

**BRIHANMUMBAI MUNICIPAL CORPORATION
MUMBAI SEWAGE DISPOSAL PROJECT
STAGE – II PRIORITY WORKS**



**UPGRADATION OF GHATKOPAR INFLUENT
PUMPING STATION & CARRYING CAPACITY
OF RISING MAIN TO DESIGN PPF CAPACITY
OF 699 MLD**

VOLUME - IV

TECHNICAL SCHEDULES

OCTOBER 2022

EMPLOYER

**Brihanmumbai Municipal Corporation
Municipal Head Office Building,
Mahapalika Marg, Fort, Mumbai
India.**

CONSULTANT

**Tata Consulting Engineers Limited
15th Floor, Empire Tower, Thane-
Belapur Road, Airoli, Navi Mumbai
400 708 India.**

TECHNICAL SCHEDULES

SCHEDULE - A
SPECIFICATION DRAWINGS

Specification Drawings provided by the Corporation as illustrative of the specifications are listed below. The drawings listed in Sr. Nos. 1 to 49 (existing drawings/ old Tender drawings of Ghatkopar IPS) are available with the Department and can be obtained from the Department.

Sr. No.	Drawing No.	Title
AS BUILT DRAWINGS OF EXISTING GHATKOPAR INFLUENT PUMPING STATION		
1.	7-EE-P-2-1	PLAN FOR MAIN RAW SEWAGE PIPING & MECHANICAL EQUIPMENT LAYOUT
2.	7-EE-P-2-2	SECTION 'M' OF MAIN RAW SEWAGE PIPING & MECHANICAL EQUIPMENT LAYOUT
3.	7-EE-P-7	DETAILS OF SEAL WATER SYSTEM
4.	7-EE-P-8	LAYOUT FOR MOTOR PLATFORM
5.	7-EE-P-10	PLAN OF SEAL WATER PIPING LAYOUT
6.	7-EE-P-10A	PLAN FOR FIELD MOUNTED EQUIPMENT LAYOUT AT PUMP FLOOR
7.	7-EE-P-12-2	ACCESS PLATFORM FOR SUCTION & DELIVERY VALVES & PUMPS (ELEVATION)
8.	B30-3025B	GENERAL ARRANGEMENT OF BCDI-85 & 75 FAN ARRT-3 C.W. & C.C.W. TOP-HORIZONTAL DISCHARGE
9.	B30-3026B	GENERAL ARRANGEMENT OF BCDI-110 C.C.W. TOP HORIZONTAL DISCHARGE FAN. SF-031 TO SF 033
10.	B31-3024B	GENERAL ARRANGEMENT OF BCSI-100, 75 & 50 FAN ARRT-1 C.W. & C.C.W. TOP-HORIZONTAL DISCHARGE
11.	HMW-20389	1 TONNE CAPACITY WIRE ROPE HOIST
12.	HMW-22388	7.5 TONNE CAPACITY DOUBLE GIRDER EOT CRANE
13.	HMW-22389	20 TONNE CAPACITY DOUBLE GIRDER EOT CRANE
14.	PEA-GHT-10	VENTILATION SYSTEM FOR WET WELL

Sr. No.	Drawing No.	Title
15.	NA	CROSS-SECTIONAL ASSEMBLY OF DRAINAGE PUMPS
16.	PEA-GHT-4A	RISER CHAMBER - 150 DIA CI PRESSURE EQUILISING PIPE WITH VALVES AND FITTINGS
17.	PEA-GHT-4B	BLOCKOUT FOR FIXING INSERTS OF BULK HEAD GATE
18.	PEA-GHT-35	FLASE CEILING FOR CONTROL ROOM-IPS
19.	PEA-GHT-38	RECORD DRAWING FOR VENTILATION DUCTING IN RISER CHAMBER
20.	PEA-GHT-4	RECORD DRAWING FOR LAYOUT SHOWING THE PEARL'S SCOPE OF SUPPLY IN RISER CHAMBER
21.	PEA-GHT-7	RECORD DRAWING LAYOUT SHOWING THE PEARL'S SCOPE OF SUPPLY IN PUMPING STATION
22.	PEA-GHT-8	RECORD DRAWING LAYOUT SHOWING THE PEARL'S SCOPE OF SUPPLY IN PUMPING STATION
OLD TENDER DRAWINGS		
23.	TCE-2237-162-GA-1001	TYPICAL ARRANGEMENT DRAWING FOR BAR SCREENS
24.	TCE-2237-162-GA-1002	SCREEN CHAMBER DETAILS
25.	TCE-2237-162-GA-1003	SITE PLAN
26.	TCE-2237-162-GA-1004	SITE LOCATION GHATKOPAR
27.	TCE-2237-258-ST-6001	TRANSFORMER AREA - GATE & FENCING DETAILS
28.	TCE-2237-713-AU-3101(G)	SINGLE LINE DIAGRAM 22KV AND 6.6KV SYSTEM
29.	TCE-2237-713-AU-3102(G)	415V SYSTEM SINGLE LINE DIAGRAM
30.	TCE-2237-713-AU-	TYPICAL CABLING DETAILS

Sr. No.	Drawing No.	Title
	3103(G)	
31.	TCE-2237-713-AU-3104(G)	TYPICAL CABLING DETAILS
32.	TCE-2237-713-AU-3105(G)	TYPICAL EARTHING DETAILS
33.	TCE-2237-713-AU-3106(G)	TYPICAL LIGHTING DETAILS
34.	TCE-2237-713-AU-3107(G)	SCREEN CHAMBER: CABLING, LIGHTING, EARTHING LAYOUT AND SECTION
35.	TCE-2237-713-AU-3108(G)	RISER CHAMBER: CABLING, LIGHTING, EARTHING LAYOUT AND SECTION
36.	TCE-2237-713-AU-3109(G)	PUMPING STATION- LIGHTING/ CABLING/ EARTHING LAYOUT AT EL 34.90
37.	TCE-2237-713-AU-3110(G)	PUMPING STATION- LIGHTING LAYOUT AT EL 29.90
38.	TCE-2237-713-AU-3111(G)	PUMPING STATION- CABLING AND EARTHING LAYOUT AT EL 29.90
39.	TCE-2237-713-AU-3112(G)	PUMPING STATION- CABLING AND GENERAL LAYOUT AT EL 29.90
40.	TCE-2237-713-AU-3113(G)	PUMPING STATION- LIGHTING LAYOUT AT EL 26.90
41.	TCE-2237-713-AU-3114(G)	PUMPING STATION: CABLING, LIGHTING, EARTHING LAYOUT FOR AREA BELOW FLOOR EL 29.90
42.	TCE-2237-713-AU-3115(G)	SITE PLAN & STORE LIGHTING LAYOUT

Sr. No.	Drawing No.	Title
43.	TCE-2237-713-AU-3116(G)	PUMPING STATION: CABLING, LIGHTING, EARTHING SECTION
44.	TCE-2237-713-AU-3117(G)	SUB STATION LIGHTING AND GENERAL LAYOUT
45.	TCE-2237-713-AU-3118(G)	LABORATORY AND ADMINISTRATION BUILDING LIGHTING LAYOUT
46.	TCE-2237-713-AU-3119(G)	WORK-SHOP LIGHTING & CABLING LAYOUT
47.	TCE-2237-713-AU-3120(G)	PROCESS WATER, DOMESTIC WATER PUMPHOUSE AND SUBOFFICE ELECTRICAL DETAILS
48.	TCE-2237-713-AU-3121(G)	CABLE INTERCONNECTION AND COMMUNICATION SCHEME
49.	TCE-2237-713-AU-3125(G)	PUMPING STATION FLOOR CUTOUTS & PLATE INSERTS LAYOUT AT EL 29.9 & EL 26.9
CIVIL DRAWINGS		
50.	TCE.11710A-CV-3000-RC-30000	GENERAL ARRANGEMENT OF VALVE CHAMBER, THRUST BLOCK & PIPE ENCASING DETAILS.
51.	TCE.11710A-CV-3000-RC-30001	GENERAL ARRANGEMENT OF SURGE TANK PLAN & SECTION DETAILS
52.	TCE.11710A-CV-3000-RC-30002	GENERAL ARRANGEMENT OF CREEK PIPE CROSSING DETAILS
53.	TCE.11710A-CV-3000-RC-30003	GENERAL ARRANGEMENT OF DG AND TRANSFORMER FOUNDATION DETAILS

Sr. No.	Drawing No.	Title
MECHANICAL DRAWINGS		
54.	TCE.11710A -ME-6173- GA-60001	PUMP HOUSE LAYOUT - PLAN
55.	TCE.11710A -ME-6173- GA-60002	PUMP HOUSE LAYOUT - SECTION
56.	TCE.11710A -ME-6173- GA-60003	GHATKOPAR IPS SITE LAYOUT
57.	TCE.11710A -ME-6173- GA-60004	VALVE CHAMBER DRAWING
58.	TCE.11710A -ME-6173- GA-60005	PIPING DRAWING NEAR CREEK
59.	TCE.11710A -ME-6173- GA-60006	PIPE ROUTING OUTSIDE PUMPHOUSE - SECTION
60.	TCE.11710A -ME-6173- GA-60007	PIPE ROUTING NEAR WWTF
61.	TCE.11710A -ME-6173- GA-60008	PIPE & FITTING FABRICATION (SHEET 1 OF 2)
62.	TCE.11710A -ME-6173- GA-60008	PIPE & FITTING FABRICATION (SHEET 2 OF 2)
ELECTRICAL DRAWINGS		
63.	CE.11710A- EL-4002-AU- 40000	SINGLE LINE DIAGRAM
64.	CE.11710A- EL-4002-AU- 40001	GENERAL ARRANGEMENT DRAWING OF PANEL ROOM AT EL 29.9

Sr. No.	Drawing No.	Title
INSTRUMENTATION DRAWINGS		
65.	TCE.11710A -IC-3013-PI- 50000	PROCESS AND INSTRUMENTATION DIAGRAM
66.	TCE.11710A -IC-3013-CD- 50001	PLC SCADA SYSTEM ARCHITECTURE DRAWING

We confirm that due consideration has been given to details shown in the above drawings in the preparation of the Tender.

Note:

Tenderer shall submit the duly signed scanned copy of drawings mentioned at Sr. Nos. 50 to 67 and shall upload the same in Packet B.

The Existing Drawings of the plant shall be downloaded from the following link.

[https://docs.tce.co.in/main.html?download&weblink=1ec7af67d07deb2baecc67ab09d3b57e&realfilename=Ghatkopar\\$20IPS\\$20Existing\\$20Drawings-Combined.pdf](https://docs.tce.co.in/main.html?download&weblink=1ec7af67d07deb2baecc67ab09d3b57e&realfilename=Ghatkopar$20IPS$20Existing$20Drawings-Combined.pdf)

Seal of the Company

Signature of Tenderer:

Date:

SCHEDULE - B**ASSOCIATED CONTRACTS**

Other contracts which the Corporation has entered into or expected to enter into and which affect the execution of this Contract are:

Sr. No.	Contract No.	Type	Description of Contract
1		DBO – Civil + Mech + Elec + I&C	Design Build Operate of 337 MLD Ghatkopar Waste Water Treatment Plant
2		Any type of engineering works	Any other type of contract if awarded by the Employer

SCHEDULE - C**(A) PLACES OF MANUFACTURE & INSPECTION AND CONTRACT TIMES**

The bidder shall, fill in column (a), (b), and (d) at the time of bid and shall submit information in respect of column (c) within six weeks of award of Contract. The delivery period as per column (d) shall be treated as Contract times and all delivery dates committed in this schedule shall be correlated with the CONTRACT PERT/CPM network.

Sr. no.	Item	Make	Place of Manufacture	Place of Inspection	Delivery to site from Contract award (months) (max.)
		(a)	(b)	(c)	(d)
A	MECHANICAL				
1	Dry Pit Submersible Pumps with PMU and suitable for VFD Drive				
2	Knife Gate Valves with Electrical Actuator				
3	Non Return Valves				
4	Blowers				
5	EOT Crane				
6	Mechanical Screens				
7	Sluice Gates with Electrical Actuator				
8	Pipes and Fittings				
9	Dismantling Joints				
10	Elevator				
11	FRP Ducting				
12	Electric Hoist				
13	Air Conditioning system				
B	ELECTRICAL				
1	Variable Frequency Drives				
2	415V APFC Panel				
3	Transformer 22/6.6 kV 6300kVA				
4	Transformer 22/0.433 kV 800 kVA				
5	22kV Switchgear panel				
6	6.6 kV Switchgear panel				
7	415V LV panel				
8	HT & LT cable				

9	Battery& battery charger				
C	INSTRUMENTATION				
1	Electro-Magnetic Flowmeter				
2	Pressure Transmitter				
3	Pressure Gauge				
4	Radar Level Transmitter				
5	Ultrasonic Differential Level Transmitter				
6	Conductivity type Level Switch				
7	Temperature Scanner (12 Channel)				
8	Vibration Sensors and Monitoring System				
9	Instrumentation cables				
10	UPS and Battery with distribution boards				
11	Gas Monitoring System				
12	SCADA PC, Laptop & Server				
13	Printer				
14	PLC Panel components				
15	Ethernet Switches				
16	Communication cables				
17	LPU				

Notes :

1. Bidders to furnish experience of all manufacturers/sub-contractors after award of contract.
2. Makes offered shall be from LIST OF APPROVED MAKES mentioned in Volume III of tender documents

Signature of Bidder : _____

Date : _____

SCHEDULE - D**TECHNICAL PARTICULARS**

- (a) This Schedule is intended to indicate factually the Bidders proposals at the time of bidding and the systems/equipment shall comply with these particulars if approved by Engineer and for any deviations prior approval of the Engineer will have to be obtained.
- (b) Bidder shall note that information/data etc.. against items of schedules identified with an asterisk (*) mark shall have to be furnished by the successful Bidder, if the same is not furnished in his Bid. All such details shall be subject to Engineer's approval.
- (c) The Engineer may proceed with the design of the Works in accordance with the completed Schedule and Bid Drawings, and the Contractor shall be responsible for notifying the Engineer immediately of any amendment in data which may be necessary, consequent upon the Contractor carrying out detailed design following the award of the Contract and pending the submission of detailed final drawings.
- (d) The Bidder is particularly requested not to repeat the details called for by this Schedule in any separate Schedule of his own.
- (e) Each copy of the Bid shall contain copy of catalogues, documents and drawings listed in the Schedule in addition to those specified elsewhere in the Specification.
- (f) Specific makes for each equipment are to be mentioned and words such as Equivalent/Approved/Reputed are not acceptable. If names of more than one manufacturer are indicated, Engineer reserves the right to select the equipment/system from indicated makes.

MECHANICAL DATASHEETS

DATASHEET ME-01
DRY PIT SUBMERSIBLE PUMPSETS

Sr. No.	Description	Unit	Required	Proposed by Tenderer
	Total Quantity	Nos.	6	X
<u>Operating Conditions</u>				
1	Pumped Medium	-	Municipal sewage	
2	Fluid Temperature	Deg. C	20 to 40 Deg. C	
3	Sp. Gravity	-	1.02	
4	Fluid Viscosity	Centipoise	1	
5	pH	-	6.5 to 8	
6	Pumping station capacity	MLD	699	
7	Flow per pump	m ³ /hr	5825	
8	Total developed head at rated capacity	m	36**	
9	Number of working	Nos	5	
10	Installation		Submersible type dry pit installation	
11	Pump duty		Continuous duty capable of sustaining up to 6 starts per hour	
12	Minimum Efficiency			
	When one pump in operation at duty point	%	Minimum 75% without negative tolerance	
13	Pump run out head	m	*	
14	NPSH required	m	*	
15	Make		*	
	Model No	-	*	
<u>Pump Description</u>				
1	Design	-	Dry pit submersible - non clog	
2	Orientation	-	Vertical	
3	Service	-	Continuous	
4	Suction Position	-	Bottom suction	
5	Discharge Position	-	Side discharge	
6	Impeller type	-	Non – Clog, Semi-open/ Enclosed	
7	Free Passage size	mm	100 minimum	
8	Direction rotation from drive	-	Clockwise/ Anti-Clockwise	
9	Bearing type	-	Antifriction	
10	Minimum bearing life	hrs	50000	
11	Pump discharge nozzle/suction nozzle	mm	*/*	
12	Type of sealing		Dual Mechanical Seal	
13	Test pressure		* kg/cm ² (1.5 times the shut off or twice rated pressure whichever is	

Sr. No.	Description	Unit	Required	Proposed by Tenderer
			higher)	
14	Vibration allowed for the pump & motor set		*mm/sec (as per ISO 10816)	
15	Weight of Pump		Shall be able to be safely handled by 20 T Capacity EOT Crane.	
16	Noise level		Less than 85 dB within 1 meter range	
17	Design Code		As per Manufacturer's standard	
Motor specifications				
1	Power	kW	*(Minimum 15% over the brake kW at above duty point at speed corresponding to 50 Hz or 5% over the maximum kW absorbed by the pump for single pump, whichever is higher)	
2	Speed	rpm	< or = 750	
2a	Variable Frequency Drives		All pumps shall be provided with Variable Frequency Drives	
2b	Minimum Motor Efficiency at Pump Duty Point	%	94	
3	Overall Efficiency	%	*	
4	Operating Voltage	V	6600	
5	Frequency	Hz	50	
6	Insulation Class	-	H	
7	Motor enclosure	-	IP - 68	
9	No. of starts per hour	-	Minimum 6	
10	Motor method of cooling		*	
11	Motor type		3 Phase Squirrel cage motor S1 duty. IE2 High efficiency as per IEC 60034	
12	Makes		As Per LIST OF APPROVED MAKES	
Material of Construction				
<u>For pump</u>				
1	Pump Casing	-	Grey Cast Iron-ASTM A-48 Class 35B	
2	Shaft	-	AISI 431 Stainless steel	
3	Impeller	-	Duplex alloy stainless steel (ASTM A 890 Gr, 1A CD-4MCu) / (ASTM A 890 Gr, 4A J92205	
4	Casing wear ring	-	AISI 316L	

Sr. No.	Description	Unit	Required	Proposed by Tenderer
	For motor			
5	Motor Housing	-	Grey Cast Iron-ASTM A-48 Class 35 B	
6	Motor Cable	-	Copper	
6a	Control cable	m	as per site requirement	
7	Mounting Set	-	Mild Steel	
8	Fasteners	-	SS ANSI 316	
9	Bearing	-	Antifriction type	
SENSOR				
1	Monitoring System (MAS)	-	Base Unit and Panel (To be supplied by pump manufacturer only)	
2	Bearing Temperature Sensor	-	For both upper and lower bearing	
3	Temperature sensor	-	For Stator winding	
4	Leakage Sensors		For water in oil	
5	Vibration sensor	-	Required	

“*” Contractor to provide the detail.

“***” The Design head is likely to vary +/- 10% which will be finalized at the time of approval of pump documents after award of contract.
Contractor shall note that there shall not be any financial or contractual implication on account of the same.

