	Addition/Deletion Items				
10.1	Adjustment rates for addition/deletion of supply & fixing of following including making of suitable holes/space in the panel/DBs and making good all external finishes, terminations etc. complete as required.				
a)	Multiple LED/neon type indications	Nos.	2.00	221.08	442.17
b)	Astronomic digital Timer	Nos.	2.00	8,263.70	16,527.40
c)	Ammeter/Voltmeter (4 digit display)	Nos.	2.00	2,560.73	5,121.47
d)	TP Contractor - 32 to 63 Amp.	Nos.	2.00	5,715.35	11,430.70
e)	Aux. Contact 1 NO + 1NC for MCB	Nos.	2.00	531.83	1,063.65
10.2	Adjustment rates for addition/deletion of compartmentalized switchgear in above panels/board of following rating including the supply, fabrication, extension, modification of the enclosure or in a separate enclosure, earthing, busbar, other sub-systems, accessories etc. complete as required and as per specifications and as specified in item 10.1 above				
10.2.1	1 no. 1250 A, 415V, 50kA, 4P draw out Electrically operated ACB complete with:	Nos.	1.00	3,50,906.41	3,50,906.41
a)	1- set Red/Green ON/OFF indicating lamps				
b)	1- set of three phase (red, yellow, blue) indicating lamps				
c)	Amber healthy trip indicating lamps				
d)	3 nos. cast resin current transformers of 1250/5 ratio with 15 VA Burden & Class 5P10 for protection				
e)	3 nos. cast resin current transformers of 1250/5 ratio with 15VA burden and Class 1.0 for measurement				
f)	Microprocessor based release having variable range of overcurrent, short circuit,UVR and earth fault protection with time log facility for each of the fault for achieving discrimination along with distinct fault indication through LED's.				
g)	230 V AC shunt trip coil				
h)	230 V, AC Motor wound spring closing mechanism				
i)	Terminals to receive Copper XLPE armoured cables				

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
j)	RS-485 port for display of ON/OFF status of ACB on BMS workstation through MODBUS protocol				
10.2.2	1 no. 800 A, 415V, 50kA, 4P draw out Electrically operated ACB complete with:	Nos.	0.00	3,27,579.73	-
a)	1- set Red/Green ON/OFF indicating lamps				
b)	1- set of three phase (red, yellow, blue) indicating lamps				
c)	Amber healthy trip indicating lamps				
d)	3 nos. cast resin current transformers of 800/5 ratio with 15 VA Burden & Class 5P10 for protection.				
e)	3 nos. cast resin current transformers of 800/5 ratio with 15VA burden and Class 1.0 for measurement				
f)	Microprocessor based release having variable range of overcurrent, short circuit,UVR and earth fault protection with time log facility for each of the fault for achieving discrimination along with distinct fault indication through LED's.				
g)	230 V AC shunt trip coil				
h)	230 V, AC Motor wound spring closing mechanism				
i)	Terminals to receive Copper XLPE armoured cables				
j)	RS-485 port for display of ON/OFF status of ACB on BMS workstation through MODBUS protocol				
10.2.3					
a)	630A, 415V, Ics= 35 kA, 4P, MCCB with variable over current and short circuit releases and 1-set of three phase indicating lamps (red, yellow, blue)	Nos.	1.00	57,622.95	57,622.95
b)	630A, 415V, Ics= 35 kA, TP, MCCB with variable over current and short circuit releases and 1-set of three phase indicating lamps (red, yellow, blue)	Nos.	1.00	47,597.32	47,597.32
c)	400A, 415V, Ics=35 kA, 4P, MCCB with variable over current and short circuit releases and 1-set of three phase indicating lamps (red, yellow, blue)	Nos.	1.00	52,767.37	52,767.37
d)	400A, 415V, Ics=35 kA, TP, MCCB with variable over current and short circuit releases and 1-set of three phase indicating lamps (red, yellow, blue)	Nos.	1.00	46,360.88	46,360.88
e)	250A, 415V, Ics=35 kA, 4P, MCCB with variable over current and short circuit releases and 1-set of three phase indicating lamps (red, yellow, blue)	Nos.	1.00	33,836.80	33,836.80
f)	250 A ,415V, Ics=35kA, TP, MCCB with variable over current and short circuit releases with heavy duty solid neutral link and 1-set of three phase indicating lamps	Nos.	1.00	27,764.48	27,764.48
g)	200A, 415V, Ics=35 kA, 4P, MCCB with variable over current and short circuit releases and 1-set of three phase indicating lamps (red, yellow, blue)	Nos.	1.00	32,854.29	32,854.29
h)	200 A ,415V, Ics=35kA, TP, MCCB with variable over current and short circuit releases with heavy duty solid neutral link and 1-set of three phase indicating lamps	Nos.	1.00	27,764.48	27,764.48
i)	160 A, 415V, Ics=25 kA ,TP, MCCB with variable over current and short circuit releases with heavy duty solid neutral link and 1-set of three phase indicating lamps	Nos.	1.00	19,904.11	19,904.11
j)	125 A, 415V, Ics=25 kA ,TP, MCCB with variable over current and short circuit releases with heavy duty solid neutral link and 1-set of three phase indicating lamps	Nos.	1.00	19,290.41	19,290.41
k)	100/63 A, 415V, Ics=25 kA ,TP, MCCB with variable over current and short circuit releases with heavy duty solid neutral link and 1-set of three phase indicating lamps	Nos.	1.00	17,012.58	17,012.58
l)	Less than 63A to 40A, 415V, Ics=25 kA ,TP, MCCB with variable over current and short circuit releases with heavy duty solid neutral link and 1-set of three phase indicating lamps	Nos.	1.00	14,529.73	14,529.73
m)	Electrical Operating mechanism (Motorized mechanism) for all types of above MCCBs	Nos.	2.00	23,948.32	47,896.63
n)	5-32A FP MCB 10 kA	Nos.	1.00	1,712.08	1,712.08
o)	40-63A FP MCB 10 kA	Nos.	1.00	1,955.73	1,955.73
p)	5-32A TP MCB 10 kA	Nos.	1.00	1,387.38	1,387.38
q)	40-63A TP MCB 10 kA	Nos.	1.00	1,902.34	1,902.34

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
r)	5-32A DP MCB 10 kA	Nos.	1.00	914.90	914.90
s)	40-63A DP MCB 10 kA	Nos.	1.00	1,271.08	1,271.08
t)	5-32A SP MCB 10 kA	Nos.	1.00	461.19	461.19
u)	40-63A SP MCB 10 kA	Nos.	1.00	693.21	693.21
v)	16-32A DP RCCB, 30 mA	Nos.	1.00	3,082.12	3,082.12
w)	40-63A DP RCCB, 30 mA	Nos.	1.00	3,681.68	3,681.68
x)	16-32A DP RCCB, 100 mA	Nos.	1.00	3,200.55	3,200.55
y)	40-63A DP RCCB, 100 mA	Nos.	1.00	3,383.57	3,383.57
z)	16-32A DP RCCB, 300 mA	Nos.	1.00	3,068.67	3,068.67
aa)	16-32A DP RCBO, 30 mA	Nos.	1.00	3,252.77	3,252.77
ab)	40-63A DP RCBO, 30 mA	Nos.	1.00	4,587.28	4,587.28
ac)	16-32A DP RCBO, 100 mA	Nos.	1.00	4,360.43	4,360.43
ad)	40-63A DP RCBO, 100 mA	Nos.	1.00	4,234.83	4,234.83
ae)	16-32A DP RCBO, 300 mA	Nos.	1.00	3,731.05	3,731.05
10.3	Supply, installation and testing of 63/40 Amp adjustable, TP MCCB with fixed neutral in sheet steel enclosure with incoming & outgoing cable box and ON indication lamp complete as required.	Nos.	1.00	20,500.73	20,500.73
10.4	Supply, installation and testing of 4 Way TPN sheet steel enclosure with incoming & outgoing cable, distribution Board complete as required.	Nos.	1.00	19,971.91	19,971.91
10.5	Supply of 1250A,415V,50KA,4P ACB in 2mm. Sheet Steel Enclosure with incoming & outgoing cable.	Nos.	1.00	3,11,533.82	3,11,533.82
10.6	Supply of 800A,415V,50KA,4P ACB in 2mm. Sheet Steel Enclosure with incoming & outgoing cable.	Nos.	0.00	2,64,874.26	-
10.7	Supply of 630A,415V,35KA,TP MCCB in 2mm. Sheet Steel Enclosure with incoming & outgoing cable	Nos.	1.00	69,618.34	69,618.34
10.8	Supply of 400A,415V,35KA,TP MCCB in 2mm. Sheet Steel Enclosure with incoming & outgoing cable	Nos.	1.00	56,504.85	56,504.85
10.9	Supply of 250A,415V,35KA,TP MCCB in 2mm. Sheet Steel Enclosure with incoming & outgoing cable	Nos.	1.00	40,373.50	40,373.50
10.10	Supply of 160A,415V,35KA,TP MCCB in 2mm. Sheet Steel Enclosure with incoming & outgoing cable	Nos.	1.00	30,219.04	30,219.04
10.11	Supply of 63A,415V,35KA,TP MCCB in 2mm. Sheet Steel Enclosure with incoming & outgoing cable	Nos.	1.00	24,842.59	24,842.59
10.12	Over Load Relay				
a)	4 - 6 A	Nos.	1.00	1,238.25	1,238.25
b)	6 - 12 A	Nos.	1.00	1,304.00	1,304.00
c)	9 - 15 A	Nos.	1.00	1,322.62	1,322.62
d)	30 - 40 A	Nos.	1.00	2,953.66	2,953.66
e)	40 - 65 A	Nos.	1.00	3,844.33	3,844.33
f)	63 - 100 A	Nos.	1.00	5,473.31	5,473.31
10.13	75 HP, Star Delta starter comprising 3 Nos. TP contactor AC-3 duty Auto/Manual switch, Start Stop push button, bimetallic over current relays single phasing preventer and timer & with potential free contacts for remote monitoring and control.	Nos.	1.00	78,784.26	78,784.26
10.14	50 HP, Star Delta starter comprising 3 Nos. TP contactor AC-3 duty Auto/Manual switch, Start Stop push button, bimetallic over current relays single phasing preventer and timer & with potential free contacts for remote monitoring and control.	Nos.	1.00	70,306.44	70,306.44
10.15	10/7.5 HP, Star Delta starter comprising 3 Nos. TP contactor AC-3 duty Auto/Manual switch, Start Stop push button, bimetallic over current relays single phasing preventer and timer & with potential free contacts for remote monitoring and control.	Nos.	1.00	42,884.68	42,884.68

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
10.16	Up to 5HP, DOL starter comprising 1 No. TP contactor AC-3 duty Auto/Manual switch, Start Stop push button, bimetallic over current relays single phasing preventer and timer & with potential free contacts for remote monitoring and control.	Nos.	1.00	25,730.56	25,730.56
	Sub-total for J.10 (Addition/deletion item)				16,84,981.58
J.11	Building Management System				
	Building Management System:	Set	1.00	34,16,986.72	34,16,986.72
	Design, Supply, Installation, Testing and Commissioning of Building Management System (BMS) for control, monitoring and supervision of following system.				
	Electrical-low voltage power and distribution monitoring including energy metering. Remote relay setting of ACBs. Status monitoring of MCCBs and ACBs, as per I/O schedule the signal for energy metering shall be provided to RS 485 port of panel. Interfacing with other systems, Control panels, Elevator, Escalator panels, Fire alarm control panel, etc. RS 485 port shall be provided on the panels of all systems for communicating with BMS.				
	Hydraulic system. Automation of Hydraulic system, Domestic water pumps, Level sensors, Lux level meters ,humidity sensors Temp sensors and level status shall be communicated to RS 485. Status monitoring of Pumps, Monitoring of Fire water pumps, Diesel generator system, On/off of DG sets and monitoring the system including diesel level. However, all required signals from the DG set shall be provided through RS 485 port. The system should comprise the following.				
a)	One number program Logic controller with 40 digital inputs. 10 Digital output at pump room (expandable by 50%).				
b)	One number program Logic controller with 60 digital inputs. 18 Digital output at ESR (expandable by 50%).				
c)	One number Hub/Switch not less than 24-port 10/100 Dual Speed port-up to 200Mbps.				
	The contractor shall submit the detailed design of BMS system matching with the electrical and other hardware provided. The interfacing of all components shall be described before proposal/procurement of any device needed to implement the BMS scheme by complying the tender Specification & IO summary provided in the Technical Specification. The same shall be included in the cost of the BMS system. The I/O summaries mentioned in the Technical Specification are tentative and the contractor shall interface with other system contractors to finalize the functional requirements of BMS system of a Metro station.				
	Complete BMS Architecture shall be prepared based on the design for the efficient functionality of the monitoring & controlling of the MEP system with parameters at KRIDE stations. The contractor shall ensure that the parameters be made available at OCC through a MODBUS protocol and proper interface with system contractors.				
	Sub-total for J.11 (Building Mangement System)				34,16,986.72