Signature of Tenderer

DATASHEET ME-02
DOUBLE GIRDER EOT CRANE

Sr. No.	Description	Unit	Required	Proposed by Tenderer
	Quantity	No	Annexure ME-02	X
	<u>Operating Conditions</u>	-		
1	Capacity	Tonne	Annexure ME-02	
2	Operation	-	Overhead	
3	Installation	-	Dry well	
	<u>Make</u>	-	As per the LIST OF APPROVED MAKES	
	<u>Model No*</u>	-	-	
	<u>Crane Specifications</u>	-		
1	Type	-	Electrical operated overhead crane	
2	Clear Lift	m	Annexure ME-02	
3	Safe working load	Ton	Annexure ME-02	
4	Span	m	Annexure ME-02	
5	Hoist Speed	m/min	3-5	
6	Cross Traverse speed	m/min	10-15	
7	Long Travel speed	m/min	10-20	
8	Micro speed for all the motions through VVFD	m/min	10% of actual speed	
9	Location		In door	
10	Long travel distance (m)		Annexure ME-02	
11	Duty		Class II as per IS 3177	
12	Applicable standard		IS 3177, IS 807 & relevant IPSS standards.	
13	Operation		Rope suspended Pendant push button & Remote pendant	
14	Hoist design		IS 3177	
15	Steel wire ropes		as per IS 2266	
16	No. of falls		*	
17	Rope drum Material		Deep grooved type, Steel construction made out of seamless pipes with flanges as per IS 3177.	
18	Gear box MOC		Fabricated out of MS plates and stress relieved	
19	Material (Gear and Pinion)		Helical & straight spur: Hardened and tempered alloy or Carbon steel.	
20	Hardness		Gears – 200 BHN (min) Pinion – 250 BHN(min)	

Sr. No.	Description	Unit	Required	Proposed by Tenderer
21	Gear box Lubrication		Oil lubricated	
22	Rope sheave Material		Medium carbon steel	
23	Compensating sheave Material		Medium carbon steel	
24	Motors for all the motions:			
	Type		Squirrel Cage induction type in IEC frame sizes and shall have 6 poles / 8 poles as per IS 1265, TEFC motor with VVVF drive, terminal box to be located on top	
	Mounting		Foot / Flange Mounting type.	
	Voltage/phase /frequency		415V / 3-phase / 50 Hz, AC supply	
	Voltage variation / frequency variation		-10 to +10% / ± 5 %	
	Rating (KW)		*	
	Duty / Duty factor		Heavy duty reversible crane service/ 40% CDF	
	Starts / hour		150	
	Class of insulation		Class F Limited to Class B temperature raise	
	Frame size / Protection class		* / IP 55	
	Motor make		As per APPROVED MAKE LIST	
25	Brakes: (To be installed on gear box input shaft)			
	Type / Quantity		Hoist: Electrohydraulic Thrust (shoe) brake. Brake to hold any load up to & equal to 125% of rated hoist capacity at any position of lift when power supply fails. CT & LT: DC Disc brake	
26	Type and details of limit switches		Hoist: Gravity & one counter weight operated back-up limit switch CT & LT: Lever type	
27	Type of bearings		Antifriction Ball / Roller Bearings	
28	Trolley frame MOC		Structural Steel conforming to IS: 2062 Grade A or BS 2573	
29	Trolley drive wheels		Double Flanged Type	
30	Wheels Material (CT & LT)		Forged	
31	Wheel Hardness		320 BHN (min) with 10mm depth of hardness. Counter case-hardened track wheels to be provided with high hardness wear resistant surface supported by tough ductile core.	
32	Details of trolley power feeding arrangement		Festoon cable system using I beam track with four wheel cable	

Sr. No.	Description	Unit	Required	Proposed by Tenderer
			trolley	
33	Power feeding for LT drive		Shrouded bus bar system with separate current carrying conductors	
34	Lubrication provided for wire ropes		Grease	
35	Maximum deflection of girders with safe working load		Max 1/900 of span	
36	Crane lighting		RIM dome type reflectors with E.S. screw type, Two (2) No. 250 W sodium vapour lamps complete with shock absorbing type holders and anti swing suspension. These shall be mounted so that it can be easily accesses from the crane walkway platform.	
37	Guards		All wheels, couplings, open gears, etc., shall be provided with covers opening on strong hinges. These covers shall preferably be made of min 5mm thick plates.	
38	Buffer		Crane shall be provided with spring / Hydraulic buffers on four corners of the bridge and trolley motion.	
39	Safety switches (Emergency off)		Two safety switches in totally enclosed metal cover with operating lever outside shall be provided on two corners of the bridge to cut-off power supply under emergency condition.	
40	Socket outlet		2 No 24V socket outlet for hand lamps.	
41	Safety		Crane shall be complete with approved safety devices for safe access of personnel to and around equipment for operational and maintenance functions. This includes not only the safety devices which are usually furnished but also covers, guards, stairways, ladders, platforms, hand rails, etc. which are required for safe operation and maintenance of the cranes. Full length MS chequered platform will be provided on the top for both the bridge girders or	

Sr. No.	Description	Unit	Required	Proposed by Tenderer
			bracketed out from the bridge girder for easy access to the operators cabin, LT drive, current collectors, trolley current collection system, control panels, etc. along the bridge girder for mounting control panel, long travel drive assembly etc..	

ANNEXURE ME-02

Sr.no	Service	Qty. (Nos.)	Wt. (Tons)	Span (m)	Lift (m)	Long Travel (m)
1	In pump house	1	20	9.975	32	34
2	In pump house	1	7.5	4.625	32	34

* indicates contractor to provide the details.

Signature of Tenderer

DATASHEET ME-03
KNIFE GATE VALVE – WITH MOTORISED ACTUATOR

Sr. No.	Description	Unit	Required	Proposed by Tenderer
1	Design and Testing		AWWA C 520	X
	<u>Operating Conditions</u>			
1	Fluid	-	Municipal sewage	
2	Fluid Temperature	Deg. C	20 to 40	
3	Sp. Gravity	-	1.02	
4	Fluid Viscosity	Centipoise	1	
5	pH	-	6.5 to 8	
6	Permissible Operating Pressure	Bar	3.6	
7	Quantity	Nos	Annexure ME-03	
8	Size	mm	Annexure ME-03	
9	Valve Rating		Annexure ME-03	
10	Type	-	Bi-directional	
11	Mounting	-	Vertical	
12	Gate Shape	-	Round	
13	Operation	-	Electric Actuator	
14	End Style	-	Flanged, BS EN 1092, PN 6, PN 10	
15	Valve Type		Knife Edge Gate Valve (Rising Spindle)	
16	Companion Flanges		Yes	
	<u>Make</u>	-	As per the LIST OF APPROVED MAKES	
	<u>Model No</u>	-	*	
	<u>Material of Construction</u>	-		
1	Outer Body	-	Ductile Iron (Epoxy coated)	
2	Gate (Blade)	-	Stainless Steel ASTM A 240 Gr. 316L	
3	Spindle	-	Stainless Steel ASTM A 276 Gr. 316	

Sr. No.	Description	Unit	Required	Proposed by Tenderer
4	Seat	-	Resilient EPDM, Bidirectional	
5	Gland packing	-	PTFE impregnated syntex fiber	
6	Fasteners	-	SS 316	
7	Hand wheel	-	CI (IS: 210 Gr FG 260)/ASTM-126ABS-2789	
	<u>Test pressure</u>			
1	Body	-	1.5 times pressure rating	
2	Seat	-	1.1 times pressure rating	
	<u>Painting</u>			
1	Painting External	-	Epoxy	
2	Painting Internal	-	Epoxy	
		-		
	<u>Actuator</u>	-		
1	Type	-	Electric Actuator With manual override	
2	Make	-	As per the LIST OF APPROVED MAKES	

ANNEXURE ME-03

Sr No.	Service	Size (mm)	Valve Rating	Quantity	Actuation
1	On suction line of pump	1200	PN 6	06	Motorized
2	On delivery line of pump	1000	PN 10	06	Motorized
3	On Rising main	1800	PN 6	05	Motorized

* Indicates contractor to provide the details.

Signature of Tenderer

DATASHEET ME-04
SLUICE GATE- WITH MOTORIZED ACTUATOR

Sr. No.	Description	Unit	Required	Proposed by Tenderer
	Design and testing code		IS 13349	X
	<u>Operating Conditions</u>	-		
1	Fluid	-	Municipal sewage	
2	Fluid Temperature	Deg. C	20 to 40	
3	Sp. Gravity	-	1.02	
4	Fluid Viscosity	Centipoise	1	
5	pH	-	6.5 to 8	
6	Class	-	3	
7	Type	-	Thimble mounted, Rising stem	
8	Size of opening W X H	mm X mm	Annexure ME-04	
9	Quantity	Nos.	Annexure ME-04	
10	Operation	-	Electric with Manual override	
11	Platform Level	m	Annexure ME-04	
12	Invert Level	m	Annexure ME-04	
13	Wall thimble type	-	*	
	<u>Make</u>	-	As per the LIST OF APPROVED MAKES	
	<u>Model No</u>	-	*	
	<u>Material of Construction</u>	-		
1	Wall thimble, Frame	-	Cast Iron : IS: 210 Gr FG 260	
2	Gate Wedge	-	Cast Iron : IS: 210 Gr	

Sr. No.	Description	Unit	Required	Proposed by Tenderer
			FG 260	
3	Lifting operator	-	Cast Iron : IS: 210 Gr FG 260	
4	Seating face of frame and gate	-	AISI-Gr 316, Stainless Steel	
5	Stem, stem coupling, stem extension, stem guide	-	AISI-Gr 316, Stainless Steel	
6	Stem nut, drive nut	-	AISI-Gr 316, Stainless Steel	
7	Fasteners and anchor bolts/nuts	-	AISI-Gr 316, Stainless Steel	
8	Lift Nut	-	Bronze IS: 318 Type LTB-2	
9	Resilient seal for flush bottom gate	-	ASTM D 2000, EPDM	
	<u>Actuator</u>			
1	Type	-	Electrical+ manual override	
2	Supply Voltage	V	415	
3	Make	-	As per the LIST OF APPROVED MAKES	

ANNEXURE ME-04

Sr No.	Service	Size (mm)	PI (m)	CI (m)	SE & USE (m)	Quantity	Actuation
1	Inlet of Screens	1500 X 1500	29.9	10.9	10.6	04	MOTORIZED
2	Outlet of Screens	1500 X 1500	29.9	10.9	10.6	03	MOTORIZED
3	Outlet of Screen chamber	1500 X 1500	29.9	10.9	10.6	02	MOTORIZED
4	Partition of Wet-well	1500 X 1500	29.9	8.75	12.75	02	MOTORIZED
5	Inlet of Surge Tank	2200 X 2200	41.5	26.8	14.7	01	MOTORIZED

Where:

* indicates contractor to provide the details.

CL indicates Center Line

PL indicated Platform Level

SE & USE indicates Seating and unseating pressure head.

Signature of Tenderer

DATASHEET ME-05
NON-RETURN VALVES

Sr. No.	Description	Unit	Required	Proposed by Tenderer
	<u>General</u>			
1.1.	Size	NB	1000	
1.2.	Design Standard		IS 5312-Part 2	
1.3.	Dimension Standard		IS 5312-Part 2	
1.4.	Pattern		Multi-Door	
	<u>Technical Particulars</u>			
1.5.	Design Pressure	Kg/cm ²	6	
1.6.	Operating Pressure	Kg/cm ²	3.6	
1.7.	Valve Rating		PN10	
1.8.	Seat Type		Metallic	
1.9.	Seat Construction		Renewable	
1.10.	Flange Drilling Standard		BS EN 1092 PN10	
1.11.	Companion Flanges		Yes	
1.12.	Disc Stop		Yes	
1.13.	Drain Plug		Yes	
1.14.	Min. Pressure At Which Disc /Door To Open	Kg/cm ²	2	
1.15.	Special Requirements If Any		No	
1.16.	Quantity	Nos.	6	
2.0	<u>Materials of Construction</u>			
2.1.	Body And Doors Or Disc		SG Iron: IS 1865 SG. 400 / 15	
2.2.	Body Seat Ring		Bronze: IS 318 GR. LTB 2	
2.3.	Door Face Ring		Bronze: IS 318 GR. LTB 2	
2.4.	Hinge Pin		SS ASTM A 276 Type	

Sr. No.	Description	Unit	Required	Proposed by Tenderer
			410	
3.0	<u>Inspection and Tests</u>			
3.1.	Inspection as per IS 5312-Part 2			
3.2.	Hydrostatic Test Pressure	Kg/cm ²	1.5 times of Design pressure	

* indicates contractor to provide the details.

Signature of Tenderer

DATASHEET ME-06
MOTORIZED MECHANICAL BAR SCREEN IN SCREEN CHAMBER

Sr. No.	Description	Unit	Required	Proposed by Tenderer
	Quantity	No	3	X
	<u>Operating Conditions</u>	-		
1	Fluid	-	Municipal sewage	
2	Fluid Temperature	Deg. C	20 to 40 Deg. C	
3	Fluid Sp. Gravity	-	1.02	
4	Fluid Viscosity	Centipoise	1	
5	pH	-	6.5 to 8	
6	Working	No	2	
	<u>Make</u>	-	As per the LIST OF APPROVED MAKES	
	<u>Model No</u>	-	*	
	<u>Screen Description</u>	-		
1	Type		Mechanical (Motorized)	
2	Flow rate	m ³ /hr	14562.5	
3	Maximum water level	m	21.5	
4	Screen channel width	m	1.5	
5	Width of rectangular bars	mm	*	
6	Clear spacing between bars	mm	40	
7	Screen inclination with horizontal	Deg	90 (vertical)	
8	Screen channel invert level	m	10.15	
9	Screen operating platform level	m	29.3	
10	Wheel barrow floor level	m	*	
11	Screen chute discharge level	m	*	
12	Screen channel max. water level	m	*	
13	Screen top level	m	*	

Sr. No.	Description	Unit	Required	Proposed by Tenderer
14	Screen frame width	m	*	
15	Screen effective width	m	*	
16	Sprocket tooth width	mm	*	
17	Pitch	mm	*	
18	Distance between rakes	m	*	
19	No of rakes/ screen	m	*	
20	Conveyor Belt (Motor driven endless)		As per IS 11592	
21	Width of conveyor belt	mm	600	
	<u>Material of Construction</u>	-		
1	Bars	-	SS 316L	
2	Side frame /channels	-	SS 316L	
3	Rake	-	SS 316L	
4	Discharge chute	-	SS 316L	
5	Drive chain	-	SS 316L	
6	Control Panel	-	SS 316L	
7	Scraper	-	SS 316L	
8	Drive shaft	-	SS 316L	
9	Drive & bottom sprocket	-	SS 316L	
10	Belt of Conveyor	-	Two ply nylon with minimum 3 mm neoprene	

“*” indicates Contractor to provide the detail.

Signature of Tenderer

DATASHEET ME-07
DISMANTLING JOINTS

Sl. No.	Description	Unit	Required	Proposed by Tenderer
	<u>General</u>			
1	Fluid to be handled		Municipal Sewage	
2	Size	NB	Annexure ME-07	
3	Quantity	Nos.	Annexure ME-07	
4	Design Pressure	Kg/cm ²	Annexure ME-07	
5	Operating Pressure	Kg/cm ²	3.6	
6	Design Temperature	°C	40	
7	Operating Temperature	°C	40	
8	Pressure Rating or Flange Class		Annexure ME-07	
9	Installation Orientation		Horizontal Axis	
10	Installation Length	mm	*	
11	Design Std/Code		AWWA C219	
12	Flange Standard		BS EN 1092- PN 6, PN 10	
13	Type of Flange Face and Surface Finish		*	
	<u>Materials of Construction</u>			
1	Body/Adaptor		IS:2062 / BS EN 10025 Grade S275	
2	Flanged Spool/Spigot		IS:2062 / BS EN 10025 Grade S275	
3	Rubber Seal / Gasket		EPDM as per IS 5382	

Sl. No.	Description	Unit	Required	Proposed by Tenderer
4	Tie Rods		SS 316	
5	Bolts, Nuts and Washers		SS 316	
6	Painting		Epoxy (as per manufacturer's std. for sewage application)	
	<u>Testing and Inspection</u>			
1	Hydrostatic Test Pressure	Kg/cm ²	1.5 times of the design pressure	

ANNEXURE ME-07

Sr No.	Service	Size (mm)	Valve Rating	Quantity
1	On suction line of pump	1200	PN 6	06
2	On delivery line of pump	1000	PN 10	06
3	Near Flow meter	1000	PN 10	06
4	On Rising main	1800	PN 6	05

“*” indicates Contractor to provide the detail.

Signature of Tenderer

DATASHEET ME-08
CENTRIFUGAL BLOWER

Sl. No.	Description	Unit	Required	Proposed by Tenderer
1.0	<u>General</u>			
1.1	Designation		Air Blower for ventilation	
1.2	Number Required (W+S)	Nos.	2 W + 2 S	
1.3	Application Area		Riser Chamber	
1.4	Tag Numbers		-	
1.5	Location		Outdoor	
1.6	Duty	HR/DA Y	Continuous	
1.7	Location in Hazardous Area		No	
1.8	Discharge Position		Horizontal	
2.0	<u>Design Data</u>			
2.1	Type of Blower		Centrifugal	
2.2	Type of Rotor		Backward/Radial/Forward Blade	
2.3	Medium Handled		Air with Dust	
2.4	Suction Temperature	°C	40	
2.5	Design Temperature	°C	*	
2.6	Suction Pressure	kg/cm ² (g)	Atmospheric	
2.7	Suction Humidity	RH %	100 (DESIGN)	
2.8	Capacity	FAD		
2.8.1	Normal	Nm ³ /hr	6750.3 at 20 degrees Celsius	
2.8.2	Maximum	m ³ /hr	-	
2.9	Discharge Pressure	mm WC	5	
2.10	Speed of Blower at Duty Condition	RPM	*	
2.11	Maximum Speed of Blower	RPM	*	
2.12.1	Bearing Type		Roller or Sleeve bearing	
2.12.2	Bearing Life	hr	Min. 40000	

Sl. No.	Description	Unit	Required	Proposed by Tenderer
3.0	<u>Materials and Codes of Construction</u>			
3.1	Casing		Mild Steel with epoxy coated	
3.2	Impeller		SS 304	
3.3	Shaft		EN 8	
3.4	Pulley		Cast Iron	
3.5	Hub		SS 304	
3.6	Base Frame		Mild Steel	
4.0	<u>Accessories</u>			
4.1	Inlet Guard		Yes	
4.2	Inlet Connection		Flanged	
4.3	Outlet Connection		Flanged	
4.4	Vibration Dampening Pads		Yes	
4.5	Common Base Frame		Yes	
4.6	Foundation Bolts		Yes	
5.0	<u>Drive Data (For Motor details refer LT Motor Data Sheet)</u>			
5.1	Motor		Vendor	
5.2	Motor by		Vendor	
5.3	Starter by		Vendor	
6.0	<u>Painting</u>			
6.1	MANUFACTURER'S STANDARD			
7.0	<u>Tests and Inspection</u>			
7.1	As per IS 4894			
8.0	<u>Codes and Standards</u>			
8.1	Design Code		As per Manufacturer's Standard	
9.0	<u>Performance Guarantees (as per IS 4894)</u>			
9.1	Capacity	m ³ /hr		
9.2	Discharge Pressure	mm of WC		
9.3	Power Consumption	kW		
9.4	Noise Level at 1 Meter Distance from Blower Without Acoustic	db(A)	<85	

Sl. No.	Description	Unit	Required	Proposed by Tenderer
	Enclosure, when Connected to the System			
9.5	Vibration	mm/s	AS PER ISO: 10816 - 1:1995 / AMD.1:2009(E) ZONE BOUNDARY B/C – 1.8 TO 9.3 m/s.	

“*” indicates Contractor to provide the detail.

Signature of Tenderer

DATASHEET ME-09
ELECTRIC HOIST

Sr. No.	Description	Unit	Required	Proposed by Tenderer
	Quantity	No	1	X
	<u>Operating Conditions</u>	-		
1	Capacity	Tons	1	
2	Operation	-	Overhead	
	<u>Make</u>	-	As per APPROVED MAKES LIST	
	<u>Model No*</u>	-	*	
	<u>Crane Specifications</u>	-		
1	Type	-	Trolley suspended Electric Hoist	
2	Clear Lift	m	4	
3	Safe working load	Ton	1	
4	Span	m	26.25	
5	Hoist Speed	m/min	3-5 (vendor to confirm)	
6	Cross Traverse speed	m/min	12-18 (vendor to confirm)	
7	Long Travel speed	m/min	NA	
8	Micro speed for all the motions through VVFD	m/min	NA	
9	Location		In door	
10	Long travel distance (m)		*	
11	Duty		Class II as per IS 3938	
12	Applicable standard		IS 3938	
13	Operation		Rope suspended Pendant push button	
14	Hoist design		IS 3938	
15	Steel wire ropes		as per IS 2266	
16	Rope fall		4/2 (vendor to confirm)	
17	Rope drum Material		Deep grooved type, Steel construction made out of seamless pipes with flanges as per IS 3177.	
18	Gear box MOC		Fabricated out of MS plates and stress relieved	
19	Material (Gear and Pinion)		Helical & straight spur: Hardened and tempered alloy or Carbon steel.	
20	Hardness		Gears – 200 BHN (min) Pinion – 250 BHN(min)	
21	Gear box Lubrication		Oil lubricated	

Sr. No.	Description	Unit	Required	Proposed by Tenderer
22	Rope sheave Material		Medium carbon steel	
23	Compensating sheave Material		Medium carbon steel	
<u>Motors for all the motions:</u>				
1	Type and number		Squirrel Cage induction type in IEC frame sizes and shall have 6 poles / 8 poles as per IS 12615, TEFC motor with VVVF drive, terminal box to be located on top	
2	Mounting		Foot / Flange Mounting type.	
3	Voltage/phase /frequency		415V / 3-phase / 50 Hz, AC supply	
4	Voltage variation / frequency variation		-10 to +10% / ± 5 %	
5	Rating (KW)		*	
6	Duty / Duty factor		Heavy duty reversible crane service/ 40% CDF	
7	Starts / hour		150	
8	Class of insulation		Class F Limited to Class B temperature raise	
9	Frame size / Protection class		* / IP 55	
10	Motor make		As per APPROVED MAKES	
<u>Brakes: (To be installed on gear box input shaft)</u>				
1	Type / Quantity		Hoist: Electromagnetic Shunt (shoe) brake. Brake to hold any load up to & equal to 125% of rated hoist capacity at any position of lift when power supply fails. CT : Double shoe brake	
2	Type and details of limit switches		Hoist: Gravity & one counter weight operated back-up limit switch CT : Lever type	
3	Type of bearings		Antifriction Ball / Roller Bearings	
4	Trolley frame MOC		Fabricated steel	
5	Trolley drive wheels		Open geared type bearing mounted	

Sr. No.	Description	Unit	Required	Proposed by Tenderer
			assembly	
6	Wheels Material (CT)		Forged	
7	Wheel Hardness		320 BHN (min) with 10mm depth of hardness. Counter case-hardened track wheels to be provided with high hardness wear resistant surface supported by tough ductile core.	
8	Details of trolley power feeding arrangement		Festoon cable system using I beam track with four wheel cable trolley	
9	Lubrication provided for wire ropes		Grease	
10	Buffer		Crane shall be provided with spring / Hydraulic buffers on ends of the bridge and trolley motion.	

“*” indicates Contractor to provide the detail.

Signature of Tenderer

ELECTRICAL DATASHEETS

ELECTRICAL**1.0 22 KV / 6.6kV Power Transformer -****Data Sheet No. EL01**

Sr. No.	Description	Unit	Required	Proposed by Tenderer
1.	Make		As per the make List	
2.	Type		Oil type, Three phase, Core type, Power Transformer	
3.	Applicable Standards		IS: 2026 / IEC 60076 and other standards as per specifications	
4.	Rated output	KVA	6300	
5.	Quantity required	Nos.	2	
6.	Transformer location		Outdoor	
7.	Transformer ratio	kV/kV	22/6.6	
8.	Number of phases		3	
9.	Rated frequency	Hz	50	
10.	Impedance at rated taps	%	7.15% (As per IS Standards)	
11.	No load loss on principal tap	W	As per applicable IS standards	
12.	Load loss on principal tap and rated kVA	W	As per applicable IS standards	
13.	Dimensions	mm x mm x mm	To be given by the vendor	
14.	Weight	Kg	To be given by the vendor	
15.	Number of winding / material of conductor		2nos. of windings and Material of winding - Copper	
16.	Method of connection			
a)	HV winding		Delta	
b)	LV winding		Star	
17.	Vector group		Dyn11	
18.	LV Neutral		Non-Effectively earthed by NGR	

19.	Type of cooling		ONAN			
20.	Tap changer		On load tap changer with tappings on HV (Primary) side			
21.	Tap range	%	+5% to -10%			
22.	Tap step	%	2.5%			
23.	Terminal connection					
a)	HV terminals		Inbuilt cable Box suitable			
b)	LV terminals		Inbuilt cable Box suitable			
24.	Current Transformer					
a)	On LV		To be furnished by the tenderer			
b)	On LV Neutral		To be furnished by the tenderer			
25.	LV Neutral earthing		NGR			
26.	Insulation of Windings		H.V.	L.V.		
a)	One minute power frequency withstand voltage (dry and wet)	kV(rms)	50	20		
b)	1.2/50 micro second full wave impulse withstand voltage	kV (peak)	125	60		
27.	Insulation of bushings		HV	HV (Line and Neutral)		
a)	Rated Voltage of bushing	kV	As per the specification	As per the specification		
b)	One minute power frequency withstand voltage	kV (rms)	50	20		
c)	1.2/50 microsecond full wave impulse withstand voltage	kV (peak)	125	60		
d)	Minimum creepage	mm	As per the IS standards	As per the IS standards		

	distance					
28.	Vacuum withstand capability of transformer main tank with bushings, radiations, fitting and accessories.		As per the IS standards			

2.0. 22 KV / 0.433kV Distribution Transformer**Data Sheet No. EL02**

Sr. No.	Description	Unit	Required	Proposed by Tenderer
1.	Make		As per the make list	
2.	Type		Oil type, Three phase, Core type, Distribution Transformer	
3.	Applicable Standards		IS 1180 , IS: 2026 and other standards as per specifications	
4.	Rated output	KVA	800	
5.	Quantity required	Nos.	2	
6.	Transformer location		Outdoor	
7.	Transformer ratio	kV/kV	22kV/0.433kV	
8.	Number of phases		3	
9.	Rated frequency	Hz	50	
10.	Impedance at rated taps	%	5% (As per IS Standards)	
11.	No load loss on principal tap	W	As per applicable IS standards	
12.	Load loss on principal tap and rated kVA	W	As per applicable IS standards	
13.	Dimensions	mm x mm x mm	To be given by the vendor	
14.	Weight	Kg	To be given by the vendor	
15.	Number of winding / material of conductor		2nos. of windings and Material of winding - Copper	
16.	Method of connection			
a)	HV winding		Delta	
b)	LV winding		Star	
17.	Vector group		Dyn11	
18.	LV Neutral		Effectively earthed	
19.	Type of cooling		ONAN	
20.	Tap changer		Off circuit Tap Switch on HV	

			side with padlocking capacity			
21.	Tap range	%	+5% to -10%			
22.	Tap step	%	2.5%			
23.	Terminal connection					
a)	HV terminals		Inbuilt cable Box suitable			
b)	LV terminals		Inbuilt cable Box suitable			
24.	Current Transformer					
a)	On LV		To be furnished by the tenderer			
b)	On LV Neutral		To be furnished by the tenderer			
25.	LV Neutral earthing		Solidly Earthed			
26.	Insulation of Windings		H.V.	L.V.		
a)	One minute power frequency withstand voltage (dry and wet)	kV(rms)	50	3		
b)	1.2/50 micro second full wave impulse withstand voltage	kV (peak)	125	-		
27.	Insulation of bushings		HV	LV (Line and Neutral)		
a)	Rated Voltage of bushing	kV	As per the specification	As per the specification		
b)	One minute power frequency withstand voltage	kV (rms)	50	3		
c)	1.2/50 microsecond full wave impulse withstand voltage	kV (peak)	125	-		
d)	Minimum creepage distance	mm	As per the IS standards	As per the IS standards		

28.	Vacuum withstand capability of transformer main tank with bushings, radiations, fitting and accessories.		As per the IS standards	
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3.0 22 kV Metal Enclosed Switchgears Panel**Data Sheet No. EL03**

Sr. No.	Description	Unit	Required	Proposed by Tenderer
1.	Make		As per the Make List	
2.	Type		Metal enclosed	
3.	Applicable Standards / Zone of installation		IEC 62271 and other standards as mentioned in the Electrical Specifications	
4.	Quantity	No.	As per BOQ	
5.	Dimensions	mm x mm x mm	To be furnished by the Tenderer	
6.	Switchgear cubicles and Bus bar ratings			
a)	Rated voltage, phases and frequency		22 kV, 3 phase, 50Hz	
b)	System Neutral Earthing		Solidly earthed for 22kV System	
c)	Maximum system voltage	kV	24kV for 22kV	
d)	One minute power frequency withstand voltage	kV (rms)	50kV	
e)	1.2/50 μ sec impulse withstand voltage	kV (peak)	125kV	
	Short circuit withstand			
f)	(i) Short time (1 sec) at rated voltage	kA(rms)	31.5kA	
g)	(ii) Dynamic rating	kA(peak)	2.5 X 31.5 kA	
h)	Reference ambient temperature	$^{\circ}$ C	45	
i)	Maximum temperature of bus bars droppers connectors and contacts at continuous current rating under site reference ambient temperature	$^{\circ}$ C	As per applicable IS/IEC	
j)	Continuous current rating of bus bar	A	As per the SLD	
k)	Bus bar material/size		Copper	
l)	Bus bar Insulation		Flame retardant heat shrinkable type sleeving	
m)	Cable entry		Bottom	
n)	Cable type for Incoming and Outgoing feeders		22kV (UE) XLPE insulated Aluminum, 3 core, Aluminum conductor armoured	

			cable	
7.	Switchgear constructional Requirement			
a)	Thickness of sheet steel Frame, Frame enclosures, doors, covers and partitions	mm	2mm CRCA sheet steel	
b)	Degree of protection		IP 4X	
c)	Colour finish shade		As per shade 631 of IS-5	
d)	Earthing bus : i) Material ii) Size	mm x mm	Copper To be furnished by the tenderer	
e)	Earthing conductor: i) Material ii) Size	mm x mm	GI To be furnished by the tenderer	
8.	Breaker Particulars			
a)	Circuit breaker type		Vacuum Circuit Breaker (Electrical Draw out type)	
b)	Voltage, phases and frequency		22kV, 3 phase, 50 Hz	
c)	Rated operating duty		O – 0.3 sec - CO - 3 min - CO	
d)	Rated current at reference ambient temperature Incoming breakers	A	As per SLD	
e)	Outgoing breakers	A	As per SLD	
f)	Rated breaking capacity	kA (rms)	31.5kA rms for 1secs	
g)	Rated making current	kA (peak)	2.5 X 31.5 kA	
h)	Short time current withstand	kA (rms)	31.5kA rms for 1secs	
i)	Total break time		Less than 60 msec	
j)	Operating mechanism type (Normal)		Motor charged spring operated mechanism	
	Operating mechanism type (Emergency)		Manually charging with spring charging handle	
k)	Minimum no. of auxiliary contacts		4 NO + 4 NC	
l)	Minimum clearance between poles		As per Type Tested Design	
m)	Minimum clearance between live and earth		As per Type Tested Design	
n)	Duty cycle		O – 0.3 sec - CO - 3	

			min - CO	
o)	Withstand test voltage			
	(i) One minute power frequency	kV (rms)	50kV	
	(ii) 1.2/50 μ sec impulse	kV (peak)	125kV	
p)	Auxiliary control voltage			
	(i) For closing / tripping coil		110V DC	
	(ii) For spring charging motor		240V AC	
	(iii) For space heaters and lighting		240V AC	
q)	Anti-pumping feature		Required	
r)	Latching requirement		NA	
s)	Off load disconnecter / earth switch - Type and voltage / current rating		NA	
9.	Current Transformers			
a)	Type/make/model		As per the make List	
b)	Class of insulation		Class E	
c)	Rated current ratio and burden			
	(i) Incomers and bus couplers		As per SLD / Specifications	
	(ii) Outgoing feeders		As per SLD / Specifications	
d)	Accuracy class			
	(i) Metering		Class 0.5	
	(ii) Protection		Class 5P (For Protective relays) Class PS (For differential protection)	
e)	Short time 1 sec current rating	kA (rms)	31.5kA rms for 1sec	
f)	Dynamic rating	kA (peak)	2.5 X 31.5 kA	
10.	Voltage Transformers			
a)	Type/make/model		As per the make List	
b)	Rated Voltage			
	(i) Primary	V	22000 V	
	(ii) Secondary - S1	V	Secondary S1 - 110 V, Tertiary S2 - 110V	
c)	Method of connection			
	(i) Primary - P		Star	

	(ii) Secondary - S1		Secondary S1 - Star, Tertiary S2 - Star	
d)	Application - S1		Secondary S1 - Metering, Tertiary S2 - Protection	
e)	Rated burden	VA	*	
f)	Accuracy class			
	(i) Metering		Class 0.5	
	(ii) Protection		Class 3P	
g)	Rated voltage factor			
	(i) Continuous		1.1	
	(ii) Short time		1.5	
h)	Insulation class		Class E	
11.	Meters			
a)	Make		As per the make list	
b)	Accuracy Class			
	(i) Indicating Meters		Class 1.0	
	(ii) Energy Meter with communication port		Class 1.0	
12.	Protective Relays with communication port			
	Type		Microprocessor based Numerical	
	Auxiliary supply		110 V DC	
13.	Auxiliary A.C. Supply Voltage & Frequency	V, Hz	240 V, Single phase, 50 Hz	

4.0 6.6 kV Metal Enclosed Switchgears Panel**Data Sheet No. EL04**

Sr. No.	Description	Unit	Required	Proposed by Tenderer
1.	Make		As per the Make List	
2.	Type		Metal enclosed	
3.	Applicable Standards / Zone of installation		IEC 62271 and other standards as mentioned in the Electrical Specifications	
4.	Quantity	No.	As per BOQ	
5.	Dimensions	mm x mm x mm	To be furnished by the Tenderer	
6.	Switchgear cubicles and Bus bar ratings			
a)	Rated voltage, phases and frequency		6.6 kV, 3 phase, 50Hz	
b)	System Neutral Earthing		6.6kV System	
c)	Maximum system voltage	kV	7.2kV	
d)	One minute power frequency withstand voltage	kV (rms)	20kV for 6.6kV	
e)	1.2/50 μ sec impulse withstand voltage	kV (peak)	60kV for 6.6kV	
	Short circuit withstand			
f)	(i) Short time (1 sec) at rated voltage	kA(rms)	31.5kA	
g)	(ii) Dynamic rating	kA(peak)	2.5 X 31.5 kA	
h)	Reference ambient temperature	$^{\circ}$ C	45	
i)	Maximum temperature of bus bars droppers connectors and contacts at continuous current rating under site reference ambient temperature	$^{\circ}$ C	As per applicable IS/IEC	
j)	Continuous current rating of bus bar	A	As per the SLD	
k)	Bus bar material/size		Copper	
l)	Bus bar Insulation		Flame retardant heat shrinkable type sleeving	
m)	Cable entry		Bottom	
n)	Cable type for Incoming and Outgoing feeders		6.6kV (UE) XLPE insulated Aluminum, 3 core, Aluminum conductor armored cable	

7.	Switchgear constructional Requirement			
a)	Thickness of sheet steel Frame, Frame enclosures, doors, covers and partitions	mm	2mm CRCA sheet steel	
b)	Degree of protection		IP 4X	
c)	Colour finish shade		As per shade 631 of IS-5	
d)	Earthing bus : i) Material ii) Size	mm x mm	Copper To be furnished by the tenderer	
e)	iii) Earthing conductor: i) Material ii) Size	mm x mm	GI To be furnished by the tenderer	
8.	Breaker Particulars			
a)	Circuit breaker type		Vacuum Circuit Breaker (Electrical Draw out type)	
b)	Voltage, phases and frequency		6.6kV, 3 phase, 50 Hz	
c)	Rated operating duty		O – 0.3 sec - CO - 3 min - CO	
d)	Rated current at reference ambient temperature Incoming breakers	A	As per SLD	
e)	Outgoing breakers	A	As per SLD	
f)	Rated breaking capacity	kA (rms)	31.5kA rms for 1secs	
g)	Rated making current	kA (peak)	2.5 X 31.5 kA	
h)	Short time current withstand	kA (rms)	31.5kA rms for 1 sec	
i)	Total break time		Less than 60 msec	
j)	Operating mechanism type (Normal)		Motor charged spring operated mechanism	
	Operating mechanism type (Emergency)		Manually charging with spring charging handle	
k)	Minimum no. of auxiliary contacts		4 NO + 4 NC	
l)	Minimum clearance between poles		As per Type Tested Design	
m)	Minimum clearance between live and earth		As per Type Tested Design	
n)	Duty cycle		O – 0.3 sec - CO - 3 min - CO	

o)	Withstand test voltage			
	(i) One-minute power frequency	kV (rms)	20kV	
	(ii) 1.2/50 μ sec impulse	kV (peak)	60kV	
p)	Auxiliary control voltage			
	(i) For closing / tripping coil		110V DC	
	(ii) For spring charging motor		240V AC	
	(iii) For space heaters and lighting		240V AC	
q)	Anti-pumping feature		Required	
r)	Latching requirement		NA	
s)	Off load disconnecter / earth switch - Type and voltage / current rating		NA	
9.	Current Transformers			
a)	Type/make/model		As per the make List	
b)	Class of insulation		Class E	
c)	Rated current ratio and burden			
d)	(i) Incomers and bus couplers		As per SLD / Specifications	
e)	(ii) Outgoing feeders		As per SLD / Specifications	
f)	Accuracy class			
	(i) Metering		Class 0.5	
	(ii) Protection		Class 5P (For Protective relays) Class PS (For differential protection)	
g)	Short time 1 sec current rating	kA (rms)	31.5kA rms for 1secs	
h)	Dynamic rating	kA (peak)	2.5 X 31.5 kA	
10.	Voltage Transformers			
a)	Type/make/model		As per the make List	
b)	Rated Voltage			
	(i) Primary	V	6600 V	
	(ii) Secondary - S1	V	Secondary S1 - 110 V, Tertiary S2 - 110V	
c)	Method of connection			
	(i) Primary - P		Star	
	(ii) Secondary - S1		Secondary S1 - Star,	

			Tertiary S2 - Star	
d)	Application - S1		Secondary S1 - Metering, Tertiary S2 - Protection	
e)	Rated burden	VA	*	
f)	Accuracy class			
	(i) Metering		Class 0.5	
	(ii) Protection		Class 3P	
g)	Rated voltage factor			
	(i) Continuous		1.1	
	(ii) Short time		1.5	
h)	Insulation class		Class E	
11.	Meters			
a)	Make		As per the make list	
b)	Accuracy Class			
	(i) Indicating Meters		Class 1.0	
	(ii) Energy Meter with communication port		Class 1.0	
12.	Protective Relays with communication port			
	Type		Microprocessor based Numerical	
	Auxiliary supply		V DC	
13.	Auxiliary A.C. Supply Voltage & Frequency	V, Hz	240 V, Single phase, 50 Hz	

5.0 Neutral Grounding Resistor**Data Sheet No. EL05**

Sr. No.	Description	Unit	Required	Proposed by Tenderer
1.	Scope of Supply			
a)	Rated Voltage	kV	6.6	
b)	Rated Current	Amp	551.1	
c)	Max. Temp. Rise	°C	As per IEEE 32	
d)	Degree of Protection		IP 55	
e)	Installation		Outdoor	
2.	Enclosure			
a)	Construction		Sheet Steel 3mm	
b)	External Hardware		Stainless steel	
3.	Resistors			
a)	Value of Resistance	Ohms	6.91 ± 10% ohms	
b)	Type		Punched stainless steel	
c)	Material of Resistance Element Insulation		Heavy duty epoxy cast insulators	
4.	Bushings			
a)	Make		M/s GE	
b)	Rated Voltage	kV	6.6	
c)	Creepage Distance		As per IS/IEC standards	
5.	Current Transformer			

Sr. No.	Description	Unit	Required	Proposed by Tenderer
a)	Make		As per the make list	
b)	Ratio		To be furnished by the tenderer	
c)	Burden		To be furnished by the tenderer	
d)	Insulation		7.2/20/60kVp	
e)	Accuracy Class		To be furnished by the tenderer	
6.	Accessories			
a)	Cable Glands	Yes/No	Yes	
b)	Make of Cable Glands		As per the make list	
c)	Cable lugs	Yes/No	Yes	
d)	Make of cable lugs		As per the make list	
7.	Operating Requirement			
a)	Rated Current	Amps	551.1	
b)	Continuous current rating		As per the specification	
c)	Time	secs	30	
8.	Painting		Shade 631 as per IS : 5.	
9.	Tests		As per IEEE 32 Std.	
10.	Applicable Standards		IEEE 32, IS 3043	

6.0 Medium Voltage VFD**Data Sheet No. EL06**

Sr. No.	Description	Unit	Required	Proposed by Tenderer
1.	Name of the manufacturer		As per the make list	
a)	Type of Drive		Digital type PWM with IGBT based Inverter controlled AC drives.	
b)	Rating of the drive		To be furnished by the Tenderer	
c)	Type of duty		Variable Torque	
d)	Quadrants of operation		II	
e)	Quantity	No.	6	
f)	Power supply		6.6 kV, 3ph, 50 Hz	
g)	Variation voltage		$\pm 10\%$	
h)	Variation in Frequency		50 Hz $\pm 5\%$	
i)	Combined voltage and frequency variation		$\pm 10\%$	
2.	Location		Indoor	
a)	Whether in air conditioned room		Yes	
b)	If No:			
	i. Average ambient temperature $^{\circ}\text{C}$		45 $^{\circ}\text{C}$	
	ii. Design ambient temperature $^{\circ}\text{C}$		50 $^{\circ}\text{C}$	
	iii. Relative humidity %		90% non-condensing	
3.	Type of cooling for drive panel		Natural cooling/forced cooling with fan or water cooled	
a)	If water cooled, is DM water required	Yes/No	To be furnished by the tenderer	
b)	If yes, quantity of DM water	litres/minute	----	
4.	Cable			
a)	Size and type		To be furnished by the tenderer	
b)	Entry		Bottom	
5.	Applicable Standards		IEC / EN 60071-1 IEC / EN 60146	

Sr. No.	Description	Unit	Required	Proposed by Tenderer
			IEC / EN 60664-1 IEC / EN 61800-4 IEC / EN 61800-5-1 IEC 62103 IEC 60146-1-3 IEC 61378-1 IEC / EN 61800-3 CISPR 22 Cl A IEC / EN 61000-2-4 IEC / EN 60721-3-1 IEC / EN 60721-3-2 IEC / EN 60721-3-3 IEEE 519 IEEE 958 IEEE 1566 IEEE C57.12.00 IEEE C57.12.01 IEEE C57.18.10 ICS7.1 IS/IEC 60529- 1	

Sr. No.	Description	Unit	Required	Proposed by Tenderer
	INVERTER CONTROLLED A.C. DRIVES			
1.	Application		Pump	
2.	Quantity		6 Nos, *kW, 6.6kV, 3phase	
3.	Starting/rated torque		Variable Torque	
4.	Type of converters		Voltage sources PWM	
5.	Inverter capacity at specified pf		*KW	
6.	Rated Current		* Amp	
7.	Load power factor		*	
8.	Max. continuous current		To be furnished by the tenderer	
9.	Rated voltage with number of phases		6.6kV , 3phase	
10.	Rated frequency		50Hz	
11.	Converter Bridge		Minimum 30 pulse	
12.	Single Quadrant/Two		Two Quadrant	

	quadrant/ Four Quadrant			
13.	Supply Type		Integrated Transformer	
14.	Control Characteristics			
i.	Speed Control		0 to 100 % Speed	
	a) Rated speed		750 RPM	
	b) Speed ratio		NA	
	c) Constant torque/constant power		Variable Torque	
	d) Speed accuracy		0.1 %	
	e) Closed loop/open loop		Closed Loop	
	f) If tach generator used (for closed loop)		No	
	g) Accel./Deaccel. time		To be furnished by the tenderer	
	h) Type of tachogenerator		Digital (pulse type)	
	i) Is remote operation required		Yes	
	- If yes, it is through		HMI and PLC/SCADA	
	j) Type of control		Digital/Analogue	
ii.	Braking		As per Manufacture	
	a) Type of braking		As per Manufacture	
	b) Braking Torque		As per Manufacture	
15.	Miscellaneous			
a)	Soft-start		Yes	
b)	Flying restart		Yes	
c)	Auto restart		Yes	
d)	Kinetic Buffering		NA	
16.	Indication on Drive Panel (minimum)			
	(a) Motor running		Yes	
	(b) Motor stopped / trip		Yes	
	(c) AC mains 'ON'		Yes	
	(d) System Ready to start		Yes	
	(e) VSD system fault		Yes	
17.	Metering			