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
	PART - K : FIRE FIGHTING WORKS				
K.01	FIRE FIGHTING WORK				
K.01.1	FIRE HYDRANT SYSTEM				
1.0	Supply, installation, testing and commissioning of fire pumps, electrically driven generally as specified and shown in equipment schedule complete with:				
i)	All accessories				
ii)	Anti vibration pads				
iii)	Test connection excluding starter panel				
iv)	The pump heads specified on the Drawings and / or Equipment Schedules are for guidance and information only and are calculated based on assumed equipment pressure drops. The exact pump head based on the pipe run and the offered equipment shall be carefully checked and re-calculated for each pump before ordering the equipment. Calculation shall be submitted for approval. No modification to the piping system shall be allowed without prior approval. Any additional cost for the modification of the system (pumps, motors, switchgears, cables, panel boards, switchboards, etc.) necessary to meet the specified duties, special conditions and the offered equipment shall be provided as approved by the Employer.				
1.1	Main Fire Pump-Electrical				
	Supply, Installation, testing and commissioning of electrical motor fire pump capable to deliver flow at rated head. The pump shall be horizontally split casing type as per specification having fluiguide system for anti-corrosive protection. The pump shall be coupled to TEFC motor with Class "F" insulation of suitable HP and complete set shall be mounted on common base frame. The quoted rate shall includes providing & fixing of pressure gauge, pressure switch, inter connecting cable, coupling, coupling guard, Foundation bolts, cable termination adopter box of 3 mm thickness etc.				
iv)	2850 LPM @ 90 m head	Nos.	2.00	7,79,009.82	1558019.635

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
1.3	Fire Jockey Pumps				
i)	Supply, Installation, testing and commissioning of electrical motor driven jockey pump of horizontal centrifugal end suction back pull out type capable to deliver 180 LPM at 70m head. The pump shall be coupled to TEFC motor of suitable HP and complete set shall be mounted on common base frame. The quoted rate shall includes providing & fixing of pressure gauge, pressure switch, inter connecting cable, coupling, coupling guard, Foundation bolts etc.	Nos.			
ii)	Supply, Installation, testing and commissioning of electrical motor driven jockey pump of horizontal centrifugal end suction back pull out type capable to deliver 180 LPM at 90 m head. The pump shall be coupled to TEFC motor of suitable HP and complete set shall be mounted on common base frame. The quoted rate shall includes providing & fixing of pressure gauge, pressure switch, inter connecting cable, coupling, coupling guard, Foundation bolts etc.	Nos.	1.00	1,47,725.82	147725.8175
1.4	Water Supply Pumps				
	Supply, Installation, testing and commissioning of horizontal mount pump set with CI casing, Bronze impeller and SS shaft with SS key suitable for operation on 380-440 volts, 3 phase 1450 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.				
	Domestic Water Pumps (1 Working + 1 Stand by)				
	Pump capacity - 150 LPM				
	Head - 50 m				
	RPM - 1450	Set	1.00	1,86,547.21	186547.2114
1.5	Submersible Drainage Pumps				
	Supply, Installation, testing and commissioning of non clog type mono block Horizontal submersible drainage pumps with CI casing, Bronze impeller and SS shaft suitable for handling solids of 12 mm size with totally water and dust proof motor as specified complete with motor control panel and float switch, inclusive of all terminations and earthing required all complete as per specifications.				

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
	Capacity 300 LPM & Head 10 m (1w+1s)	Set	1.00	1,10,058.53	110058.531
1.6	Supply, Installation, testing and commissioning of landing hydrants comprising of the following in the Fire duct. (Internal FHC)				
1.6.1	63mm dia gun metal instantaneous pattern single headed landing valve, with chain & ABS Cap.	Nos.	32.00	6,261.90	200380.9196
1.6.2	Hose reel drum of swinging type with 25 mm dia, rubber braided hose 45 m long with gate valve and 3 position nozzle (Spray, Jet & Shut off) complete.	Nos.	32.00	13,798.20	441542.2482
1.6.3	15 m long, 63 mm dia, RRL hose with 63 mm instantaneous gun metal coupling and hoses rolled & hang to suitable powder coated structural support fixed inside the fire duct wall.	Nos.	63.00	5,806.51	365810.1123
1.6.4	1 no. gun metal type branch pipe with nozzle.	Nos.	32.00	2,450.69	78422.1448
1.6.5	Fire Hose cabinet fabricated out of post office red paint external and internal complete in all respects SS sheet of 16 SWG with angle iron frame (min. 32 ISA) of dimension 900mm x 1200 mm x 600 min. fixed with 5mm thick glass, suitable rubber beading and locking arrangement. Quoted rate shall include all fasteners etc., and complete as required.	Nos.	14.00	12,110.52	169547.3069
1.6.6	Fire duct/Hose shutter fabricated out of post office red paint external and internal complete in all respects SS sheet of 16 SWG. with angle iron frame (min. 32 ISA) of dimension 900mm x 1200 mm min. Door shall be fixed with 5mm thick glass suitable rubber beading and locking arrangement. Quoted rate shall includes all fasteners etc., and complete as required.	Nos.	17.00	9,262.68	157465.5603
1.7	Supply, Installation, testing and commission of yard hydrant consisting of the following. The quoted rate shall include the cost of bore making in the concrete wall/roof slab/retaining wall if required. (External FHC)				
1.7.1	63mm dia gun metal instantaneous pattern single headed landing valve, with chain & ABS Cap.	Nos.	9.00	6,261.90	56357.11456
1.7.2	15 m long, 63 mm dia, RRL hose with 63 mm instantaneous gun metal coupling and hoses rolled & hang to suitable powder coated structural support fixed inside the fire duct wall.	Nos.	17.00	5,806.51	98710.66522
1.7.3	1 no. gun metal type branch pipe with nozzle.	Nos.	9.00	2,450.69	22056.22823
1.7.4	Fire Hose cabinet fabricated out of powder coated SS sheet with angle iron frame (min. 32 ISA) of dimension 750 mm x 600 mm x 250 mm made of 2 mm thick with 5mm thick glassed doors including necessary locking arrangement suitable to accommodate external hydrants and duly coated with post office red paint external and internal complete in all respects.	Nos.	9.00	12,227.70	110049.3127
1.8	Providing and fixing stainless steel orifice plate made out of 8mm thick SS plate of suitable pipe dimension to reduce the pressure up to 3.5 kg/sq.cm. complete in all respects				
1.8.1	80 mm dia	Nos.	29.00	1,754.86	50890.87314
1.9	Providing and fixing standard Fire man AXE with heavy rubber handle as complete	Nos.	22.00	893.92	19666.23948
1.10	Providing and fixing double flanged double arched flexion rubber expansion joint with unit control of standard length as per manufacturer specifications tested to a pressure of 16kg/ cm ² including rubber gasket, flanges, GI Bolts&Nuts and washers complete as required.				
1.10.1	50 mm dia	Nos.	4.00	3,267.13	13068.52857
1.10.2	65 mm dia	Nos.	4.00	4,240.34	16961.34555
1.10.3	80 mm dia	Nos.	9.00	5,446.78	49021.02021
1.10.4	150 mm dia	Nos.	9.00	6,846.18	61615.62497
1.10.5	200 mm dia	Nos.	3.00	10,667.91	32003.72339
	Sub-total for K.01.1				39,45,920.16
K.01.2	PIPING FOR FIRE FIGHTING SYSTEM				

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
2.1	Supply, fabricating, laying, Testing, Painting and commissioning of external piping (Underground) generally as specified using heavy duty "C" class GI conforming to IS 1239 with all fittings at a depth of 1.0 m all complete with one protection layer of 4mm thick pypkote or similar including all kind of excavation.				
	All piping and GI fittings shall conform to IS 1239 together with welded joint flanges, gasket, GI Bolts&Nuts and washer, fittings, adapter piece etc.				
2.1.1	200mm nominal bore	RM	12.00	5,172.11	62065.28917
2.1.2	150 mm nominal bore	RM	229.00	3,003.16	687723.4584
2.1.3	100 mm nominal bore	RM	29.00	2,201.22	63835.46483
2.1.4	80 mm nominal bore	RM	72.00	1,564.98	112678.5021
2.1.5	65 mm nominal bore	RM	44.00	1,252.16	55095.04589
2.1.6	50 mm nominal bore	RM	86.00	1,201.49	103327.9193
2.2	Supply, Installation, testing and commissioning of CI Butterfly Valves (PN 16), slim seal standard lever operated type conforming to IS 13095 with required flanges, GI Bolts&Nuts and washer etc., complete.				
2.2.1	200 nominal bore	Nos.	6.00	17,781.72	106690.3406
2.2.2	150 nominal bore	Nos.	22.00	7,090.95	156000.9904
2.2.3	100 nominal bore	Nos.	14.00	4,827.41	67583.71309
2.2.4	80 nominal bore	Nos.	29.00	3,719.38	107862.0407
2.2.5	65 nominal bore	Nos.	9.00	3,241.75	29175.78555
2.2.6	50 nominal bore	Nos.	22.00	3,126.18	68776.06766
2.3	Supply, Installation, testing and commissioning of CI Non-return valves (PN 16) as per ANSI B 16.10 wafer type with required flanges, gaskets, GI Bolts&Nuts and washer etc.				
2.3.1	150 mm dia	Nos.	9.00	20,460.45	184144.0437
2.3.2	100 mm dia	Nos.	3.00	11,950.15	35850.4494
2.3.3	80 mm dia	Nos.	4.00	8,795.90	35183.592
2.3.4	65 mm dia	Nos.	4.00	6,405.59	25622.34041
2.3.5	50 mm dia	Nos.	7.00	5,831.58	40821.03015
2.4	100 mm dia gun metal Draw Out connection with foot valve for Fire Brigade.	Nos.	3.00	7,162.54	21487.61552
2.5	Construction of (450mm x 450mm and depth up to 450mm) valve chamber with 230mm thick mm best quality TM bricks in Concrete Mixture of 1:4 over a bed of 150mm thick PCC of 1:4:8. Internal wall plastered smooth in Concrete Mixture of 1:3 with water proofing compound and external walls plastered rough with sponge finish including curing, back filling of the chamber sides with excavated soil, disposing of the surplus earth after back filling including cost of providing hinged lockable Heavy duty ductile-iron frame and cover etc., complete as per specification.	Nos.	2.00	14,909.83	29819.6689
2.6	Construction of (750mm x 750mm and depth up to 900mm) valve chamber with 230mm thick mm best quality TM bricks in Concrete Mixture of 1:4 over a bed of 150mm thick PCC of 1:4:8. Internal wall plastered smooth in Concrete Mixture of 1:3 with water proofing compound and external walls plastered rough with sponge finish including curing, back filling of the chamber sides with excavated soil, disposing of the surplus earth after back filling including cost of providing hinged lockable Heavy duty ductile-iron frame and cover etc., complete as per specification.	Nos.	2.00	15,859.10	31718.20729
	Sub-total for K.01.2				20,25,461.57
K.01.3	INTERNAL PIPING				