	Digital Display of the following Minimum parameters on the Drive Panels: -			
a)	Input AC Voltage		No (For input parameters, energy meter to be connected on input side of VFD to get input V, Hz and Amps)	
b)	Input AC Frequency			
c)	Input AC Current			
d)	Output Voltage		Yes (Required on drive display)	
e)	Output Current VSD/Bypass		Yes (Required on drive display)	
f)	Output Frequency		Yes (Required on drive display)	
g)	Motor speed		Yes (Required on drive display)	
18.	Necessary transducers shall be Provided with 4-20mA output for indicating motor speed & current in DCS.		No	

7.0 415 V Metal Enclosed Switchgears /MCC**Data Sheet No. EL07**

Sr. No.	Description	Unit	Required	Proposed by Tenderer
1.	Make		As per the make list	
2.	415 V Switchgear and Bus bar Ratings		As per SLD	
a)	Rated voltage phase and frequency		415V, 3 phase, 4 wire, 50 Hz	
b)	System Neutral Earthing		Solidly earthed	
c)	Maximum system voltage	V	456 V	
d)	One minute power frequency voltage			
	i) Power circuits	V	2500V	
	ii) Control circuits	V	1500V	
	iii) Aux. Circuits connected to Sec of CTS	V	2000V	
e)	Continuous current rating of Bus bars under site reference Ambient Temperature and type & material	Rating Material	Rating – As per SLD Material – Copper	
f)	Bus bar insulation/ material/ size		Busbar insulation – Air insulated Heat shrinkable PVC sleeves, Busbar material - Copper Size – To be furnished by the tenderer	
g)	Reference Ambient Temperature	°C	45	
h)	Maximum Temperature of Bus bars, Droppers and Contacts at Continuous current rating under site ambient temperature	°C	As per relevant IS/IEC standards	

i)	Short Circuit current withstand for Bus bars and droppers (i) Short time 1 sec	kA (rms)	50kA (RMS)	
	(ii) Dynamic Rating	kA (peak)	2.5 X 50kA	
j)	Applicable Standards		IEC 61439-1 & 2, IS 13947, IS 60947 etc.. as per Specifications	
3.	Switchgear Constructional Requirement			
a)	Type of Construction		Compartmentalized	
b)	Thickness of sheet steel			
	(i) Frame, Frame enclosures, doors, covers and partitions	mm	2.0 mm thick, cold rolled, cold annealed (CRCA)	
c)	Degree of protection		IP 54 - For indoor IP 42 - where heat dissipation is an important consideration for indoor IP 55- For outdoor	
d)	Colour finish shade		Exterior - shades 631 as per IS : 5.	
e)	Earthing bus			
	i. Material		Copper	
	ii. Size	mm x mm	To be furnished by the tenderer	
f)	Earthing conductor			
	i. Material		GI	
	ii. Size	mm x mm	To be furnished by the tenderer	
g)	Minimum clearances in air of live parts			
	(i) Phase to Phase	mm	25.4	
	(ii) Phase to Earth	mm	19.4	
h)	Cable entry to cubicles		Bottom	
4.	Air Circuit Breaker (ACB)			
a)	Make		As per the make list	

b)	Type (Thermal Magnetic Release/ Microprocessor)		Microprocessor	
c)	Voltage, Phases, Frequency		415V, 3 phase, 50 Hz	
d)	Normal continuous current carrying capacity (A)		As per SLD	
e)	Rated symmetrical interrupted current (kA)		50kA	
f)	Utilization category		B	
g)	Making current capacity (A)		2.5 X 50kA	
h)	Short time current for 1 Sec. (kA)		50kA	
i)	Duty cycle for breaking capacity (kA)		As per the applicable standards	
j)	Minimum clearance			
	Between Poles (mm)		As per the applicable standards	
	In air between live parts and earth (mm)		As per the applicable standards	
k)	Protection		Over load, Short circuit, Under voltage, over current and Earth fault by micro-processor-based release	
5.	Moulded Case Circuit Breaker (MCCB)			
a)	Make		As per the make List	
b)	Type (Thermal Magnetic Release/ Microprocessor)		Thermal Magnetic Release	
c)	Voltage (V), Phases, Frequency (Hz)		415V, 3 phase, 4 wire, 50 Hz	
d)	Normal continuous current carrying capacity (A)		As per SLD	
e)	Rated symmetrical interrupted current (kA)		50kA	
f)	Making current		2.5 X 50kA	

	capacity			
g)	Short time current for 1 Sec. (kA)		50kA	
h)	Duty cycle for breaking capacity (kA)		As per the applicable standards	
i)	Minimum clearance			
	Between Poles (mm)		25.4mm	
	In air between live parts and earth (mm)		19.4mm	
j)	Additional features			
	Protection		Overload, Short circuit , overcurrent and earth fault protection by Thermal Magnetic release	
6.	Motor Starters			
a)	Direct On Line (DOL), Star Delta, RDOL			
b)	Make / Model		As per the make list	
c)	Motor Rating (kW)		As per SLD	
d)	Starter Rating (kW)		As per SLD	
e)	Voltage (V), Phases, Frequency (Hz)		Voltage - 415V, Phase -3, Frequency - 50Hz	
f)	Normal continuous current carrying capacity (A)		As per SLD	
g)	Mounting		Inside the MCC base mounted	
h)	Application			
i)	Protection		MPCB (overload and short circuit protection)	
j)	Hardwired communication with PLC SCADA system		Will be provided Local / Remote selection for each feeder. When Selection in remote mode on that time it can operate from remote SCADA.	
7.	Contactors			
a)	Make / Model		As per the make	

			list	
b)	Type of duty		AC-3	
c)	Voltage (V), Phases, Frequency (Hz)		415V, 3 phase, 50Hz	
d)	Normal continuous current carrying capacity (A)		As per SLD	
e)	Number of poles		As per type -2 Coordination chart	
f)	Rated insulation voltage (Ui)		3 pole	
g)	Thermal Overload Relay		As per applicable IS/IEC	
8.	Potential/control Transformer			
a)	Make		As per the make list	
b)	Type (Bar/Wound/Any- other)		Cast resin type (insulation Class 'E')	
c)	Voltage (V), Phases, Frequency (Hz)		415V, 3 phase, 50Hz	
d)	Rated primary voltage (V)		415V	
e)	Ratio		415 / 110 V	
f)	Accuracy class		CL-1	
g)	Short Circuit Level (kA)		50	
h)	VA Burden		To be furnished by the tenderer	
i)	Application (Protection/ metering /other)		Metering	

8.0 415 V Power Capacitor and Control Panel**Data Sheet No. EL08**

Sr. No	Description	Unit	Required	Proposed by Tenderer
1.	General			
a)	Quantity		2nos	
b)	Rated Capacity	KVAR	200kVAR- 2Nos.	
c)	Rated voltage	V	415	
d)	Rated frequency and phases		50 Hz, 3 Phase	
e)	Ambient temperature	° C	45	
f)	Cable gland required		Yes	
g)	Type of cable		1.1 kV, XLPE, Al. Conductor, armoured cable	
h)	Size of cable		As per the SLD	
i)	Cable entry		Bottom	
j)	Make		As per the Make List	
k)	Applicable standard		IS:13925 IS 16636	

Sr. No	Description	Unit	Required	Proposed by Tenderer
2.	Constructional Requirement			
a)	Thickness of sheet steel i) Frame, Frame enclosures, doors covers and partition	Mm	Cold rolled cold annealed sheet steel 2.0mm thickness	
b)	Degree of protection		IP 42 (indoor)	
c)	Colour finish shade		Interior : Glossy white Exterior : Light Grey Semi Glossy Shade 631 of IS 5	

Sr. No	Description	Unit	Required	Proposed by Tenderer
d)	Earthing bus	Material	Copper	
		Size	mm x mm	Minimum 25x6
e)	Earthing conductor	Material	GI	
		Size	mm x mm	To be furnished by the tenderer
3.	Design Requirement			
a)	Insulation level	kV (rms)	2.5	
b)	Capacitor bank connection		Delta	
c)	Short circuit withstand for busbars	kA (rms)	50	
d)	i) Short time (1 sec)			
	ii) Dynamic	kA (peak)	To be furnished by the tenderer	
e)	Type of switching		Automatic switching responsive to power factor through microprocessor based power factor sensing relay (Through APFC)	

Sr. No	Description	Unit	Required	Proposed by Tenderer
f)	Switching steps		Minimum 8 steps	
g)	Rating of contactor		To suit rated capacity of KVAR unit	
h)	Incomer switch current rating		To suit rated capacity of KVAR	
i)	Busbars		Copper	
4.	Capacitor control Panel			
a)	Make		As per the make list	
b)	Dimension (LXDXH)	mm x mm x mm	To be furnished by the tenderer	
c)	Weight	Kg	To be furnished by the tenderer	
5.	Type test certificate attached		Yes	

9.0 Battery and Battery Charger**Data Sheet No. EL09**

Sr. No.	Description	Unit	Required	Proposed by Tenderer
1.	General			
a)	Make		As per Approved make list	
b)	Applicable Standards		IS:9000 IS:5921 IS:6297 IS:7405 IS 6553 IS:4007 IS 10918/IEC 60623 IEEE 1115 IEEE 1116 BIS IS/IEC 60947-1 And as per the specifications	
c)	Number required (i) Battery charger (ii) Battery set	Nos. Nos.	i. 2 nos. (1no. in 6.6kV Panel Room and 1no. in 22kV Panel Room) ii. 2 nos. (1no. in 6.6kV Panel Room and 1no. in 22kV Panel Room)	
d)	Rated Output voltage (DC)	v	110 V	
e)	Rated Output	kW	To be furnished by the tenderer	
f)	DC System Earthing		Earthed	
g)	voltage regulation from no load to rated load	%	0.02% for 10% mains voltage variation, 0.3% from zero to full load conditions	
h)	Ambient Design Temperature	Deg. C	45	
i)	Bus bar material & size	-	Material - Copper, Size - To be furnished by the tenderer	
j)	Overall dimensions	mm x m x mm	To be furnished by the tenderer	
2.	Battery Details			
a)	Float/ Trickle charging current of battery	A	10	
b)	Boost Charging Current of battery (Maximum)	A	To be furnished by the tenderer	

c)	Boost Charging voltage of battery (maximum)	v	1.55V	
d)	Maximum Time for Boost charging of battery	hr	To be furnished by the tenderer	
e)	Battery capacity	Ah	100AH in 6.6kV Panel & 54AH in 22kV Panel Room	
f)	No. of cells	Nos.	To be furnished by the tenderer	
g)	Battery type (Lead acid or Ni-Cd).		Ni-Cd	
h)	Battery discharge facility		Required	
i)	Battery cell arrangement		Dropper Diode	
j)	Charging Method		Float cum boost	
3.	AC System Data			
a)	Supply: Voltage	V	415V	
b)	Phase		3phase, 4wire	
c)	Variation in supply voltage	%	± 10	
d)	Variation in supply frequency	%	± 5	
e)	Short Circuit level	kA	50	
f)	Type of earthing		Solidly earthing	
4.	Performance			
a)	DC voltage setting adjustment for float charger		$\pm 1\%$ of the set value	
b)	voltage stabilization for constant voltage regulator		To be furnished by the tenderer	
c)	Maximum permissible variation in DC voltage (no load to full load)		$\pm 1\%$ of the set value	
d)	D.C. voltage setting adjustment for boost charging		$\pm 1\%$ of the set value	
e)	D.C. current adjustment for		$\pm 2\%$ of the set value	

	boost Charging			
f)	Current stabilization for constant current regulator for boost charger		To be furnished by the tenderer	
g)	Minimum permissible power factor to rated continuous load		To be furnished by the tenderer	
h)	Permissible ripple content at rated continuous load		less than 1% of the nominal DC voltage	
i)	Relay for auto changeover from Float to boost mode to be provided (in case of float- cum-boost charger)		Required	
5.	Constructional Features			
a)	Thickness of sheet steel Frame, Frame enclosures, doors, covers and partition	mm	2.0 mm thick, cold rolled, cold annealed (CRCA) sheet steel	
b)	Degree of protection		IP 42	
c)	Colour finish shade		Shade 631 as per IS:5	
d)	Earthing bus : Material		Copper	
e)	Size	mm x mm	To be furnished by the tenderer	
f)	Earthing conductor: Material		GI	
g)	Size	mm x mm	To be furnished by the tenderer	
h)	Cable entry		Bottom	
i)	Cable Sizes		To be furnished by the tenderer	
j)	(i) Battery	sq.mm	To be furnished by the tenderer	
k)	(ii) DC output	sq.mm	To be furnished by the tenderer	
l)	(iii) AC input	sq.mm	To be furnished by the tenderer	

10.0 Cables : HV, LV, Control**Data Sheet No. EL10**

Sr. No.	Description	Unit	Technical Particulars	Proposed by Bidder
1.	22 kV Unearthed Aluminum Conductor XLPE, armoured power cable		As per IS 7098-Part II, IS 8130, IS 10810, IS 10418	
a)	Make		As per the make list	
b)	Continuous current rating with cable laid in air under specified ambient temperature	Amps	To be furnished by the tenderer	
c)	Overall diameter of the cable	mm	To be furnished by the tenderer	
d)	Bending radius		15D	
e)	Standard length of the cable on each drum	mts	To be furnished by the tenderer	
2.	6.6 kV Unearthed Aluminum Conductor XLPE, armoured power cable		As per IS 7098-Part II, IS 8130, IS 10810, IS 10418	
a)	Make		As per the make list	
b)	Continuous current rating with cable laid in air under specified ambient temperature	Amps	To be furnished by the tenderer	
c)	Overall diameter of the	mm	To be furnished	

	cable		by the tenderer	
d)	Bending radius		15D	
e)	Standard length of the cable on each drum		mts	
3.	650/1100 V grade PVC insulated Aluminum conductor armoured power cable (AYWY or AIFY)		As per IS 1554-Part I, IS 5831, IS 8130, IS 10810, IS 10418	
a)	Make		As per the make list	
b)	Continuous current rating with cable laid in air under specified ambient temperature	Amps	To be furnished by the tenderer	
c)	Overall diameter of the cable	mm	To be furnished by the tenderer	
d)	Bending radius		12D	
e)	Standard length of the cable on each drum	mts	To be furnished by the tenderer	
4.	650/1100 V grade XLPE insulated Aluminum conductor armoured power cable		As per IS 7098-Part I, IS 8130, IS 10810, IS 10418	
a)	Make			
b)	Continuous current rating with cable laid in air under specified ambient temperature	Amps	To be furnished by the tenderer	
c)	Overall diameter of the cable	mm	To be furnished by the tenderer	

d)	Bending radius		12D	
e)	Standard length of the cable on each drum		mts	
5.	650/1100 V grade PVC insulated copper conductor armoured control cable		As per IS 1554 part I, IS 694, IS 5831, IS 8130, IS 10810, IS 10418	
a)	Make			
b)	Overall diameter of the cable	mm	To be furnished by the tenderer	
c)	Standard length of the cable on each drum	mts	To be furnished by the tenderer	
6.	Epoxy Heat Shrinkable Straight through joints and end terminations .	.	To be furnished by the tenderer	

NOTES:

1. (*) – Tenderer to furnish
2. (*) & "To be furnished by the Tenderer" – The numbers, ratings, sizes etc.. shall be worked out by the contractor during execution and to be approved by the Engineer
3. Any requirement / features / provisions not specifically mentioned in the Specification/Datasheet but are necessary for trouble free and smooth operation of the Plant System shall be included.

INSTRUMENTATION & CONTROL**Pressure Gauges for Wastewater (Quantity: Total 13 Nos.) Data Sheet No. IC01**

Sr. No.	Description	Required	Proposed by Bidder
1	Sensor	Bourdon tube	
2	Dial size	100 mm	
3	Mounting	Direct	
4	Dampener	12mm, stainless steel, if required	
5	Sensing and Diaphragm Material	SS 316 or better	
6	Movement, Socket material	SS 316	
7	Diaphragm bottom Connection	Based on actual requirement	
8	Diaphragm & gauge	Factory calibrated, glycerine filled	
9	Accuracy	± 1% of full scale or better	
10	Range	a) 0-10 kg/cm ² for discharge service: 07 Nos. b) -1 to +2.5 kg/cm ² for suction service: 06 Nos.	
11	Over-range protection	130% of full range	
12	Housing material	Die-cast aluminium	
13	Degree of protection	IP67	
14	Specifications	IS 3624	
15	Selection & installation	BS EN 837	
16	Name plate/ Metal tag	Tag number, manufacturer's name or trademark; Model number, serial number, pressure & temperature rating; Diaphragm material; Process connection/ rating; Operating pressure & range values	
17	Other feature	As per installation and hook-up requirement	

Pressure Transmitters (Quantity: 7 Nos.)**Data Sheet No. IC02**

Sr. No.	Description	Required	Proposed by Bidder
1	Type	Microprocessor based Smart, 2-wire Indicating	
2	Mounting	Field	
3	Sensor	Wetted parts – SS 316 diaphragm	
4	Pressure range	0-10 bar	
5	Over-range protection	130% of full range	
6	Power supply input	24V DC / 230V AC	
7	Output	4-20mA DC HART	
8	Accuracy	+/- 0.15 % of span or better	
9	Turndown	10:1	
10	Diaphragm seal	Required	
11	Process connections	Based on actual requirement	
12	Sensing and Diaphragm Material	SS 316 or better	
13	Body material	SS 316L	
14	Housing material	Aluminium with epoxy coating	
15	Degree of protection	IP67	
16	Certificates	CE	
17	Mounting	As per field requirement	
18	Cable entry	½" NPT (F) (2 Nos.) with SS double compression type cable glands with PVC shroud. Spare entry shall be plugged with SS plug.	
19	Safety Level	Suitable for SIL 2 applications in accordance with IEC 61508 /IEC 61511	
20	Display Type	Backlit LCD Display	
21	Input transmitter	4 to 20mA HART from pressure	
22	Display	LCD with engineering units	
23	Unit	Bar	

Sr. No.	Description	Required	Proposed by Bidder
24	External zero and span adjustment	Required	
25	Communication Port	Retransmission output 4-20mA interfacing with PLC	

Differential Level Transmitter - Ultrasonic (Quantity: 03 Nos.) Data Sheet No. IC03

Sr. No.	Description	Required	Proposed by Bidder
1	Type and material	Ultrasonic, Pulse Time of flight Stainless steel PVDF/ EPDM seal Flanged or un-flanged as per site requirement, Suitable for Hazardous Areas	
2	Power supply	24V DC from transmitter	
3	Output	Frequency	
4	Range	Suitable for 0 to 15 m	
5	Beam Angle	6°	
6	Accuracy	±0.25% of range or better	
7	Resolution	Minimum 2 mm or 0.1% of measuring range	
8	Programming	Through remote transmitter and indicator	
9	Temp. Compensation	Ambient to 50°C, with suitable temperature range compensation technology	
10	Temp. Error	Sensor: maximum 0.1% of full range	
11	Ingress protection	IP68	
12	Version	4 wire	
13	Enclosure	ABS Plastic / Polycarbonate or better	
14	Application	Measurement of differential level across Mechanical bar screen in screen Channel	
	Remote Level Transmitter cum Indicator		
15	Mounting	Panel	
16	Display	Digital display with readout in engineering units, Alphanumeric backlit LCD, 2½ digits, Microprocessor based electronics	
17	Input signal	From 2 nos. transducer	
18	Output signal	4-20mA DC HART	

Sr. No.	Description	Required	Proposed by Bidder
		(equivalent to level differential)	
19	Output voltage	24V DC suitable for transducer	
20	Accuracy	within $\pm 0.25\%$ of range	
21	Power supply	input 230V AC $\pm 10\%$, 50 Hz	
22	Protection	IP54	
23	Ambient Temp	Maximum 65°C	
24	Reset Facility	shall be provided	
25	Digital output	2 NO + 2 NC	
26	Communications	Retransmission 4-20mA signal for connection with PLC-SCADA system	
<p>Note : Level sensor shall be installed at suitable locations in a channel considering beam angle and allowed clearance for non-interference of ultrasonic signal due to channel wall</p>			

Radar Level Transmitter (Quantity: 02 Nos.)**Data Sheet No. IC04**

Sr. No.	Description	Required	Proposed by Bidder
1	Type and Antenna	FMCW (Frequency Modulated Continuous Wave) Parabolic antenna	
2	Process connection	Flanged or un-flanged as per site requirement, Suitable for hazardous areas	
3	Radar signal frequency	*	
4	Power supply	24V DC (Loop powered) / 230V AC	
5	Output	4 - 20mA HART	
6	Range	Suitable for 0 to 40 m	
7	Beam Angle	*	
8	Accuracy	±0.1% of range or better	
9	Dead zone distance	*	
10	Temp. Compensation	Ambient to 50°C, with suitable temperature range compensation technology	
11	Temp. Error	Sensor: maximum 0.1% of full range	
12	Ingress protection	IP66	
13	Enclosure	Aluminium alloy/ SS316	
14	Application	Measurement of sewage (wastewater) level in wet well	
15	Display	Digital display with readout in engineering units, Alphanumeric backlit LCD, 2½ digits, Microprocessor based electronics	
16	Reset Facility	Shall be provided	

Full bore Electromagnetic Flow Meter (Quantity: 06 Nos.) Data Sheet No. IC05

Sr. No.	Description	Required	Proposed By Bidder
1	Flow Sensor type	Full bore Pulsed DC Electromagnetic flow meter	
2	Liner	PTFE/ Hard rubber [compatible for sewage (wastewater) application]	
3	Operating Temp	0 to 65° C	
4	Pressure	0-10 bar	
5	Enclosure rating	IP67	
6	Metering tube	SS 316	
7	Electrodes	SS 316 /Hastelloy C276	
8	Ground Electrode	SS 316/ Hastelloy C276	
9	Flange material	Carbon Steel	
10	Sensor Housing	SS304 or better	
11	Flange Standard	EN 1092 - 1	
12	Application	Wastewater	
13	Velocity Range	0.7 m/s to 5 m/s	
14	Accuracy	+/- 0.5 % of actual flow or better	
15	Repeatability	+/- 0.25% of FSD	
16	Type of transmitter	4 wire	
17	Output	Induced potential/ voltage suitable for transmitter	
18	Coil Insulation	Class F suitable for high temperature as per IEC60085/ IS 1271	
Flow Transmitter and Indicator			
19	Mounting	"Field/ Panel (Cable length as required)"	
20	Display	Backlit LCD Display, 4 ½ Digit for flow rate, 8 Digit for totaliser	
21	Measuring Principal output	Electromagnetic with pulsed constant field	
22	Enclosure	IP54	
23	Accuracy	+/- 0.5% of reading or better	
24	Flow rate indication	MLD and M ³ /hr	
25	Flow Integrator (Totalizer)	MLD	

Sr. No.	Description	Required	Proposed By Bidder
26	Power supply	230 VAC / 24VDC	
27	Input signal	From transducer	
28	Output signal	4-20 mA DC HART	
29	Sensor length	As per ISO 13359	
30	Features	Built in diagnostics, empty pipe detection, Inbuilt grounding electrodes, suitable for remote monitoring,	
31	Calibration methods	Either by gravimetric (ISO 4185) or volumetric (ISO 6817)	
32	Testing facility	Accredited to ISO 17025	
33	Communication Port	Retransmission output 4-20mA for PLC interfacing	
34	Approval	CE marked, EN 61010	

Vibration Sensor and Monitoring System**Data Sheet No. IC06**

Sr. No.	Description	Required	Proposed by Bidder
	General		
1.	Manufacturer	Bidder to state	
2.	Model	Bidder to state	
3.	Service	HT pumps and motors	
4.	Quantity	For all HT pumps	
	Vibration Sensor		
5.	Type	Non-contact type	
6.	Type of pickup	Velocity/ Acceleration	
7.	Measurement	Vibration absolute	
8.	Enclosure protection	IP65	
9.	Operating temperature	-10° C to +100°C	
10.	Measurement range	0-25 mm/sec	
11.	Frequency response	Bidder to state	
12.	Pick-up sensitivity	Min 25 mV/mm/second	
13.	Coil resistance	Bidder to state	
14.	Transverse sensitivity	Bidder to state	
15.	Natural frequency	Bidder to state	
16.	Amplitude range	Bidder to state	
17.	Impedance	Bidder to state	
18.	Mounting	Bidder to state	
	Vibration Monitoring System		
19.	Type	Cabinet mounted, control room	
20.	Power supply	230VAC, 50Hz, 1Ph UPS	
21.	Output	4-20mA signal	
22.	Measuring range	Suitable for pick up	
23.	Provision of high and low pass filter	Yes	
24.	'OK' circuits	To be provided	
	Cabinet		
25.	Type	Free standing vertical cabinet	
26.	Location	Indoor (control room)	

Sr. No.	Description	Required	Proposed by Bidder
27.	Quantity	All	
28.	Final paint colour (exterior)	RAL 7032 (semi glossy)	
29.	Final paint colour (interior)	Glossy white	
30.	Enclosure	IP42	
31.	Sheet material	Cold rolled steel	
32.	Sheet material thickness	3 mm	
33.	Cable entry	Bottom	
34.	Panel depth	800 mm (maximum)	
35.	Anti-vibration pads	15 mm thickness	
36.	Fan	Required	
37.	Louvers	Required	
38.	Lighting	Fluorescent	
39.	Receptacle with fuse switch	To be provided	
40.	Fire proof compound for sealing	To be provided	
	Accessories		
41.	Junction box	To be provided	
42.	Special cable from pickup to junction box	Required (min. 10 mtrs)	
43.	Cable from junction box to VMS cabinet (control room)	To be provided	
44.	Cable glands-double compression type	To be provided	

Standards	
1.	BS, ISO, IEC or API-670
Tests	
1.	Calibration test, accuracy test, repeatability test
2.	Certificate of test house evaluation for accuracy, repeatability & reliability
3.	Verification of degree of protection for the cabinet.
4.	Type tests and routine tests as per relevant Indian Standards for the cabinet.

5.	Vendor to submit all test certificates for engineer /owner's review &records
	Documents
1.	Vendor to submit data sheet, wiring diagram, drawings and manuals for the equipment.
	Notes
1.	Vibration Monitoring System shall be complete with proximity type vibration sensors (including pre-amplifiers/drives), signal conditioning cards, amplifiers, special cables, vibration monitor racks, mounting pads, power supplies, cabinets etc.. Together with all necessary equipment and accessories.
2.	Vibration monitoring system display is required in the VMS cabinet. 4-20mA signal from vibration monitoring system shall be made available for use with PLC.
3.	Vendor scope shall include supply of entire Vibration Monitoring System, installation of vibration sensor, supervision of installation of cabinets, and commissioning of the entire Vibration Monitoring System.
4.	Necessary, one or two stage integrators for obtaining vibration measurement in terms of displacement shall be provided in the system.
5.	All accessories shall be supplied as applicable. In addition, any other accessories required shall be supplied without any cost implication to make the measurement complete and to match with process requirement
6.	The bidder shall indicate all applicable codes and standards.
7.	Bidder to submit list of installations and commissions for the make & type of instrument offered and user's certificate.

Level Switch (Conductivity type) (Quantity: 4 Nos.)**Data Sheet No. IC07**

Sr. No.	Description	Required	Proposed by Bidder
1	Electrode	suitable for upto 15 mtr depth measurement	
2	Electrode material	SS316	
3	Electrode insulation	PVC/ PTFE	
4	Service	Wastewater sewage, hazardous area	
5	Control/ alarm points	2 Nos. set points	
6	Relay contact rating	2A@24V DC or 5A@230V AC	
7	Specific gravity	1.0	
8	Enclosure material	Die-cast Aluminium, PU painted weather proof to IP66	
9	Electric connection	Cables will be connected to intrinsically safe relays.	
10	Electric cable length	As required to suit installation	
11	Stilling pipe	Required, perforated	
12	Mounting accessories	As per field requirement.	
13	Degree of protection	IP68	

Temperature Scanner (Quantity: 6 Nos.)**Data Sheet No. IC08**

Sr. No.	Description	Required	Proposed by Bidder
1	Type	Rugged construction microprocessor based	
2	No. of channels	min. 12	
3	Input	multichannel RTDs input/ 4-20mA DC input	
4	Accuracy	±0.1% of full scale	
5	Resolution	0.1 deg. C	
6	Weather-proof	IP42	
7	Display	LED Display with 4 digits for Temperature, 2 digits for channel No., 2 digits for group No.	
8	Alarm display	LED Alarm display on faceplate	
9	User interface	Keypad on scanner for alarm, password setting	
10	Memory	Non-volatile memory	
11	Power supply	230V AC / 24 VDC	
12	Communication	RS485/ RS232 communication ports	
13	Dry contacts	Relay contacts for alarm	
14	Case	Non-corrosive	
15	Accessories	Panel/ Field mounting accessories, Nameplate and fitting accessories for mounting	

Junction Box (Quantity: As required but minimum 10 Nos.) Data Sheet No. IC09

Sr. No.	Description	Required	Proposed by Bidder
1	Mounting	Wall/ column	
2	No. of terminals	24	
3	Terminal type	Screwed	
4	Terminal size	Suitable for 2.5 sq. mm. wire	
5	Mounting plate	Required	
6	Cable entry	Bottom	
7	Gland plate	Removable	
8	Door	Single lockable door with gasket	
9	Lock & Key	Required	
10	Sheet thickness	3 mm	
11	Painting	Inside: glossy white; Outside: RAL 7032	
12	Protection class	Weather proof to IP65	
13	Enclosure	MS with epoxy painting	
14	Gasket	Neoprene	
15	Cable entry sealing	Fire proof compound	
16	Name plate/ metal tag	Fixed SS304	
17	Installation hardware	Required	

Interposing Relay (IPR) (Quantity: As required.)**Data Sheet No. IC10**

Sr. No.	Description	Required	Proposed by Bidder
1	Type	Electromagnetic	
2	Connections	Plug-in type	
3	Mounting	channel/ rail mounting in cabinet	
4	Coil rating	24V DC	
5	Change over contacts	2 sets	
6	Contacts rating	0.2A, 220V DC	
7	Freewheeling diode	Across relay coil	
8	Status indicator flag	self reset type (electronic)	
9	Installation hardware	Required	

Sr. No.	Description		Bidder to state/confirm
PLC System		Data Sheet No. IC11	
1.0	GENERAL		
1.1	Manufacturer	: *	
1.2	Model no.	: *	
1.3	Proven track record	: Latest system and system configuration available/ being marketed in the international market by the bidder/ collaborator with 1 year of proven performance record. The offered hardware & software shall have a proven track record of one installation which is currently functional. The offered configuration with the offered models of the modules – controller, IO interface modules, Ethernet interface modules, serial link modules, IO modules, power supply modules, etc.. & the offered type of data highway & its type of network, type of IO bus & its type of network, type of OPC links, no. of remote IO links, maximum distance of remote link, etc., shall be in operation for min. period of 1 year in a similar application.	✓
1.4	Criteria for proven track record	: Same controller as per the proven performance record.	
1.5	System configuration	: As per TCE Drg. issued for Tender purpose	
1.6	List of users Also specify about the manufacturing setup.	To be enclosed by Bidder Indicate the users where it is supplied for a similar application with similar configuration & indicate the no. of successful years of operation.	
1.7	Control room environment	: 24°C ± 1°C	
1.8	Total Nos. of cabinets	: *	
1.9	System power supply	: Redundant from UPS - AC DB 240 V AC <input checked="" type="checkbox"/> 110 V AC <input type="checkbox"/>	
1.10	Card replacement with power on for systems	: Required, Hot-swapping.	
1.11	Configuration diagram	: Bidder to enclose the	

Sr. No.	Description		Bidder to state/confirm
		configuration diagram for the system offered.	
1.12	System Expandability	: Modular system design with capability and facility for modular expansion is required.	
1.13	PLC with open system architecture to enable integration of third-party system	: Required.	
1.14	Open Protocols to be supported by PLC system for third-party interface	: Required through a) Modbus TCP – IP b) Ethernet connectivity	
1.15	Spare nodes in the IO bus	: 20%	
1.16	Spare capacity for system memory and user memory	: 50% (After configuring the system and application software, considering the installed spares) The same shall be indicated in Bidder's offer by means of calculations and shall be demonstrated at site during Site Acceptance Tests.	
1.17	Surge withstand capability as per IEEE Standard	: Required	
1.18	Special tools and tackles	: Bidder to quote special tools and tackles required for installation, testing, commissioning & future maintenance.	
2.0	CONTROLLER SUB-SYSTEM		
2.1	Microprocessor based	: Yes	
2.2	Configurable multi loop controller	: Required, PLC shall be capable of running multiple loops of different scan times with assigned priority.	
2.3	Scan time	: All I/Os shall be scanned Interlocking I/Os: within 50 ms Sequential logic: within 100 ms PID control: within 250 ms Analog Monitoring: within 500 ms It shall be possible to allocate different scan times to different I/O points.	
2.4	Controller redundancy	: Required	
2.5	Power supply for controller dual redundancy	: Required	
2.6	Power supply for I/O racks	: Required	
2.7	Status monitoring of power	: Required for monitoring at the	

Sr. No.	Description		Bidder to state/confirm
	supply of CPU & I/O modules	HMI	
2.8	Processor		
2.8.1	Model No.	: *	
2.8.2	Processor and word length	: 32 bit <input checked="" type="checkbox"/> 64 bit <input type="checkbox"/>	
2.8.3	I/O redundancy	: Required for critical IOs based on project specific requirement.	
2.8.4	Processor redundancy	: Required	
2.8.5	Primary & Secondary indication on controllers	: LED indication required.	
2.8.6	I/O capacity of each controller	: *	
2.8.7	Logic changes possible through laptop/HMI	: Yes, with necessary security	
2.8.8	Debugging/ simulation software	: Should be preloaded in HMI as a system feature	
2.8.9	Self-diagnostics software required	: In each processor	
2.8.10	Online configuration possibility	: Required	
2.8.11	Logic changes in main processor	: Required	
2.8.12	Simultaneous Downloading of programs into both the Processors (main & redundant) by one click.	: Required	
2.8.13	Online logic changes or Manual data entered (as set point or A/M selection, forcing the outputs to some value, etc..) done in primary controller	: Required	
2.8.14	Output status on loss of power	: Outputs shall go to fail safe position which shall be user defined	
2.8.15	Sequence control functions	: Required	
2.8.16	Control modes	: Auto, Menu driven, Discrete	
2.8.17	User memory	: Minimum 8 MB	
2.8.18	Memory type for configuration	: *	
2.8.19	Battery back-up	: Battery backup is required, Bidder shall confirm that data can be retrieved anytime even after switching off the controllers.	
2.8.20	Battery type	: 1-year lifetime: Rechargeable Ni-Cd <input checked="" type="checkbox"/> other proven options <input type="checkbox"/>	
2.8.21	Battery drain alarm/ indication	: Required, on HMI	
2.8.22	Estimated CPU load with furnished configuration	: CPU loading shall not exceed 50% under worst data loading condition considering used	

Sr. No.	Description		Bidder to state/confirm
		IOs, spare IO channels, spare IO modules, spare IO slots & specified scan time. The same shall be indicated in Bidder's offer by means of calculations and shall be demonstrated at site during Site Acceptance Tests.	
2.8.23	Synchronization of real time clock	: Required	
3.0	ALGORITHMS REQUIRED AS A MINIMUM		
3.1			
A	Alarm check functions	: Input/ output open check	
		: High-high, high,	
		: Low-low, low	
		: Velocity & deviation	
		: Bypass	
		: Output open	
B.	Output processing Function	: High/low alarm	
		: High/low limiter	
		: Velocity limiter	
C.	Control algorithms	: Proportional control	
		: PI, PID, PD and adaptive gain	
		: External feedback facility	
		: Sample & hold PID, PID with batch switch	
		: Ratio control	
		: PID with dead band	
		: Cascade control	
		: On-off control	
		: Feed forward control	
		: Mathematical Functions	
		: Logic Functions	
D.	Selector	: Low	
		: High	
		: Mean value	
		: Median	
		: Over ride	
3.2	Galvanic isolation for input/output & power supply	: Required	
3.3	Self diagnostic tests		
A.	Input diagnostics	: Required	
B.	Configuration diagnostics	: Required	
C.	Memory diagnostics	: Required	
D.	System hardware check	: Required	
E.	Output diagnostic	: Required	
F.	External hardware check	: Required	

Sr. No.	Description		Bidder to state/confirm
G.	Power system Diagnostics	: Required	
H.	Alarm indication in MMI when any self-diagnostic test fails	: Required	
4.0	COMMUNICATION SUB-SYSTEM		
4.1	Architecture	: Bus structure required	
4.2	Type of protocol for communication between MMI & controller	: Ethernet, IEEE 802.3 u	
4.3	Speed between HMI & controller	: * Min. 100 Mbps	
4.4	Redundant communication between HMI & controllers	: Required	
4.5	Method of communication Ring / Mesh / Star Type	: *	
4.6	Communication modules for controllers for communicating with I/O bus	: Required	
4.7	Communication modules in I/O or Remote I/O panels for communicating with controllers	: Not Required	
4.8	Type & speed of communication between I/Os and controller Method of communication Ring / Mesh / Star Type	: * Min. 10 Mbps. In case of lower speed. Bidder will justify how the functional requirement will be met.	
4.9	Type of I/O bus communication	: Ethernet, IEEE 802.3 u <input checked="" type="checkbox"/> Modbus TCP/ IP <input checked="" type="checkbox"/> OPC <input checked="" type="checkbox"/> Modbus RTU <input checked="" type="checkbox"/>	
4.10	Maximum no. of nodes (Controller/I/O modules) on the system bus	: *	
4.11	No. of I/O modules per node	: *	
4.12	Maximum length of the system cable I/O bus	: *	
4.13	Bus loading allowed	: ≤ 50% under worst data loading condition. The same shall be indicated in Bidder's offer by means of calculations and shall be demonstrated at site during Site Acceptance Tests.	
4.14	Levels of protection for message transmission		
A	Hand shaking	: Required	
B	Errors by external noise	: Required	
C	Checks on data acquired	: Required	

Sr. No.	Description		Bidder to state/confirm
D	Message retransmission or other schemes for Orderly recovery if a Message is lost	: Required	
5.0	HUMAN MACHINE INTERFACE SUB-SYSTEM (HMI)		PLC panel mounted
A	Quantity	: 1 No. min. 12" size	
B	Make/ model	: Same as PLC make	
C	Type	:	
5.1	MAN MACHINE INTERFACE SUB-SYSTEM (MMI)		
5.1.1	Quantity	: Refer Configuration Drawing	
5.1.2	Make/ model	: HP/ Dell / IBM (Lenovo)	
5.1.3	Type	: MMIs shall be standard industrial grade – Workstation model	
5.1.4	Operating system	: Windows 10 or Windows server 2016 or latest proven version available in market.	
5.1.5	Minimum levels of operation security	: *	
5.1.6	Interchangeability between the MMIs	: Required	
5.1.7	Online configuration changes possibility	: Required	
5.1.8	Ethernet card	: Redundant 10/100/1000 Mbps required, all interface cards shall be PCI based	
5.1.9	DDR RAM	: Min 8 GB RAM or more as per latest available in market.	
5.1.10	Combo drive	: DVD/CD RW Combo drive	
5.1.11	Cache memory	: Minimum 6 MB	
5.1.12	Processor	: Core i7 or better	
5.1.13	Hard disk capacity	: 2 TB or better	
5.1.14	Ports (Other than those required for connecting monitor, keyboard, mouse)	: Two Ethernet ports, one RS-232 serial port, one parallel port, four USB ports.	
5.1.15	Slots for ISA & PCI Express	: 3 Nos. of each slot required.	
5.1.16	Power Supply	: 230V AC UPS, inbuilt SMPS required	
5.1.17	SCREEN		
5.1.18	Size	: 22" Flat LED screen, High definition	
5.1.19	Pixel resolution	: 1920 x 1080 pixels	
5.1.20	Colour Monitor	: Required	
5.1.21	Length of tag number	: 32 characters or better	
5.1.22	Display update time	: Must be < 1 sec. / < 2 sec.	