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
3.1	Supply, Installation, testing and commissioning of heavy duty "C" class GI Pipes conforming to IS:1239 part-II including Tees, elbows, check nuts, union, flanges, nipple, threading, cutting, welding, fixing in/on walls, ceiling by using suitable "L" angle supports,etc. Painting with two coats of post office red enamel as approved with welded jointing for Wet Riser system.				
3.1.1	25 mm nominal bore	RM	100.00	398.46	39845.57436
3.1.2	32 mm nominal bore	RM	29.00	490.04	14211.29799
3.1.3	40 mm nominal bore	RM	16.00	618.12	9889.871057
3.1.4	50 mm nominal bore	RM	173.00	804.65	139203.7205
3.1.5	65 mm nominal bore	RM	57.00	1,039.35	59242.67333
3.1.6	80 mm nominal bore	RM	287.00	1,264.99	363052.7744
3.1.7	100 mm nominal bore	RM	287.00	1,627.26	467024.4049
3.1.8	150 mm nominal bore	RM	884.00	2,706.08	2392175.557
3.1.9	200 mm nominal bore (6 mm wall thickness)	RM	72.00	4,434.88	319311.2743
3.2	Supply, fabrication (as per code), installation, testing and commissioning Pressure vessels (PN 16) of 450 mm diameter and 1000 mm height fabricated from 8mm thick MS sheet with flanged dished Ends, supporting legs, inlets & Outlet flanged connections, 25mm dia drain valve, air release valve with stop cock on the top and pressure Gauge(PN10) controlled with ball valve, duly painted with two coat of anti corrosive primer and two coat of post office red enameled paint of approved make inside and outside complete.	Nos.	1.00	38,438.65	38438.64755
3.3	Supply, Installation, testing and commissioning of CI flanged "Y" type strainer with SS mesh, flanges, GI Bolts&Nuts and washer, gaskets etc. complete as required.				
3.3.1	Size 200 mm	Nos.	3.00	30,010.95	90032.85782
3.3.2	Size 150 mm	Nos.	4.00	20,699.70	82798.78831
3.3.3	Size 100 mm	Nos.	3.00	13,224.17	39672.50454
3.3.4	Size 80 mm	Nos.	4.00	8,160.33	32641.33584
3.3.5	Size 65 mm	Nos.	3.00	4,849.35	14548.05946
3.4	Supply, installation, testing and commissioning fire brigade inlet connection of 4 way with 4 nos. 63mm dia. Built - in Gun metal Non return valves instantaneous coupling type arranged on 150 mm dia. Pipe manifold and connected to wet riser main including the cost of accessories like Supports, bolts & Nuts, Gaskets etc. complete as required.	Nos.	3.00	12,318.27	36954.80944
3.5	Supply, installation, testing and commissioning fire brigade inlet connection conforming to IS 904 comprising of 2 nos. 63mm dia. Built-in Gun metal Non return valves instantaneous coupling type arranged on 150mm dia. Pipe manifold and connected to wet riser main including the cost of accessories like Supprots, bolts & Nuts, Gaskets etc. complete as required.	Nos.	1.00	8,057.14	8057.141265
3.6	Supplying and fixing approved make 25mm dia. Automatic air release valve (PN 10) with ball valve, union etc.				
3.6.1	25 mm dia	Nos.	14.00	2,370.44	33186.1242
3.7	Supply and installation of Ball Valve (Test valve/drain valve) generally as specified all complete.				
3.7.1	25 mm nominal bore	Nos.	36.00	1,037.56	37352.26455
3.7.2	50 mm nominal bore	Nos.	50.00	2,882.96	144147.9976
	Sub-total for K.01.3				43,61,787.68
K.01.4	SPRINKLER SYSTEM				

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
4.1	Supply, installation, testing and commissioning of 150 mm dia Installation Control Valve inclusive of 1 no. 150 mm dia Butterfly Valve, trainer, Alarm Valve with Water Motor Gong, Pressure Gauges, Test Lines with Ball Valves with necessary GI (H) piping with threaded fittings of required pipe sizes complete. The item also includes providing and fixing 100 mm dia Pressure Gauges on Sprinkler Headers including Ball Valves, Test Control Box, brass strainer, retard chamber.	Set	7.00	80,284.32	561990.2125
4.2	Providing, fixing, testing and commissioning of UL listed Pendant / Upright type Sprinkler Head rated at 68 degree centigrade	Nos.	72.00	385.64	27765.83916
4.3	Providing and fixing UL listed Flow Switch of 50 /80 / 100 / 150 mm dia on Sprinkler Header complete with flexible full bore paddle, U clamp and NO / NC contact terminals	Nos.	72.00	6,693.74	481949.5125
	Sub-total for K.01.4				10,71,705.56
K.01.5	PORTABLE FIRE EXTINGUISHERS				
	Supply and installation of portable fire Extinguishers with suitable fixing arrangements as described below:				
5.1	Providing and fixing fire extinguishers water type of Capacity 9 litter with internal plastic fitting and ISI marked as per IS-940 with Gun metal Cap co2 cartridge and Initial refill.	Nos.	4.00	2,170.51	8682.051621
5.2	ABC dry chemical powder type fire extinguisher of 6 kg, capacity with initial filling in brand new cylinder with powder coated finish, fitted with Gun metal union, high pressure CO2 gas cartridge discharge hose, wall mounting bracket etc. complete, confirming to IS:15683 latest version as required	Nos.	64.00	2,465.13	157768.6318
5.2.1	Carbon dioxide extinguisher conforming to relevant IS with high pressure discharge tube, horn, control valve, IS marked including clamps etc. conforming to IS 15683 : 2006				
5.2.2	4.5 kg capacity extinguisher	Nos.	7.00	6,392.95	44750.68278
5.2.3	5kg DCP extinguisher	Nos.	7.00	3,104.72	21733.06497
5.3	Mechanical foam type 9.0 litter capacity fire extinguisher (for DG room)	Nos.	2.00	2,598.66	5197.32592
5.4	Providing and Fixing Co2 gas type trolley mounted fire extinguisher of capacity 22.5 kg with ISI marked and as Item IS 2878with discharge nozzle and initial refill.	Nos.	1.00	23,069.50	23069.50182
5.5	Providing and fixing Co2 gas type trolley mounted fire extinguisher of capacity 50 litters with IS marked as per IS 13385 or Equivalent Standard with nozzle and Initial refill.	Nos.	1.00	18,892.39	18892.39432
5.6	Fire buckets round bottom type enamel painted, white inside & red outside and letter "FIRE" in the black outside and handle with mounting bracket	Nos.	7.00	548.02	3836.157468
	Sub-total for K.01.5				2,83,929.81
K.01.6	PANEL FLOODING TUBE SYSTEM				
6.1	CLEAN AGENT BASED PANEL FLOODING SYSTEM FOR ELECTRICAL(LT) PANELS (CLEAN AGENT PANEL FLOODING SYSTEM- FIRE TRACE TUBE SYSTEM OR EQUIVALENT WITH UL LISTED SYSTEM).				
	Supply, fixing, testing and commissioning of UL 521, UL listed Polymer Tube Detection based Clean Agent System for Electrical Panels (Fire trace Tube Panel Protection System), consisting of the following components:				
6.1.1	10 LB CAPACITY Clean agent system complete with all necessary gas ,fitting ,support ,and accessories, connected with valve.	Nos.	7.00	80,237.84	561664.8944
6.1.2	5 LB CAPACITY Clean agent system complete with all necessary gas ,fitting ,support ,and accessories, connected with valve.	Nos.	7.00	56,951.53	398660.7169