Sr. No.	Description		Bidder to state/confirm
5.1.23	Keyboard	: Standard QWERTY full-stroke type	
5.1.24	Latency of keyboard	: < 2 sec.	
5.1.25	Optical mouse- scroll type	: Required	
5.1.26	Software to be loaded on each MMI	: (a) Licensed copy of Data Acquisition & Control System Software and Operating system software, MS Office (Bidder shall indicate the version) Latest version of Adobe Acrobat read software for each MMI.	
		: (b) Engineering software shall be loaded on the Engg. Station with 1 No. User's license.	
		: (c) Anti-virus software (Quick heal, McAfee, Norton)	
5.1.27	CD / DVDs for all software & drivers for each MMI	: Required	
5.2	<u>Features of Data Acquisition & Control System Software</u>		Centralised SCADA software
5.2.1	Trending function	:	
A	Real time	: Required	
	Trend assign parameters as min.	: PV, MV, SEV etc..	
	No. Of parameters	: *	
	Sampling time	: *	
	Time base	: *	
B	Historical trending		
	No. of parameters	: *	
	Sampling time	: 1 minute data	
	Time base	: *	
C	No. of points per trend page	: *	
	Trend points for sampling time of 1 sec to 10 sec and full scale time base of 4,6,16,32 minutes/ hours/ days for tuning the process loops	: Required	
5.2.2	Logging functions		
A.	Log formats	: User definable	
B.	Event logging	: Required	
C.	Hourly logs	: Required	
D.	Shift logs	: Required	
E.	Daily logs	: Required	
F.	Weekly logs	: Required	
G.	Logging frequency	: * (User selectable)	

Sr. No.	Description		Bidder to state/confirm
H.	Operator actions	: To be logged	
5.2.3	Alarm display function		
A.	Last alarm always to Appear on top of screen	: Regardless which page is being seen	
B.	No. Of alarms / page	: *	
C	No .of Alarms Stored	: *	
D.	Differentiation between Process & system alarms	: Required	
E.	Alarm return to normal	: Required. To appear in a separate line with time.	
F.	Group display function	: Required	
5.2.4	No. of windows opened at a time	: *	
5.2.5	Information display group	: 8 faceplates per window with following details	
A	Input	: Required	
B	Output	: Required	
C	Set point	: Required	
D	Tag nos.	: Required	
E	Set point status	: Required	
F	Mode status	: Required	
G	Service description	: Required	
5.2.6	Print message history required	: Yes	
5.2.7	Alarm handling while continuous alarm condition	: Required	
5.2.8	Faceplate details should be user selectable	: Required	
5.2.9	Faceplate indication colours selection	: Easy, Menu driven required	
5.2.10	Tag security for individual tags	: Required	
5.2.11	MMI database should be selectable	: Possible by assigning MMI name/PC no.	
5.2.12	Control drawing & logics for engineering & use	: High level language (like Ladder/Function blocks / Other as per Manufacturer Standard)	
5.2.13	Change in Engg. Unit of any tag is made should get reflected in the graphics also	: Required	
5.2.14	Change of operation mode: auto, manual, cascade	: Required	
5.2.15	Alarm priorities and levels	: Min. 5 levels	
5.2.16	Operation mark on the tag: Faceplates & Graph	: Required – e.g. - service, repair, calibration, maintenance, no operation etc..	
5.2.17	Safe operation range indicators on tag's faceplate	: Required for safe operating range: low & high	
5.2.18	Alarm & trip mark indicators on	: Required for: low-low, low,	

Sr. No.	Description		Bidder to state/confirm
	tag's faceplate	high & high-high level	
5.2.19	Clamp input facility	: Required to be clamped if goes beyond certain range/value	
5.2.20	Repeat alarm after preset time for critical poll	: Required, even if it is acknowledged by operator but still in alarm stage	
5.2.21	Pass, fail, stuck up status for every sequence	: Required, to know where the process sequence has stuck up	
5.2.22	Scan time setting for individual sequence table	: Required	
5.2.23	Timers counting capacity	: Up to 9999 seconds and/or 9999 minutes	
5.2.24	Generate flags from timer status	: Required from: on, stop, deviation, pause	
5.2.25	Pause facility in the timer	: Required	
5.2.26	Counter counting capacity	: Up to 9999 (0 to 9999 or 9999 to 0)	
5.2.27	Functional blocks	: Readymade library for ease of engineering	
5.2.28	Faceplate to appear on trend display on call	: Required	
5.2.29	Scrolling facility in the stored trend	: Required	
5.2.30	Trend pause, compress/expand 'x' & y axis	: Required	
5.2.31	History storage	: Required for all process parameters, all process/system alarms, operator action, upsets, changes etc.. 100GB storage capacity for history storage Sampling rates shall be user selectable	
5.2.32	Search feature on alarm, history, operator action etc..	: Required	
5.2.33	Connected with	: Engineering Station <input checked="" type="checkbox"/> Operating Station Network <input checked="" type="checkbox"/> Other <input type="checkbox"/>	
5.2.34	HMI Compatible with	: OPC/ UA	
6.0	ETHERNET SWITCH (LAYER-2)		
6.1	Bidder shall submit Ethernet switch – Layer – 2 & Layer – 3 level configurations for Grouping of different controllers,	: *	

Sr. No.	Description		Bidder to state/confirm
	HMI's		
6.2	Type	: Industrial Grade, Manageable, Layer-2 Fast Ethernet switches, with at-least 2 Fibre Optic Port	
6.3	Make	: As per Approve make list	
6.4	Model No.	: *	
6.5	Number of Ports	: Min. 8 ports (10/100 Mbps) full duplex electrical ports and 2 uplink ports (FO) (1Gbps).	
6.6	Auto sensing & Auto-negotiating ports	: Required	
6.7	SNMP management features	: Required	
6.8	Power	: 230V AC, UPS required.	
6.9	Diagnostics	: LEDs for Power, duplex mode indication, flow control activation, collision indication (when working in half duplex), CRC indication	
6.10	Security	: Port Security	
6.11	Quality of Services (QOS)	: Required	
6.12	Spanning tree protocol	: Required	
6.13	1 No. Licensed copy of management software	: Required of the same make as the Ethernet switches	
6.14	Type of communication on LAN	: Ethernet, IEEE 802.3 u	
6.15	Communication Protocol for LAN	: TCP/IP	
6.16	Virtual LAN capability	: Required	
6.17	Operating Temperature	: Up to +60° C ambient	
6.18	Quantity	: * Nos. 1 No. to be provided separately.	
7.0	FIBRE OPTIC CONVERTERS		
	INTEGRAL TO NETWORK SWITCH WITH LIU & FO PATCH CORDS AS REQUIRED		
8.0	INPUT/OUTPUT SYSTEM		
8.1	I / O series (model No.)	: Bidder shall offer IO module series that are latest & best suitable for the offered controller. Subjected to Purchaser's approval.	
8.2	Signal isolation for all I/Os	: Optical or galvanic	
8.3	Individual fuse for each I/O point	: Required, Fused Terminals shall be provided.	
8.4	Module failure indication in module and PLC	: Required	
8.5	Indication and alarm in PLC for	: Required	

Sr. No.	Description		Bidder to state/confirm
	module failure		
8.6	Channel – to –channel isolation	: Required for each input & output modules	
8.7	Chanel to back plane isolation	: Required	
8.8	Fault status of each channel of each input/output module	: Required for monitoring on MMI	
8.8.1	Intrinsic safe barrier for instruments located in Hazardous area	: Required	
8.8.2	Type of isolation	: Optical/Galvanic	
8.8.3	Support HART Protocol to carry out all diagnosis & calibration	: Required	
8.8.4	Concept of I/O grouping	: a) No two identical/ similar equipment shall be grouped in the same I/O module. b) I/Os related to equipment and I/Os related to its associated auxiliaries shall be connected to different modules. c) Inputs and outputs shall not be combined in a single module. d) I/O modules of one equipment and associated auxiliaries to be located in the same controller.	
8.9	Analog input module		
8.9.1	Model No.	: * (Same series as that of Controller)	
8.9.2	No. of points/module	: 4 / 6 / 8	
8.9.3	Type of inputs	: 4-20mA HART, either 2 wire with loop power for 2 wire transmitter or 4 wire system	
8.9.4	Transmitter monitoring for wire break, live zero	: Required.	
8.9.5	Monitoring of signal out of range for analog inputs	: Required.	
8.9.6	Accuracy	: $\pm 0.1\%$ of full scale	
8.9.7	Resolution	: 12 bit including sign	
8.9.8	HART protocol support	: Required	
8.9.9	Intrinsic safe barrier for instruments located in Hazardous area	: Required	
8.9.10	Type of isolation	: Optical/Galvanic	

Sr. No.	Description	Bidder to state/confirm
8.9.11	Support HART Protocol to carry out all diagnosis & calibration	: Required
8.10	Analog output module	
8.10.1	Model No.	: * (Same series as that of Controller)
8.10.2	No. of points per module	: 4 / 6 / 8
8.10.3	Type of outputs	: 4-20mA
8.10.4	Resolution	: 12 bit including sign
8.10.5	Accuracy	: $\pm 0.1\%$ of full scale
8.10.6	Intrinsic safe barrier for instruments located in Hazardous area	: Required
8.10.7	Type of isolation	: Optical/Galvanic
8.10.8	Support HART Protocol to carry out all diagnosis & calibration	: Required
8.11	Digital input module	
8.11.1	Model No.	: * (Same series as that of Controller)
8.11.2	No. of inputs / module	: 16 / 32
8.11.3	Type of input	: Potential free contacts
8.11.4	Type of isolation	: Optical
8.11.5	LED status indication for each input	: Required
8.11.6	Interrogation voltage	: External 24V DC
8.11.7	Filtering at input stage	: Required
8.12	Digital output module	
8.12.1	Model No.	: * (Same series as that of Controller)
8.12.2	No. of outputs per module	: 16
8.12.3	Type of outputs	: Relay outputs (TTL outputs not acceptable)
8.12.4	Output contact rating of interposing relays	: 2A, 220 V DC for Breaker operated drives and 5A, 230V AC for rest application (2CO for each relay)
8.12.5	Discrete relays/relay boards	: Relays mounted on relay boards to be provided (maximum of 8 in a board).
8.12.6	LED status indication for each output	: Required.
8.12.7	Output Status	: Outputs shall change to fail-safe position in case processor failure or module failure.
8.12.8	Power Supply	: *
8.12.9	Interface Module	: *
8.13	I/O Summary	
8.13.1	Analog inputs (4-20mA)	: Refer 'Section 2 – Process
8.13.2	Analog outputs (4-20mA)	: Narrative' & 'Section 3 –

Sr. No.	Description		Bidder to state/confirm
8.13.3	Digital inputs (24V DC)	: Automation System'	
8.13.4	Digital outputs (potential free)	:	
9.0	APPLICATION PROGRAMME : To be provided in R/W DVDs (2 Nos.).		
10.0	PROGRAMMING UNIT (LAPTOP)		
10.1	Make	: Toshiba/Dell/HP/IBM (Lenovo)	
10.2	Quantity	: 1 No.	
10.3	CPU	: Core i7 or better	
10.4	CPU speed	: Dual core 2.5 G Hz or higher clock speed.	
10.5	DDR RAM	: 8 GB or better as per availability in market	
10.6	Cache memory	: minimum 6 MB	
10.7	Hard disk & (SSD)	: 2 TB & (256 GB or higher)	
10.8	Combo drive	: DVD/CD RW Combo drive	
10.9	VDU	: 17 inch colour, Full HD LED display	
10.10	Integrated	: 10/100 Mbps Ethernet LAN interface card IEEE 802.3 u, 802.11 b wireless Ethernet.	
10.11	Additional Communication ports	: minimum One parallel, One serial (RS 232), Two USB ports and One USB Type C port	
10.12	Mouse	: Optical mouse	
10.13	Power supply	: Universal AC adapter: 100 to 240V AC (50 Hz) input; rechargeable lithium-ion battery with up to 4 hour run time, up to 7 hour total run time with primary and secondary batteries, fast battery recharge, low-battery warning	
10.14	Any other features	: All standard features available on a laptop	
10.15	Minimum accessories to be provided		
A	Carry case	: Required.	
B	Battery adapter	: Required.	
C	Power chord	: Required.	
D	LAN cable with connectors	: Required.	
E	All cables & accessories required for connecting to PLCs/MMIs/ Ethernet switches		

Sr. No.	Description		Bidder to state/confirm
11.0	FACTORY ACCEPTANCE TEST		
11.1	FAT procedure shall be submitted for Purchaser's approval before commencement of FAT	: Required	
11.2	A 100% integrated system simulation test shall be carried out in the shop to test all the hardware and software including all communication links to third party systems	: Required.	
11.3	PURCHASER /CONSULTANT's representative shall participate in the FAT at works, prior to dispatch	: Required.	
11.4	FAT shall be carried out as per final approved drawings / documents	: Required.	
11.5	Various tests to be covered in FAT shall be as per FAT procedure	: Required.	
11.6	VENDOR should have performed all standard basic functional tests prior to start of FAT	: Required.	
11.7	Throughout the FAT supply all necessary test equipment and consumable	: Required.	
11.8	VENDOR shall be responsible for making all connections between system components, peripherals and test equipment, including foreign device interfaces	: Required.	
11.9	Supply software and hardware technical support of sufficient standard to ensure mal delays during the interface-testing program	: Required.	
11.10	Calibration certificates traceable to National/ international Standards for test instruments used during inspection	: Required.	
12.0	SITE ACCEPTANCE TEST (SAT)		
12.1	Close loop checking, Open Loop and Interlock checking	:	

Sr. No.	Description		Bidder to state/confirm
12.2	System loading (CPU, bus & memory) after commissioning	:	
12.3	Control Loop update time	:	
12.4	Screen update time	:	
12.5	VENDOR shall submit a SAT Procedure for PURCHASER/ Consultant's review. The final SAT shall be carried out on the basis of this approved document	:	
13.0	DOCUMENTS		
13.1	Following documents to be furnished by BIDDER along with the bids		
13.2	System architecture/Configuration drawing indicating redundancy at all levels and all hardware components	:	
13.3	System-wise Bill of Material (BOM).	:	
13.4	Catalogues of all products listed in the BOM	:	
13.5	System-wise Power distribution & power consumption	:	
13.6	Number and size of each panel offered	:	
13.7	List of Deviations	:	
13.8	Delivery Schedule	:	
13.9	Data duly filled in the data sheets enclosed with entire data sheet stamped & signed	:	
13.10	Mandatory spare parts list	:	
13.11	Recommended spare part list	:	
13.12	Control Room Layout	:	
13.13	Following drawings / documents to be furnished by BIDDER after award of contract		
13.14	Bar chart for the design, manufacturing, erection, commissioning, trial operation and performance testing of the system offered.	:	
13.15	Overall System Architecture	:	
13.16	System Functional Write-up	:	
13.17	Unpriced purchase order copy for various bought out /sub contracted equipment / services	:	
13.18	Following drawings for PLC System Cabinets, I/O racks,	:	

Sr. No.	Description	Bidder to state/confirm
	Marshalling cabinets, Control desks & Power distribution boards	
a)	Front facia layout showing all instruments with cut-outs, bezel dimensions, construction details, foundation details and interior G.A. drawings showing interior layout of various modules on racks	
b)	Internal wiring diagrams indicating termination details of each component.	
c)	Bill of Material (B.O.M.) indicating tag no., quantity, service & model no. of the various instruments/items.	
13.19	Power Supply Distribution Scheme for the entire I&C system indicating quantity of feeders and type & rating of each feeder in each PDB	
14.0	Following drawings/ documents for PLC system	
a)	Configuration drawing	
b)	Make Model No., Catalogues, Data sheets for CPU modules, I/O modules, Communication modules and all other modules of the PLC system and engineering stations	
c)	I/O list indicating grouping of various signals in each module (I/O assignment).	
d)	Sequence & logic diagrams and control schemes	
e)	Operating manual for PLC system	
f)	Hardware and software manuals	
g)	Configuration data	
h)	Trouble shooting manual	
i)	Arrangement of cabinets with dimensions	
j)	Software Installation List	
14.1	Following drawings for Operator Stations:	
a)	Data sheets of hardware	

Sr. No.	Description	Bidder to state/confirm
	including communication protocol details	
b)	Catalogues	
c)	Screen Layout	
d)	Log sheets & report sheets	
e)	Control Schemes for Operator Stations	
f)	Details of Software Package in the Operator Stations indicating various functions & facilities available	
14.2	Data sheets & details of software packages for Engineering Station and Asset Management System / Alarm management system.	
14.3	Heat load and Power consumption for AC & DC loads	
14.4	Data sheet and load calculations for DC power supply units	
14.5	Data sheets for Ethernet switches	
14.6	QAPs for all items like panels, control desks, junction boxes, cables	
14.7	Earthing diagrams for cabinet & entire system	
14.8	Loop diagrams, Cable Schedules and Interconnection cable schedules.	
14.9	Standard FAT & SAT for the specified systems	
14.10	Detailed instruction manual for the entire PLC (operation & maintenance)	
14.11	'As Built' drawings	
14.12	Instruction manual for installation and start-up.	
14.13	System operation and maintenance manual	
14.14	Protocol listing (hard and soft) copies	
16.15	Guarantee certificate	
16.16	Copy of licenses for various software to be supplied	

Sr. No.	Description	Bidder to state/confirm
15.0	The product warranty must include following points:	
a)	DLP for PLC and SCADA (comprehensive, preventive and break down maintenance inclusive all type of spares and software) shall be applicable for 36 months similar to the contract conditions. Bidder to select PLC & SCADA system from preferred Vendor who provides product support warranty up to 10 years.	

Note: ‘ * ’ denotes data/ details to be provided by bidder.

Uninterruptable Power Supply (UPS) (Quantity: 1 Nos.) Data Sheet No. IC12

Sr. No.	Description	Required	Proposed by Bidder
1	Input Voltage	230V \pm 10V AC, 50Hz \pm 5% Single Phase (3 wire)	
2	Output Voltage	230V \pm 10V AC, 50Hz \pm 5% Single Phase (3 wire)	
3	UPS Rating	True online redundant UPS 5 kVA rating	
4	Over load Capacity	125% for 10min 150% for 10Sec	
5	Isolation	True on line with complete galvanic Isolation	
6	Total harmonic Distortion	< 2% for linear load, < 3% for non-linear load	
7	Duty	Continuous	
8	Max Ambient Temp and Relative Humidity	45°C & 100%	
9	Cooling	Forced air	
10	Battery backup	120 min for full load.	
11	Degree of protection	IP42	
12	Hardwired status signals to PLC	Healthy Fault Incomer failure	
13	Soft communication link	RS-232 Modbus	

UPS ACDB (Quantity: As required but minimum 4 Nos.)**Sheet No. IC13**

Sr. No.	Description	Required	Proposed by Bidder
1	Mounting	Wall/ column	
2	No. of incomers	01 No. @ 32A MCB	
3	No. of outgoing feeders	08 Nos. @ 3A MCB	
4	Components mounting	DIN rail	
5	Terminal type	Screwed	
6	Terminal size	Suitable for 4.0 sq. mm. wire	
7	Mounting plate	Required	
8	Cable entry	Bottom	
9	Gland plate	Removable	
10	Door	Single lockable door with Gasket	
11	Lock & key	Required	
12	Sheet thickness	3 mm	
13	Painting	Inside: glossy white; Outside: RAL 7032	
14	Protection class	Weather proof to IP65	
15	Enclosure	MS with epoxy painting	
16	Gasket	Neoprene	
17	Cable entry sealing	Fire proof compound	
18	Name plate/ metal tag	Fixed SS304	
19	Installation hardware	Required	

Instrumentation and Control Cables (Quantity: as per BOQ) Data Sheet No. IC14**A. Power Cable for 24V DC**

Sr. No.	Description	Required	Proposed by Bidder
1	Type	NA	
2	Voltage grade	1100V	
3	Conductor Material	Annealed Tinned Copper as per IEC 60288	
4	Shape of conductor	Stranded circular-Class 2	
5	Conductor Size	2.5 sq.mm.	
6	No. of strands	7 nos.	
7	Primary Insulation Material	XLPE as per IEC 60502-1	
8	Thickness of insulation (Nominal)	As per IEC 60502-1	
9	Primary Insulation colour	Red, Yellow, Blue	
10	Individual pair twist	NA	
11	Individual pair Identification	NA	
12	Individual pair screening Material	NA	
13	Individual pair screening Tape thickness	NA	
14	Individual pair screening Overlap/coverage	NA	
15	Individual pair screening Polyester tape	NA	
16	Individual pair screening Drain Wire size	NA	
17	Individual pair screening Drain Material	NA	
18	Overall Screening Material	NA	
19	Overall Screening Tape thickness	NA	
20	Overall Screening Overlap/coverage	NA	
21	Drain Wire size	NA	
22	Drain Wire Material	NA	

B. Control cable

Sr. No.	Description	Required	Proposed by Bidder
1	Type	Screened, Armoured	
2	Voltage grade	1100V	
3	Conductor Material	Annealed Tinned Copper as per IEC 60288	
4	Shape of conductor	Stranded circular-Class 2	
5	Conductor Size	4.0 sq.mm., 2.5 sq.mm.	
6	No. of strands	7 nos.	
7	Primary Insulation Material	XLPE as per IEC 60502-1	
8	Thickness of insulation (Nominal)	As per IEC 60502-1	
9	Primary Insulation colour	Grey	
10	Individual pair twist	NA	
11	Individual pair Identification	NA	
12	Individual pair screening Material	NA	
13	Individual pair screening Tape thickness	NA	
14	Individual pair screening Overlap/coverage	NA	
15	Individual pair screening Polyester tape	NA	
16	Individual pair screening Drain Wire size	NA	
17	Individual pair screening Drain Material	NA	
18	Overall Screening Material	AL Mylar tape applied helically with metallic side down in contact with drain wire	
19	Overall Screening Tape thickness	Min. 0.075mm	
20	Overall Screening Overlap/coverage	Min. 25% / 100%	
21	Drain Wire size	0.5 sq.mm. with 7 strands, each of 0.3mm dia.	

Sr. No.	Description	Required	Proposed by Bidder
22	Drain Wire Material	Annealed Tinned Copper	

C. Signal cable

Sr. No.	Description	Required	Proposed by Bidder
1	Type	Twisted, Screened, Armoured	
2	Voltage grade	500V	
3	Conductor Material	Annealed Tinned Copper as per BSEN-50288-7	
4	Shape of conductor	Stranded circular-Class 2	
5	Conductor Size	1.0 sq.mm.	
6	No. of strands	7 nos.	
7	Primary Insulation Material	Extruded Polyethylene (PE) as per BS-EN 50290-2	
8	Thickness of insulation (Nominal)	As per BSEN-50288-7	
9	Primary Insulation colour	White +ve Black -ve (for each pair)	
10	Individual pair twist	Min. 10 nos. twist / meter for each pair	
11	Individual pair Identification	Numbers at not more than 250mm length	
12	Individual pair screening Material	AL Mylar tape applied helically with metallic side down in contact with drain wire	
13	Individual pair screening Tape thickness	Min. 0.075mm thick for single pair cables. Min. 0.05mm thick for multipair cables.	
14	Individual pair screening Overlap/coverage	Min. 25% / 100%	
15	Individual pair screening Polyester tape	Polyester tape of 0.05mm thick each. One tapes with min. 25% overlap and 100% coverage	
16	Individual pair screening	0.5sq.mm., with 7	

Sr. No.	Description	Required	Proposed by Bidder
	Drain Wire size	strands, each of 0.3mm dia.	
17	Individual pair screening Drain Wire material	Annealed Tinned Copper	
18	Overall Screening Material	AL Mylar tape applied helically with metallic side down in contact with drain wire	
19	Overall Screening Tape thickness	Min. 0.075mm	
20	Overall Screening Overlap/coverage	Min. 25% / 100%	
21	Drain Wire size	0.5 sq.mm. with 7 strands, each of 0.3mm dia.	
22	Drain Wire Material	Annealed Tinned Copper	

D. Triad cable

Sr. No.	Description	Required	Proposed by Bidder
1	Type	Twisted, Screened, Armoured	
2	Voltage grade	500V	
3	Conductor Material	Annealed Tinned Copper as per BSEN-50288-7	
4	Shape of conductor	Stranded circular-Class 2	
5	Conductor Size	1.0 sq.mm.	
6	No. of strands	7 nos.	
7	Primary Insulation Material	Extruded Polyethylene (PE) as per BS-EN 50290-2	
8	Thickness of insulation (Nominal)	As per BSEN-50288-7	
9	Primary Insulation colour	Brown, Black and Blue	
10	Individual pair twist	Min. 10 nos. twist / meter for each pair	
11	Individual pair Identification	Numbers at not more than 250mm length	

Sr. No.	Description	Required	Proposed by Bidder
12	Individual pair screening Material	AL Mylar tape applied helically with metallic side down in contact with drain wire	
13	Individual pair screening Tape thickness	Min. 0.075mm thick for single pair cables. Min. 0.05mm thick for multipair cables.	
14	Individual pair screening Overlap/coverage	Min. 25% / 100%	
15	Individual pair screening Polyester tape	Polyester tape of 0.05mm thick each. One tapes with min. 25% overlap and 100% coverage	
16	Individual pair screening Drain Wire size	0.5sq.mm., with 7 strands, each of 0.3mm dia.	
17	Individual pair screening Drain Wire material	Annealed Tinned Copper	
18	Overall Screening Material	AL Mylar tape applied helically with metallic side down in contact with drain wire	
19	Overall Screening Tape thickness	Min. 0.075mm	
20	Overall Screening Overlap/coverage	Min. 25% / 100%	
21	Drain Wire size	0.5 sq.mm. with 7 strands, each of 0.3mm dia.	
22	Drain Wire Material	Annealed Tinned Copper	

Notes:

1. Bidder shall submit instrument manufacturer's catalog along with his Bid.
2. Bidder to note that the no. of PLC inputs and outputs indicated in this schedule shall not be used for evaluation purpose and it is Bidder's responsibility to provide the necessary no. of inputs and outputs to meet the functional requirements of the system.
3. The drawings/documents indicated below shall be submitted by the Bidder along with the Bid.
 - (a) P&I Diagrams.
 - (b) Front facia layout of Instrument Control Panel along with overall dimensions.
 - (c) Preliminary System Configuration drawing for Instrumentation, SCADA and Communication Systems.
 - (d) PLC bill of material.
 - (e) PLC Input / Output list.

SCHEDULE - E

(Ref.: Volume I – Instructions to Tenderers and General Conditions of Contract,
4. Instructions to Tenderers, Clause 12)

ANNUAL TURNOVER

Name of Bidder _____

Bidders are requested to complete the information in this form. The information supplied should be the annual turnover of the bidder in terms of the amounts billed to clients for each year for work in progress or completed.

Bidders should not enclose testimonials, certificates and publicity material with their applications; these will not be taken into account in the evaluation of qualifications.

Annual Turnover Data

	Year*	Turnover ** (Rs.)
1.	2020-21	_____
2.	2019-20	_____
3.	2018-19	_____
4.	2017-18	_____

* The last 3 years applicable for a bidder who has the 2020-21 financial statements ready as per the tender requirements shall be from 2018-19 to 2020-21. For others, the 3 years applicable shall be considered as 2017-18 to 2019-20.

** Furnish reference to financial statements referred in Schedule - E

Seal of the Company

Signature of Bidder:

Designated:

Date:

SCHEDULE - F

(Ref.: Volume I – Instructions to Tenderers and General Conditions of Contract, 4. Instructions to Tenderers, Clause 12)

EXPERIENCE**1. Work performed as a prime Contractor on works of a similar nature over the last ten years:**

Project Name	Name and Address of Employer	Description of work	Value of Contract (Rs.)	Date of Issue of work order	Stipulated Period of completion	Actual Date of completion	Remarks Explaining Reasons for delays and work completed	Name, Designation and address of Client's official to be contacted for references

Seal of the Company:

Signature of Bidder:

Designation:

Date:

2. Details of works in hand and works bid for as on date of submission of bid:

Sr. No.	Name of Work	Place	Works in Hand			Works Bid for		
			Bid Cost	Cost of Work remaining to be executed	Anticipated Date of Completion	Estimated Cost	Date when Decision is expected	Stipulated Date and Period of Completion

Seal of the Company:

Signature of Bidder:

Designated:

Date:

SCHEDULE – G

(Volume IV Schedules - Ref.: Mechanical Table ME-01 – Dry Pit submersible pump set)

PUMP MANUFACTURER'S EXPERIENCE

1. Pump manufacturer who has manufactured, supplied and commissioned minimum 2 nos. of pumps having minimum 300 kW HT pump in one sewage/water pumping station or in one sewage/water lifting pumphouse in STP in last ten years:

Project Name	Name and Address of Employer	Description of work	Value of Contract (Rs.)	Date of Issue of work order	Stipulated Period of completion	Actual Date of completion	Remarks Explaining Reasons for delays and work completed	Name, Designation and address of Client's official to be contacted for references

Seal of the Company:

Signature of Bidder:

Designation:

Date:

SCHEDULE – H

(Ref: Volume III - Description of Works & Technical Specifications– Civil Section 01021-Clause No. 2.1.502)

PIPE FABRICATION CONTRACTOR’S EXPERIENCE

1. The fabrication contractor shall have successfully carried out fabrication of 900mm diameter or higher size pipes, specials of similar size, the total length of pipeline shall not be less than 500 meters. Such work shall be completed after 01-01-2011. The factory shall be ISO certified.
2. Bidder shall submit necessary certificate in support of this performance from the end user who shall be necessarily be government/semi government/PSUs/Urban Local bodies.

Project Name	Name and Address of Employer	Description of work	Total length in meters	Date of Issue of work order	Stipulated Period of completion	Actual Date of completion	Remarks Explaining Reasons for delays and work completed	Name, Designation and address of Client’s official to be contacted for references

Seal of the Company:

Signature of Bidder:

Designation:

Date:

SCHEDULE – H (contd.)

(Ref: Volume III - Description of Works & Technical Specifications –Civil Section 01021– Clause No. 2.1.502)

PIPE FABRICATION CONTRACTOR’S EXPERIENCE**2. The factory shall be equipped with adequate number of following equipment’s and plant but not restricted to:**

1. Plate bending machines for rolling of pipe drums.
2. Automatic welding machines (suitable for circumferential as well as longitudinal welding).
3. Hydraulic Testing Machines.
4. Travelling gantry or crane of capacity 10 Tons or above.
5. Mobile cranes for loading/unloading of plates, pipes etc..15 tons capacity each.
6. Lathe for machining of the flange’s rings, plates etc..
7. Equipment for sand blasting and applying paint by spray gun.
8. Equipment for cold pressing of plates up to 25 mm thick to the required curvature (domes, plug plates, M.H. cover etc..)
9. Any other, considered necessary for carrying out the work covered in scope.
10. The factory shall have adequate area and shall also have stacking yard for the stacking of plates, structures, fabricated pipes etc.. and the scrap.

The Bidder should elaborate and submit information on above existing fabrication equipment’s & facilities in a tabular format and shall furnish with his bid the Undertaking where he intends to get the fabrication done, such as its location and the equipment, plant and other facilities available in the factory for the manufacture of Pipes, Liners and Specials required under this contract.

***Note:** BMC reserves the right to visit & inspect above fabrication facilities / establishment at any time during tender evaluation/ execution of the Contract.

Seal of the Company:

Signature of Bidder:

Designation:

Date:

SCHEDULE - I

(Ref.: Volume I – Instructions to Tenderers and General Conditions of Contract, 4. Instructions to Tenderers, Clause 13)

DETAILS OF SITE MANAGEMENT & TECHNICAL PERSONNEL

Sr. No.	Description of Category	Name	Qualification	Professional Experience & details of works carried out	Since how long in service with Bidder	Remarks
1.						
2.						

Seal of the Company:

Signature of Bidder:

Designated:

Date:

SCHEDULE - J

(Ref.: Volume I – Instructions to Tenderers and General Conditions of Contract,
4. Instructions to Tenderers, Clause 12)

FINANCIAL STANDING OF BIDDER

Name of Bidder

Bidders should provide financial information to demonstrate that they meet the requirements stated in the Instructions to Bidders. Bidders must fill this form. A copy of the audited balance sheets should be attached.

1. Name _____ of _____ Banker

2. Banker's _____ Address

Tel _____ Fax _____ Telex _____

3. Contact name and title

(Provide the same

information for other

bankers in a separate sheet)

Summary of Assets and Liabilities for the last three years*:

	2017 - 18	2018 – 19	2019-20	2020-21
1. Total Assets				
2. Current Assets				
3. Total Liabilities				
4. Current Liabilities				
5. Profits before taxes				
6. Profits after taxes				

* The last 3 years applicable for a bidder who has the 2020-21 financial statements ready as per the tender requirements shall be from 2018-19 to 2020-21. For others, the 3 years applicable shall be considered as 2017-18 to 2019-20

Projected Summary of Assets and Liabilities converted into Indian Rupees based on known commitments for the next two years:

	2021 – 22	2022 – 23
1. Total Assets		
2. Current Assets		
3. Total Liabilities		
4. Current Liabilities		
5. Profits before taxes		
6. Profits after taxes		

Attach audited financial statements, Balance Sheets and Auditor's Reports for the last five years.

Seal of the Company:

Signature of Bidder:

Designated:

Date:

SCHEDULE – K

(Ref.: Volume I – Instructions to Tenderers and General Conditions of Contract,
4. Instructions to Tenderers, Clause 12)

LITIGATION HISTORY

Name of Bidder

Bidder should provide information on any history of litigation or arbitration resulting from Contracts executed in the last five years or currently under execution.

Other Parties	Cause of Dispute	Amount Involved
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Seal of the Company:

Signature of Bidder:

Designated:

Date:

SCHEDULE L**DEVIATIONS FROM SPECIFICATIONS**

_(Ref: Volume I – Instructions to Tenderers and General Conditions of Contract,
2.Special Instructions to Bidders for e-Tendering, Clause 15 (l))

The Bidder shall state any deviations from the Tender specifications contained in his main offer. Irrespective of references to deviations made in covering letter/ correspondence/ drawings/ catalogues, the Bidder shall list separately all deviations in this schedule. Except for deviations brought out specifically in this schedule, it will be taken that there are no other deviations and the supply of equipment / system and execution of Contract will be completely in accordance with this specification and this interpretation shall be binding on Contractor. For each deviation described below, the Bidder shall indicate in this schedule, the + / - implication to the total bid price for withdrawal of the deviation.

Bidder shall note that no deviations shall be permitted in General / Special Conditions of Contract. If the Bidder takes deviations to the General / Special Conditions of Contract, the Bid will be rejected.

ITEM (or clause)	DEVIATION
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	SIGNATURE	:	
	DATE	:	
	NAME	:	
SEAL OF THE COMPANY	DESIGNATION	:	

SCHEDULE - M**SCHEDULE OF GUARANTEES**

Item No. duty	Description	Unit	Guaranteed
(I)	<u>GUARANTEE FOR PUMPSETS</u>		
1.0	Duty point Capacity	MLD	
2.0	Duty Point Head	MWC	
3.0	Water kW	kW	
4.0	Pump Efficiency at duty point	%	
5.0	Power input to pump at duty point	kW	
6.0	Motor efficiency (corresponding to power input to pump at pump duty point)	%	
7.0	Power input to motor at pump duty point	kW	
8.0	Specific Power Consumption KW/WHP (in kW) (based on 7 and 3)		
9.0	Rated speed	RPM	
10.0	NPSH required	MWC	
11.0	Maximum velocity of vibration (a) Within range of +10% of rated flow (b) Shut off to maximum flow (excluding the range in (a) above.)	mm/sec.	
12.0	Noise level inside pumping station with 4 consecutive pumpsets running simultaneously	dBA.	

Item No. duty	Description	Unit	Guaranteed
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In accordance with pump specification we guarantee that the performance of each pumps shall comply with the figures given above. We confirm that the pump motor efficiency are guaranteed without any negative tolerance whatsoever.

We further guarantee that the pumps will operate satisfactorily in parallel throughout the operating range.

Notes for Pumpsets:

1. Water Kilo Watts (WKW) shall be computed as follows:

$$W = \frac{\text{Rated flow (Mld)} \times \text{Total head (MWC)}}{8.8128}$$

(II) **GUARANTEE FOR 800 KVA & 6.3 MVA TRANSFORMER**

1.0	Voltage ratio at no load	
2.0	Impedance voltage	%
3.0	No load loss	kW
4.0	Load loss	kW

Notes for Transformers:

1. Tolerance limits, if any, on each of the above, shall be indicated separately against each items. In case of inconsistency, values indicated here shall supersede those indicated elsewhere.
2. If tolerance limits are not indicated by the Bidder, the values indicated against relevant items, shall be taken as guaranteed values without any tolerance.

We guarantee that the performance of each transformer shall comply with the figures given above.

Signed _____ Date _____

Authorised to sign for and on behalf of _____

Sr.no. 14

SCHEDULE - N

NOT USED

Sr.no.15

SCHEDULE - O

SCHEDULE OF TOOLS AND TEST EQUIPMENT

SCHEDULE - O**TOOLS AND TEST EQUIPMENT****MECHANICAL**

Sr No	Description	Unit	Quantity	CIF-Site Unit Rate inclusive of Custom Duty & GST	CIF-Site Total Amount inclusive of Custom Duty & GST	Make
1	Double open ended spanners covering entire range	sets	2			
2	Box spanners range	set	1			
3	Ring spanner range	set	1			
4	Single open ended spanner	set	1			
5	Allen key spanner 1.5 mm to 16 mm covering entire range	sets	2			
6	Pipe wrenches	set	1			
7	Pipe die set	set	1			
8	Ratchet die set	set	1			
9	Torque wrenches	set	1			
10	Wheel grinding machine with grinding wheels - 6 nos.	set	1			
11	Sander Disc machine with Sander Discs - Rough and smooth each	set	1			
12	Dial gauge 0.01 mm accuracy with magnetic base	sets	2			
13	Feeler gauges	set	1			
14	Thread gauges	set	1			
15	Precision square level 0.02 mm/metro for verticality checks	no.	1			
16	Ultrasonic thickness detector	set	1			
17	Portable vibration tester	set	1			
18	One set of tube cutter for tubes upto 12 mm	set	1			
19	Precision sound level meter	set	1			
20	Digital tachometer	no.	1			
21	Digital pressure transducer	nos.	2			
22	Grease guns	nos.	2			
23	Coupling puller suitable for main drive couplings	set	1			
24	Portable coating thickness measurement instrument	no	1			
25	Telescopic trolley mounted aluminium frame ladders suitable for maintenance of roadway lighting fixture at 10 mtr height.	no	1			

ELECTRICAL

Sr No	Description	Unit	Quantity	CIF-Site Unit Rate inclusive of Custom Duty & GST	CIF-Site Total Amount inclusive of Custom Duty & GST	Make
1	Multimeter	Nos.	2			
2	Voltage tester	Nos.	1			
3	Wire strippers	Nos.	1			
4	Circuit finder	Nos.	1			
5	Screwdrivers and nut drivers	Nos.	1			
6	Pliers	Nos.	1			
7	Fish tape	Nos.	1			
8	Tape measure	Nos.	1			
9	Hammer	Nos.	1			
10	Level	Nos.	1			
11	Torch	Nos.	1			
12	Utility knife	Nos.	1			
13	Allen wrench set (hex set)	Set	1			

Note:

Supply of Tools and Test equipment as per list above shall be supplied. The prices of these tools and test equipment will be considered for evaluation. **The duly filled & signed scan copy of the same shall be submitted in Folder 'C'**. Hard copies shall not be submitted.

Sr.no.16

SCHEDULE - P

CIVIL SCOPE OF WORK

SCHEDULE - P**CIVIL SCOPE OF WORK**

Section 1- Refurbishment of IPS Building			
Sr. No.	Description	Unit	Quantity
	Removing cement plaster of any finish from the wall, complete with racking out the joints to a depth of 20 mm.	Sqm	6615
A1			
	Chipping /removing loose concrete up to reinforcement bars, without damaging the reinforcement, removing all the loose materials and to make all the exposed surfaces free from oil, dust and all impurities etc.. complete.	Sqm	1831
A2			
	Surface Preparation: Chipping off and removing loose concrete from damaged concrete portion of columns, beams & slabs etc. manually by using chisel and low impact hammer, breaker to expose the sound concrete. Use the portable air blowers to make the surface free from loose material, dirt etc..	sqm	562
A2-A			
	Providing and fixing in vertical position telescopic M.S. prop under deflected beam/lintel/slab/chajjas by using teak wood battens of size 1000 x 80 x 80 for packing between prop plate and the beam/lintel/slab/chajjas bottom surface as per the directions of engineer- in-charge.	Nos	1226.00
A3			
	Demolishing cement concrete manually/ by mechanical means including disposal of unserviceable material within premises at a suitable stacking location at ground level including all lead & lifts as per direction of Engineer-in-charge without disturbing the other structural elements.	Cum	48
B4			

Section 1- Refurbishment of IPS Building			
Sr. No.	Description	Unit	Quantity
	Demolishing brick work in lime or cement mortar including plaster, paint, etc. manually/ by mechanical means including stacking of serviceable material and disposal of unserviceable material within 50 meters lead as per direction of Engineer-in-charge.	Cum	22
B5			
	Removing or destroying plants etc. growing on walls, drainage pipes, destroying roots by applying approved weedicide & reinstating the wall surface by plaster to the damage surface of the building	Sqm	150
B6			
	Removing existing door or windows with frame and shutters and making good etc. to the existing surface.	Nos	62
B7			
	Dismantling steel work in built up sections in angles, tees, flats and channels of rolling shutters, grills, gates, fencing, hoardings, including all gusset plates, bolts, nuts, cutting rivets, welding etc.. including dismembering and stacking within 50metres lead.	Kg	23184
B7-A			
	Breaking and removing the water proofing layers of I. P. S. with bituminous joints and brick bat concrete over the existing terrace floor, chajja, top of headroom slab and canopy including cement vata and exposing R.C.C. slab top complete.	Sqm	128
B8			
	Dismantling C.I., UPVC and asbestos vent pipes and shaft, soil, waste, rain water pipe, mild steel, GI and asbestos gutters, ridge and hips with fittings and clamps including stacking the material within 50 meters lead : 100 mm dia pipe	Rmt	90
B9			

Section 1- Refurbishment of IPS Building			
Sr. No.	Description	Unit	Quantity
	Removing mosaic, cement marble, granites non-slippery, tandur, kotah, shahabad stone or Indian Pattern stone, glazed tiles in flooring and dado including bedding brick bat coba etc. and delivering materials in Ward Office and carting away unserviceable materials.	sqm	160
B10			
	Disposal of building rubbish / malba / similar unserviceable, dismantled or waste materials by mechanical means including loading, transporting, unloading to contractor identified dumping ground for all loads including all lifts involved	cum	404
B11			
	Application of Rust Converter: Providing & applying One coat of Alkaline Rust converting primer conforming to ASTM- B-117, to exposed existing rebars after removing & cleaning loose rust by wire brush and leave it for 6- 8 hours.	Sqm	1831
C12			
	Removing corrosion of steel reinforcement by mechanical means like wire brushing, chipping to remove loose rust and then applying rust removal solution by using brush application, leaving the surface for at least 15 to 30 minutes, then removing loose materials by scrubbing or with brush and applying polymer bond to the old concrete surface before applying Polymer mortar.	Sqm	1831
C13			
	Anti-Corrosive coating to exposed reinforcement: Providing & applying Two coats of Anti Corrosive protective coating (CBRI / CSIR technology) for reinforcement bars by brush. Sprinkle dry sand when second coat is tacky so as to get rough surface.	MT	7
C14			