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
6.1.3	End of Line adaptor	Nos.	13.00	1,518.47	19740.09408
6.1.4	Pressure Switch	Nos.	13.00	1,518.47	19740.09408
6.1.5	Flexible Polymer Detection Tube with all necessary fittings & supports.	RM	686.00	805.45	552535.3399

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
6.1.6	Master Control Unit for connecting each system with electronic hooters and productivity input to SCADA /Fire Alarm system including all necessities +electrical wiring to make each entire system functional	Nos.	13.00	5,253.40	68294.15403
	Sub-total for K.01.6				16,20,635.29
K.02	FIRE DETECTION & ALARM SYSTEM				
2.0	FIRE ALARM SYSTEM- INTELLIGENT ADDRESSABLE SYSTEM				
	The Fire Alarm and Detection System specified herein, must conform to Technical Specifications, in addition to the description given in respective items of BOQ, whether explicitly specified or not. In case of contradiction between Technical specification and description in BOQ, the most stringent of the condition will prevail.				
	All the items / parts mentioned in relevant clauses of the Technical specifications and not specifically mentioned in BOQ shall be deemed to be included in the quoted rates, unless specifically excluded.				
	All the items not specifically mentioned here but necessary to make the system complete and suitable for desired application as per Technical Specifications and Drawings will be deemed to be included in the quoted prices				
2.1	Supply, Installation, Testing and Commissioning of 4 Loop Addressable Main Fire Alarm Control Panel (FACP) complete with capacity to connect required no. of Devices & Detectors in total per loop as per relevant standard (in zoned manner), with 20% spare capacity in each loop. Networkable intelligent addressable type fire alarm control panel with 240 character LCD display. The system should be capable of detecting fire within 10sec. as per UL 9th edition. The panel should have front panel keyboard for logic programming and editing capability from the panel and also should have provision for programming from PC/Laptop.				
	Four access level, flash EPROM, sufficient nos. of programmable relay control for controlling various associated work, 240V AC power supply, automatic battery charger, 24V sealed maintenance free batteries sufficient for 24hours normal working and then be capable of operating the system for 2 hours during emergency as required. The panel is required to integrate with BMS/SCADA through MODBUS protocol. FACP panel shall be UL/ Vds listed. The price shall include necessary communication card, repeater driver, software with license & graphic cards as required for complete operation.	Set	1.00	4,33,081.94	433081.9385
2.2	Supply, Installation, Testing and Commissioning of 80 character LCD display Repeater Panel which mimics all display information from the host panel and control switch for system acknowledge, signal silence, drill and reset with enable key. The repeater panel shall have system LEDs for Power, Alarm, Trouble, Supervisory and Alarm silenced. It should display device type identifiers, individual point alarm, Trouble or Supervisory, Zone, Custom alpha labels. It should have time and date display field. The panel shall have provision to be powered by 24Vdc from host FACP or from remote 24Vdc power source. It should be capable of being remotely located up to 300 meters from host control panel as per Specifications and Drawings.	Set	1.00	86,437.82	86437.8166

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
2.3	Supply, installation, Testing & commissioning of Automatic floating sensitivity type Intelligent Addressable microprocessor based photo thermal Multi sensing smoke detector with mounting based LED providing 360 degree viewing angle, address switch to program the detectors, complete as required. sensitivity level shall be adjusted automatically without the need for operator intervention or programming. The address need to be viewed and changed without the need for electronic programmer.	Nos.	143.00	3,402.90	486614.4962
2.4	Multi Co-operative Sensing Analog Addressable Rate of Rise Cum Fixed temperature detector with mounting based LED providing address switch to program the detectors complete as required. The address need to be viewed and changed without the need for electronic programmers.	Nos.	14.00	4,474.83	62647.66257
2.5	Supply, installation, Testing & commissioning of Intelligent addressable fault isolator module with base and capable of monitoring shorted loop circuit and automatically restore communications when shorted conditions are corrected. The address need to be viewed and changed without the need for electronic programmer.	Nos.	43.00	2,806.80	120692.4894
2.6	Supply, installation, Testing & commissioning of Intelligent addressable single action resettable manual pull station having an integrally mounted addressable module that monitors and reports contact status. The address need to be viewed and changed without the need for electronic programmer.	Nos.	57.00	2,669.11	152139.3356
2.7	Supply, installation, Testing & commissioning of Intelligent addressable Hooter with strobe having an integrally mounted addressable module that monitors and reports contact status. The address need to be viewed and changed without the need for electronic programmer. Including additional power supply arrangement as required.	Nos.	57.00	2,869.43	163557.7411
2.8	Supply, installation, Testing & commissioning of Response Indicator.	Nos.	114.00	114.90	13098.38793
2.9	Supply, installation, Testing & commissioning of Intelligent Addressable Control Module that monitors and reports contact status.	Nos.	72.00	2,964.07	213412.7911
2.10	Supply, installation, Testing & commissioning of Intelligent Addressable Intelligent Addressable Monitoring Modules that monitors and reports contact status.	Nos.	43.00	2,565.96	110336.1768

S.No.	Description	Unit	Qty	Rate (Excl. GST)	Amount (in INR)
2.11	Supply, installation, Testing & commissioning of Intelligent Addressable water Flow Monitoring Modules having an integrally mounted addressable module that monitors and reports contact status.	Nos.	4.00	3,664.97	14659.87331
2.12	Supply, installation, Termination, Testing & commissioning of Fire Survival, CWZ category Cables (confirming to BS: 7629 and specifications for performance requirements of Fire Survival Cables, CWZ category) un-armoured, 2 core x 2.5 sq.mm, screened / shielded, Copper conductor (one pair shielded) cable including all required accessories like gland, clip clamp, shrouds, etc.	M.	3128.00	251.97	788156.7608
2.13	Supply, installation, Termination, Testing & commissioning of Fire Survival Cables, , CWZ category (confirming to BS: 7629 and specifications for performance requirements of Fire Survival Cables, CWZ category) un-armoured, 1 twisted pair, 2 core x 1.5 sq.mm, screened / shielded copper conductor cable including all required accessories like gland, clip clamp, shrouds, etc.	M.	4401.00	154.46	679761.8238
2.14	System commissioning including programming of FACP, repeater panel and integration of BMS/SCADA etc. and performing required drills during various stages of inspections by employer, local fire authorities and CMRS.	L.S.	4.00	1,57,939.78	631759.1344
	Total for K.02				39,56,356.43

S.No.	Description	Unit	TOTAL Qty	Average Unit Rate	Amount (in INR)
	PART - L : HVAC WORKS				
L.01	AIRCONDITIONING				
1.1	VRF/ VRV UNITS				
	Supply, installation, testing and commissioning of Air Cooled Variable Refrigerant Volume / Flow System suitable for R410A / R32 and 415V, 50 Hz, AC supply. The unit shall consist of indoor units and external condensing units and other accessories complete in all respects. The unit shall be fully charged with required volume of gas. Central remote controller shall be provided to control the complete HVAC system of that particular station.				
	OUTDOOR UNIT				
	Supply, installation, testing and commissioning of Modular Type Outdoor Condensing Units equipped with highly efficient Inverter scroll compressors to work on 415 V, 50 Hz AC supply with digital/ inverter technology, special acryl precoated heat exchanger, low noise condenser fan with motor, auto check function for errors in display panel, auto address setting, as per specifications.				
	The units shall be complete with necessary mounting frames and required accessories.				
a)	28 HP	Nos.	1.00	8,54,578.00	8,54,578.00
b)	24 HP	Nos.	2.00	7,35,869.29	14,71,738.58
1.2	INDOOR UNITS AND CENTRAL REMOTE CONTROLLER				
1.2.1.a	Supply, installation, testing and commissioning of Wall mounted Type Indoor Units each complete with coil, filter, etc. Air conditioners with evaporating unit comprising of cooling coil, blower with motor suitable for operation on 230 volt, 1 phase, 50 Hz, AC supply and as per specifications. The rate shall include cost of cordless Remote controller, Top Plugs, complete length of required size drain pipes and all other accessories required for full-fledged operation of system. Nothing extra shall be paid in this account.				
a)	1.6 TR	Nos.	1.00	25,736.98	25,736.98
b)	2.0 TR	Nos.	1.00	29,289.81	29,289.81
1.2.1.b	Supplying, installation, testing and commissioning of ceiling mounted 4-way cassette Type Indoor Units each complete with coil, filter, drain pump etc. Air conditioners with evaporating unit comprising of cooling coil, blower with motor suitable for operation on 230 volt, 1 phase, 50 Hz, AC supply and as per specifications. The rate shall include cost of cordless Remote controller, Top Plugs, complete length of required size drain pipes and all other accessories required for full-fledged operation of system. Nothing extra shall be paid in this account.				
a)	1.0 TR	Nos.	5.00	36,201.78	1,81,008.92
b)	2.0 TR	Nos.	5.00	41,243.43	2,06,217.13
c)	3.2 TR	Nos.	5.00	46,975.91	2,34,879.54
d)	4.0 TR	Nos.	5.00	44,261.88	2,21,309.39

S.No.	Description	Unit	TOTAL Qty	Average Unit Rate	Amount (in INR)
1.2.1.C	Supplying, installation, testing and commissioning of Central Remote Controller for integrating and effecient control of Indoor and Outdoor Units from Station Controller room. Rate shall include all required and asssoiated accessories for complete functionality of the equipment as per technical specification. The equipment shall have inbulit compatability for integration with BMS susytem through RS485 communication port with MODBUS protocol.	Set	1.00	71,255.13	71,255.13
1.2.1.D	Supplying, installation, commissioning and testing of Metallic body Air Cooled Split type wall mounted Air conditioners with evaporating unit comprising of cooling coil, blower with motor and condensing unit comprising hermetically sealed rotary compressor, condenser coil, propeller fan. Unit shall be with metallic body & complete with controls, interconnecting copper refrigerant piping with insulation, electrical cabling etc. between evaporative and condensing unit, refrigerant gas and oil. The unit shall be suitable for operating on 220 ± 6% volt 1, phase 50 cycle AC supply. The units shall be suitable for corded remote operation. Split unit shall be Inverter type having R410 /Enviorment Friendly Refrigerant or equivalent with 5-star rating. Quoted price shall include cost of : - Voltage Stabilizer. - The refrigerant piping & cabling shall run in PVC sleeve . - Steel supporting structure for outdoor units suitable for wall mounting / floor mounting				
	1.0 TR	No	1.00	44,632.04	44,632.04
	1.5 TR	No	1.00	54,550.20	54,550.20
	GMRCL BOQ item, C-1.10A & B, page no 89 of 105				
1.2.1.e	Refrigerant piping & cabling for Inverter Split units Copper refrigerant piping including all supports, appropriate sizes duly insulated with nitrile rubber insulation of 6mm/9mm thickness for all types of HI wall split units, rates shall include power & control cablesfor these unitslaid along the pipe route as per the site conditions.				
a)	1.0 TR HI Wall type IDU	Rm	2.00	661.11	1,322.22
b)	1.5 TR HI Wall type IDU	Rm	2.00	620.13	1,240.26
	GMRCL BOQ item, C-1.11, page no 89 of 105				
1.2.1.f	Supply, installation & testing of 20-40 mm uPVC condensate drain piping complete with all fittings(including elbows, connectors, u trap, Y connection , flexible tubings and supports as per specifications and duly insulated with 6-9 mm thick closed cell nitrile rubber insulation from unit to nearest suitable drain system maintaining proper slope & aesthetics.				
a)	20 mm Dia. To 40 mm dia.	Rm	172.00	119.14	20,491.33
	GMRCL BOQ item, C-1.12, page no 90 of 105				
	Notes:				
1)	The vendor may offer the outdoor units as per availability from the manufacturer, however keeping the tonnage same as per BOQ subject to approval by KRIDE.				
2)	The indoor units capacity also can be as per availability from the manufacturer but keeping the minimum capacity as required in BOQ subject to approval by KRIDE.				
1.3	REFRIGERANT PIPING				

S.No.	Description	Unit	TOTAL Qty	Average Unit Rate	Amount (in INR)
	Supply, installation, testing and commissioning of interconnecting refrigerant pipe work with elastomeric nitrile rubber/closed cell expanded polythene tubular insulation between each set of indoor & outdoor units as per specifications, all piping should be laid on Galvanized/Powder Coated tray supported by Galvanized MS Hangers & Clamps. The rate shall include cost of Y-joints, T-Joints distributor and headers in the refrigeration piping system wherever required and all other accessories required for full-fledged operation of system. Nothing extra shall be paid in this account.				
a)	41.3 mm O.D.(insulation - 19 mm thick)	Rmt.	14.00	3,145.32	44,034.41
b)	34.9 mm O.D.(insulation - 19 mm thick)	Rmt.	29.00	2,317.11	67,196.11
c)	28.6 mm O.D.(insulation – 19 mm thick)	Rmt.	57.00	1,803.65	1,02,808.24
d)	25.4 mm O.D.(insulation – 19 mm thick)	Rmt.	22.00	1,697.74	37,350.26
e)	22.2 mm O.D.(insulation – 13 mm thick)	Rmt.	57.00	1,443.42	82,274.93
f)	19.1 mm O.D.(insulation – 13 mm thick)	Rmt.	30.00	1,257.07	37,712.09
g)	15.9 mm O.D.(insulation – 13 mm thick)	Rmt.	143.00	1,062.04	1,51,871.03
h)	12.7 mm O.D.(insulation – 13 mm thick)	Rmt.	387.00	835.57	3,23,365.75
i)	9.5 mm O.D.(insulation – 13 mm thick)	Rmt.	114.00	702.06	80,034.89
j)	6.4 mm O.D.(insulation – 13 mm thick)	Rmt.	343.00	561.15	1,92,475.46
1.4	CONTROL CABLING				
	Supply, installation, testing and commissioning of control cum transmission wiring of 3 core x 1.5 Sq.mm copper FRLSZH, PVC insulated cable in suitable GI conduits accessories between indoor and outdoor units. Necessary securing of conduit shall be made by contractor. After completion of work, wall and floor shall be repaired and brought to its original finish. The rate shall include cost of laying of GI conduit between indoor and outdoor units.	Rmt.	429.00	371.21	1,59,247.85
1.5	AIR DISTRIBUTION SYSTEM				
1.5.1	G.I. Sheet Metal Ducts				
	Supply, installation, testing and commissioning of factory fabricated G.I. Sheet metal ducts with flanges complete with supports, vanes, links, levers and quadrants etc. as per specifications and drawings. The rates shall include all materials of the duct and labour for suspension and supporting arrangement for plenums, ducts, complete with fire retardant flexible connection as required and as per specifications.				
a)	0.63 mm thick (24 Gauge)	SQM	29.00	1,004.02	29,116.70
b)	0.83 mm thick (22 Gauge)	SQM	12.00	1,142.65	13,711.79
c)	1.00 mm thick (20 Gauge)	SQM	12.00	1,534.97	18,419.68
d)	1.20 mm thick (18 Gauge)	SQM	12.00	1,702.29	20,427.47
1.5.2	Supply/Exhaust Air / Door Transfer Grill				

S.No.	Description	Unit	TOTAL Qty	Average Unit Rate	Amount (in INR)
a)	Supply, installation, testing and commissioning of Exhaust air grills with VCD (In various sizes as required at site and as approved by Engineer/KRIDE Incharge)	SQM	7.00	8,575.00	60,024.97
b)	Supply, installation, testing and commissioning of Door Transfer grills (In various sizes as required at site and as approved by Engineer/KRIDE In charge)	SQM	7.00	9,157.57	64,103.01
1.5.3	Fresh Air Louver				
	Supply, installation, testing and commissioning of Exhaust / Fresh air Aluminum Louvers (In various sizes as required at site and as approved by Engineer/KRIDE Incharge)	SQM	7.00	7,034.47	49,241.28
1.5.4	DAMPER				
	Dampers complete as per technical specifications.				
1.5.4.1	Supply, installation, testing and commissioning of MOD/MFD frames and other components made of hot-dipped galvanized mild steel shall conform to BS/EN-10142. Damper blades shall be fabricated of galvanized steel conforming to BS/EN-10142. All unprotected edges shall be touched up with an Approved paint-on type zinc-based protective coating.				
a)	Motor Operated Dampers	SQM	1.00	24,518.80	24,518.80
b)	Motorized Fire Dampers	SQM	1.00	40,058.63	40,058.63
1.5.4.2	Supply, installation, testing and commissioning of duct volume control dampers	SQM	1.00	13,697.12	13,697.12
1.5.4.3	Supply, installation, testing and commissioning of duct (Non return type) dampers	SQM	1.00	13,246.20	13,246.20
1.6	VENTILATION FANS				
1.6.1	Inline Fans/Axial Fans				
	SITC fans with all accessories complete as per specifications.				
a)	900 CMH-15 mm WG St Pr.	Nos.	2.00	22,784.10	45,568.20
b)	1275 CMH-10 mm WG St Pr.	Nos.	1.00	19,899.58	19,899.58
c)	1700 CMH-10 mm WG St Pr.	Nos.	1.00	21,725.01	21,725.01
d)	1955 CMH-10 mm WG St Pr.	Nos.	1.00	19,428.41	19,428.41
e)	1100 CMH-15 mm WG St Pr.	Nos.	1.00	20,697.90	20,697.90
f)	2000 CMH-15 mm WG St Pr.	Nos.	1.00	26,879.07	26,879.07
g)	3000 CMH-15 mm WG St Pr.	Nos.	1.00	34,414.05	34,414.05
1.6.2	Propeller Type Fans				
	Supply, Installation, testing and commissioning of Propeller type fan complete with motor suitable for 240 volt, 1 phase, 50 Hz AC supply, mounting frames and louvers and complete as per specifications.				
a)	Size 300 mm dia	Nos.	17.00	7,921.75	1,34,669.78
b)	Size 380 mm dia	Nos.	3.00	10,421.09	31,263.28
c)	Size 450 mm dia	Nos.	9.00	13,005.22	1,17,047.01
1.6.3	Temperature Based Fan Control System: Supply, installation, testing & commissioning of temperature based fan control System for ASS Room propeller fans, consisting of room thermostat, necessary control wiring etc. as per Technical Specification. The system shall be BMS compatible.				
a)	Size 450 mm dia	Nos.	2.00	26,515.12	53,030.23

S.No.	Description	Unit	TOTAL Qty	Average Unit Rate	Amount (in INR)
Sub-total for L.01					55,67,808.75