Section 1- Refurbishment of IPS Building			
Sr. No.	Description	Unit	Quantity
	Application of Corrosion Inhibitor: Providing & applying One coat of Concrete Penetrating Corrosion Inhibitor (Surface applied) which works on Bipolar Inhibition Mechanism on entire concrete surface to be repaired by using brush or spray at 250 ml per Sq.Mt./Coat or as per manufacturer's specification and prior to application of first coat of anti corrosive coating to reinforcement.	Sqm	1831
C15			
	Providing Micro Concrete jacketing to walls or beams of thickness upto 75 mm using Polymer modified cement premixed quartz sand aggregate packed in bags of standard manufacture, for high early strength of 40 N/mm sq.cm of approved brand. The dry product is to be mixed with 12.5% water by weight, along with washed and poured into rigid form work moulds & tamped properly & cured for 3 days. [Payment is to be made by weight premixed of micro concrete product consumed as per site register	Kg	24170
C16	records. No extra payment shall be made for shuttering or any other material.		
	Providing and applying Polymer modified cement mortar of average thickness 15-20mm using Polymer in one or more layers in proportion 1:5:15 of Polymer Cement Quartz Sand as manufacturer's specifications in specific layers, curing the surface after 72 hours of application with wet gunny bags etc. and by finishing the surface with 12mm thick (1:3) Cement sand plaster.	Sqm	1136
C17			

Section 1- Refurbishment of IPS Building			
Sr. No.	Description	Unit	Quantity
	Providing and applying Polymer modified cement mortar of average thickness 30-40mm using Polymer in two layers in proportion 1:5:15 of Polymer Cement Quartz Sand as manufacturer's specifications in specific layers, curing the surface after 72 hours of application with wet gunny bags etc. and by finishing the surface with 12mm thick (1:3) Cement sand plaster.	Sqm	550
C18			
	Bond Coat: Providing & applying One coat of structural grade epoxy bond coat by brush conforming to ASTM-C-882-87 to the prepared concrete surface to be repaired / strengthened. This is applied prior to the application of polymer repair mortar / epoxy mortar / Micro concrete to have monolithic action between old concrete surface and new concrete surface.	Sqm	1831
C19			
	Shear Connectors: Make 10/12 mm dia holes using heavy duty electrically operated hammer drills in the concrete of RCC members to a depth of about 75 mm at 500 mm c/c or at suitable grid in zig-zag fashion, clean the holes using air jet and fix pre-fabricated 100 x 50 mm L- shape 8 mm dia rebar using Anti Corrosive protective coating so that 75 mm out of 100 mm is inserted inside the concrete and 25 mm remain outside along with 50 mm bend. The shear connectors are used to tie the additional reinforcement bars.	Nos	3648
C20			
	Additional Reinforcement: Cutting, bending and fixing in position steel reinforcement of specified/required sizes and shapes in the form of main rebars, stirrups & rings, distribution rebars etc., and tying them to shear connectors using GI binding wire. The additional rebars should be coated with TWO coats of Anti Corrosive protective coating & dry sand to be sprinkled on second coat.	M.T	9
C21			

Section 1- Refurbishment of IPS Building			
Sr. No.	Description	Unit	Quantity
	Injection Grouting of Super low Viscosity Epoxy Grout System: Pressure grouting Super low viscosity epoxy resin using injector till nozzles refused to accept the grout under pressure of 3-4 Kg/cm ² . Grout the material through pre-fixed nozzles in the structural elements and subsequently cutting /removal of nozzles and sealing of holes with putty Monitor the leakages through other nozzles while grouting and seal them as per the requirement.	Cum	0.4
C22			
	Providing and laying in position plain cement concrete of specified grade cement with trap/granite/quartzite/gneiss metal mixing in concrete mixer including bailing out water, compacting, finishing surface, curing and including the cost of centering and shuttering at all level : Nominal Mix of 1:2:4 (1 cement OPC: 2 coarse sand : 4 graded stone aggregate 20 mm nominal size)	Cum	10
D23			
	Brick work with common burnt clay modular bricks of class designation 3.5 and above in superstructure above plinth level upto floor five level in all shapes and sizes in : Cement mortar 1:4 (1 cement : 4 coarse sand)	Cum.	10
D24			
	Providing and applying 12 mm thick internal plaster with neeru finish by using ready-mix mortar as per manufacturers recommendations at all heights and locations for masonry (except stone masonry) and concrete surfaces including racking out joints, hacking of concrete surface, finishing, curing, scaffolding etc.. complete.	Sqm.	713
D25			
	Providing and applying 20 mm thick external sand faced cement plaster by using ready-mix mortar at all heights from ground level and at all locations in two coats for masonry (except stone masonry) and concrete surfaces including racking out joints, hacking of concrete surface, finishing, curing, scaffolding etc.. complete.	Sqm.	2185
D26			

Section 1- Refurbishment of IPS Building			
Sr. No.	Description	Unit	Quantity
	Providing and applying first single coat of approved primer and two coats of synthetic enamel paint/flat oil paint of an approved make and colour as per manufacturers specifications to surfaces specified below, at all height and locations as directed including scaffolding, cleaning and preparing surfaces for painting by any approved means etc.. complete as directed by Engineer-in charge. For plastered wall surface.	Sqm.	14079
D27			
	Providing and applying first single coat of approved primer and two coats of anti-algal, anti-fungal, exterior paint as specified below of an approved make and colour as per manufacturers specifications to any surface, at all heights from ground level and at all locations as directed including preparing surfaces for painting by any approved means, scaffolding, cleaning and curing etc.. complete as directed by Engineer-in-charge. By using acrylic based exterior paint For plastered wall surface	Sqm.	2100
D28			
	Water proofing treatment to the chajja after removing old plaster and roughening the surface and finishing the top surface with 20mm thk. 1:2 c.s. plaster with approved water proofing compounds and neat cement finish, the rate also includes for 1:3 c.s. facia of chajja to match the new surface(actual area treated will be paid).	Sqm.	140
D29			

Section 1- Refurbishment of IPS Building			
Sr. No.	Description	Unit	Quantity
	Providing and fixing superior quality factory made phenol bonded solid core single leaf flush commercial door shutter of thickness as mentioned below and of approved make conforming to IS: 2202 (Part I, II) with 12mm thk. teak wood lipping all around, 3mm thk. commercial veneer on external face with three coats of french polish and 150mm x 60 mm or 125 mm x 75 mm C.P. teak wood frame without fanlight including, approved fixtures and fastening hooks, eyes, screws and painting the frame and interior side with one coat of primer, putty and two coats of synthetic enamel paint of approved make and colour etc.. complete as directed by Engineer in charge. 25mm thick shutter	Sqm	26
D30			
	Providing and fixing in position aluminum door fully paneled with 6mm thick Novapan BSL and made up of extruded and anodised aluminium sections of approved make and of size 63.5 mm x 38.10 mm x 2.0 mm thk, 47.62 mm x 10.16 mm x 1.74 mm thk (wt. 0.881kg./Rm) for outer frame, 47.62 mm x 10.16 mm x 1.74 mm thk (wt. 0.881 kg/Rm) for top rail, 95.25 mm x 25.40 mm x 2.0 mm thk (wt. 1.519 kg/Rm) for bottom rail, 25.0 mm x 44.45 mm x 2.40 mm thk (wt. 0.918 kg/Rm) for lock rail, 47.62 mm x 44.45 mm x 1.88 mm thk (wt. 0.943 kg/Rm) for vertical shutter (hinge side), 47.52 mm x 44.45 mm x 1.95 mm thk (wt. 0.936 kg/Rm) for vertical shutter (latch side), clip weighing 0.097/kg/Rm., including neoprene gasket, fixtures, fastenings and accessories like hinges, locking arrangement, door closer etc.. complete as directed by Engineer In Charge. (Note: anodic film must not be less than 15 microns i.e. AC-15 as per IS, the anodizing must be scaleted by keeping the anodized section in boiling de- anodized water for a period of one hour)	Sqm	17
D31			

Section 1- Refurbishment of IPS Building			
Sr. No.	Description	Unit	Quantity
	Providing and fixing in position uPVC/SWR (Soil/Waste/Rain) pipe of type-B 110 mm dia. in any position including all fittings and accessories, making joints / connections water tight with solvent cement, scaffolding if necessary and making good the damages if any (excluding excavation and refilling the trenches) etc.. complete as specified and directed. (All fittings and accessories like clamps, etc.. should be of same brand. No separate payment shall be made for fittings and accessories).	Rmt	90
D32			
	Providing and fixing in position aluminum louvered window with anodised aluminum frame of approved make and of size 40mm x 20mm x 2.0mm (wt. 0.605 kg/Rm) including adjustable aluminum frame, 4 to 6mm thk. frosted glass, fixtures and fastenings etc.. complete as directed by by Engineer In Charge.	Sqm	17
D33			
	Providing and fixing in position side hung window with friction hinges, made up of extruded modular and anodised aluminum section of approved make and of size 38.10 mm x 25.40 mm x 1.44 mm thk (wt. 0.471 kg/Rm) for outer rectangular tube, 40 mm x 31.5 mm x 1.5 mm (wt. 0.549 kg/Rm) for outer frame, 40 mm x 31.50 mm x 1.50 mm thk (wt. 0.502 kg/Rm) for central mullion, 40 mm x 31.50 mm x 1.50 mm thk (wt. 0.549 kg/Rm) for shutter frame and 16.50 mm x 14.50 mm x 1.20 mm thk (wt. 0.157 kg/Rm) for glazing clip with 5 mm thick plain / frosted / tinted glass including neoprene gasket, fixtures, fastenings and accessories like handles, hinges, locking arrangement etc.. complete as directed by Engineer In Charge. (Note: anodic film must not be less than 15 microns i.e. AC-15 as per IS, the anodizing must be scaleted by keeping the anodized section in boiling de-anodized water for a period of one hour)	Sqm	107
D34			

Section 1- Refurbishment of IPS Building			
Sr. No.	Description	Unit	Quantity
	<p>Providing and laying in position ready mixed design mix M-20 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying and the cost of centering, shuttering, finishing and excluding reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer-in-charge. The Mix design as per particular specifications shall be got approved by Engineer-in-Charge before execution of the item. The rate shall include cost of all specified materials and operations at all levels and heights, including the cost of centering, shuttering and and excluding reinforcement which shall be paid under relevant item. (Note :- Cement content considered in this item is @ 300 kg/cum as per IS 456 table showing minimum cement content. No extra will be paid nor any amount will recovered on account of variation of cement in mix design as per specifications for controlled concrete). Slabs, Suspended floors, roofs, landings, balconies, canopy and access platform</p>	cum	112

Section 1- Refurbishment of IPS Building			
Sr. No.	Description	Unit	Quantity
D35	<p>Providing and laying in position ready mixed design mix M-30 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying and the cost of centering, shuttering, finishing and excluding reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer-in-charge. The Mix design as per particular specifications shall be got approved by Engineer-in-Charge before execution of the item. The rate shall include cost of all specified materials and operations at all levels and heights, including the cost of centering, shuttering and and excluding reinforcement which shall be paid under relevant item. (Note :- Cement content considered in this item is @ 340 kg/cum as per IS 456 table showing minimum cement content. No extra will be paid nor any amount will recovered on account of variation of cement in mix design as per specifications for controlled concrete). Foundations, footings, bases of columns, rafts, pilecap</p>	cum	77
D36	<p>Providing and fixing in position steel bars reinforcement of various diameters for R.C.C. pile, pile caps, footings, raft, retaining wall, shear wall, lift wall, foundations, slabs, beams, columns, canopies, staircases, newels, chajjas, lintels, pardies, coping, fins, arches, etc.. as per detailed designs, drawings and bar bending schedules, including straightening, cutting, bending, hooking the bars, binding with wires or tack welding, supporting as required etc.. all complete at all levels. Corrosion Resistant Steel (500 CRS D)</p>	MT	13

Section 1- Refurbishment of IPS Building			
Sr. No.	Description	Unit	Quantity
D35	Providing and fixing the Chemical Anchor Fasteners as specified below of Hilti Make or equivalent confirming to IS 1367 (Part 3) at required locations and level including drilling the hole, cleaning with blow pump and anchoring the bolt with chemical as per manufacturers specifications etc. complete as directed by Engineer In Charge.		
D37	M24 x 210 foil capsule (HVU) & M24 x 290 Rod	Nos	1038
	M12 x 120 foil capsule (HVU)	Nos	44
	Providing and erecting two legged metal tubular scaffolding (cup lock type) of width 1200 to 1500mm largely free standing using H frames of tubular pipes of minimum 40mm diameter, with base plates fixed or adjustable with necessary clamps, coulders, brackets for projections, joint pins, pulleys and other accessories including steel angle or tubular pipe bracings at adequate intervals, access platforms of metal or timber planks of span not exceeding 1.5 metre centre to centre, horizontal & vertical tubes joint with cup & lock system with M.S. Tubes, M.S. tube challis, M.S. clamps and staircase system in the scaffolding for working platform etc.. and maintaining it in a serviceable condition for execution of work including provision of rubber inserts to pipe ends at point of contact with structure to avoid damage, including access ladders with intermediate platforms. the scaffolding to be suitably braced and anchored to to the building using support systems created temporarily at the opening in walls using vertical and horizontal adjustable propson the exterior side of building structure, upto 25 meter height, above ground level . The rate includes provision of high-density plastic sheets covering to protect architectural details on the entire building face a nylon net to prevent all debris falling onto the pavement required and the safety platform at ground level covering the pedestrian walkways. etc. complete. (The elevational area of the scaffolding shall be measured for payment purpose. The payment will be made once only for execution of all items for such works.	Sq.m	120
D38			

Section 1- Refurbishment of IPS Building			
Sr. No.	Description	Unit	Quantity
	Providing and applying three coats of White/colour wash to any surface with lime wash prepared from quick lime of best quality by adding blue/colour pigments and glue of approved colour, quality in required quantities at all height and locations as directed including scaffolding, cleaning and preparing surfaces for painting with broom, coir and sand paper if necessary or by any other approved means etc.. complete as directed by Engineer-in-charge.	Sqm	163
D39			
	Providing anti-termite treatment around the periphery of the existing building conforming to IS-6313 (part III) by excavating trenches of 20cm width and exposing the sides of the columns, plinth beams and wall upto a depth of 300mm, rodding for the holes of 300mm deep and at 150m c/c in the trenches, treating with chloropyrifos EC 20 Emulsion or equivalent of 1% concentration by weight at the total rate of 2.25 Litters per meter including backfilling the trenches etc.. complete as directed by Engineer-in-Charge covering 2 years guaranty.	Rmt	150
D40			
	Providing and Fixing MS Safety grill of weight specified below for windows as per design including fabricating the grill using M.S. square / round bar, flats and angles including painting with one coat of red oxide zinc chromate primer and two coats of synthetic enamel paint of approved colour and brand etc. complete as directed. (Grill weighing 20 to 25 kg / sqm)	Sq.m	124
D40			

Section 1- Refurbishment of IPS Building			
Sr. No.	Description	Unit	Quantity
	<p>Providing, detailing, fabricating and fixing at desired location using hot rolled sections and MS Plates of grade Fe 250 as per specifications and approved fabrication drawings (which are to be prepared by Contractor and got approved from Engineer), transporting to site and erecting structural steel members for all heights & at all levels including provision of necessary erection bolts, fixing bolts, nuts, washers, cleats, stiffeners, gussets, base plate, and all necessary fixtures and operations like preheating as per specifications, straightening, bending, cutting, drilling, grinding, machining if specified, welding, grinding and removing the welding burr and preparing surface for painting with wire brush cleaning and applying two coats of epoxy red oxide zinc phosphate primer of 30 microns each and two coats of Epoxy Corrosion Resistant Enamel paint of 30 microns after fabrication including touching up with spray painting after erection etc. complete as directed by Engineer In Charge. (The qty. for this item shall be measured for gusset plates, base plates, bolts in M.T.)</p>	MT	8
D41			
	<p>Providing, detailing, and fabricating as per specifications, transporting to site and erecting ladder / railing using stainless steel hollow pipes of grade 304 including, S.S. fixtures and fastenings, cleats, stiffeners, gussets etc.. and all necessary operations straightening, bending, like cutting, drilling, welding, grinding and removing the welding burr, machining if specified, finishing, cleaning etc.. complete as directed by Engineer In Charge.</p>	kg	15348

Section 1- Refurbishment of IPS Building			
Sr. No.	Description	Unit	Quantity
D43	Providing and applying first single coat of approved primer and two coats of synthetic enamel paint/flat oil paint of an approved make and colour as per manufacturers specifications to surfaces specified below, at all height and locations as directed including scaffolding, cleaning and preparing surfaces for painting by any approved means etc.. complete as directed by Engineer-in-charge. For steelwork	sqm	300
D44	Providing and laying 25 to 30 mm thk. Kota stone tiles 25 mm to 30 mm thick of an approved quality and size for paving / flooring including cement mortar bedding of 25 mm thick in 1:4 proportion, cement float, pointing in cement mortar 1:3, cutting, dressing, leveling, jointing, pointing, curing, finishing etc. complete as directed by Engineer In Charge.	sqm	158
D45	Dismantling aluminium/ Gypsum partitions, doors, windows, fixed glazing and false ceiling including disposal of unserviceable surplus material and stacking of serviceable material within 50 meters lead as directed by Engineer-in-charge.	sqm	339

Section 1- Refurbishment of IPS Building			
Sr. No.	Description	Unit	Quantity
D46	P&F in position Gypsum board false ceiling with 12.5mm th. Gypsum boards, screwed/ fixed to the under struct of suspended G.I. Grid const & suspended from the main ceiling of ceiling sectn at max c to c distance of 450 mm perimeter channel and intermediate channels at max c to c distance 1200 mm galvanised grid should be fixed to RF CC slab. The gypsum board should be fixed to galvanised iron grid with necessary screws. The boards should be taped and filled from underside to give smooth, seamless ceiling. The rate should include necessary additional ceiling sections and intermediate channels to be provided at openings for light fixtures, asbestos cement ducts, vertical drops, offsets etc. Additional intermediate channels should be fixed to strap hangers for additional support to prevent strapping at every 1200 mm item to be comp in all respect. (G.I. perimeter channel size-27mmx0.5mm thk., flange-20mm & 30mm, intermediate channel. size- 45mm & 0.9mm thk., hanger size-25mmx0.5mm thk.)complete.	sqm	339
D47	Providing & fixing TRAP DOOR with T.W. frame work and shutter made from 19mm marine plywood and exposed surface finished with 1.5mm laminate and internal surface finished with flat oil paint with s.s. fittings & fixtures of make (ozone, Hettich, Hafle) as per Architects detailed drg. and design.	sqm	40

Section 1- Refurbishment of IPS Building			
Sr. No.	Description	Unit	Quantity
D48	Providing & fixing factory made Fiberglass Reinforced plastics (F.R.P.) chajja 4 mm thick of required colour, size and design made by Resin Transfer Moulding (RTM) Machine Technology, resulting in void free compact laminate in single piece, having smooth gradual slope curvature for easy drainage of water and duly reinforced by 2 nos vertically and 1 nos horizontally 50x2 mm thick M.S. flat with 12 mm in built hole for grouting on the existing wall along with the 50 mm flanges duly inserted and sealed in the wall complete in one single piece casted monolithically, including all necessary fittings. The FRP chajja should be manufactured using unsaturated Polyester resin as per IS:6746, duly reinforced with fiber glass chopped stand mat (CSM) as per IS:11551 complete with protective gel coat U/V coating on top for complete resistance from the extreme of temperature, weather and sunlight.	Sqm	150
D49	Providing and fixing rolling shutters made out of 18 gauge steel sheets for curtains, including bottom rail, 100 mm wide guide channels for opening width up to 4.0m and 150mm wide guide channel for opening width more than 4.0m, lock plates, locking arrangement on both sides, fixing bolts, pulling handles, MS hood of appropriate size, rolling arrangement, standard make springs in brackets etc.. including fixing of frames with rag bolts, grouting of parts in position etc.. and also including two coats of red oxide zinc chromate primer and two coats of synthetic enamel paint of approved colour, shade and brand, providing ball bearing wherever required and directed etc. complete and providing mechanical device for operating rolling shutters. complete as per IS:6248 / specifications and as directed by Engineer In Charge. The shutter should withstand wind pressure of 47meters per second.	Sqm	55
D50	Providing and fixing rolling shutters made out of 18 gauge steel sheets for curtains, including bottom	Sqm	56.00

Section 1- Refurbishment of IPS Building			
Sr. No.	Description	Unit	Quantity
	<p>rail, 100 mm wide guide channels for opening width up to 4.0m and 150mm wide guide channel for opening width more than 4.0m, lock plates, locking arrangement on both sides, fixing bolts, pulling handles, MS hood of appropriate size, rolling arrangement, standard make springs in brackets etc.. including fixing of frames with rag bolts, grouting of parts in position etc.. and also including two coats of red oxide zinc chromate primer and two coats of synthetic enamel paint of approved colour, shade and brand, providing ball bearing wherever required and directed etc. complete and providing mechanical device for operating rolling shutters. complete as per IS:6248 / specifications and as directed by Engineer In Charge. The shutter should withstand wind pressure of 47meters per second.</p>		

Section 2 - Refurbishment of Office Building			
Sr. No.	Description	Unit	Quantity
A1	Removing cement plaster of any finish from the wall, complete with racking out the joints to a depth of 20 mm.	Sqm	1144
A2	Chipping /removing loose concrete up to reinforcement bars, without damaging the reinforcement, removing all the loose materials and to make all the exposed surfaces free from oil, dust and all impurities etc.. complete.	Sqm	560
A3	Providing and fixing in vertical position telescopic M.S. prop under deflected beam/lintel/slab/chajjas by using teak wood battens of size 1000 x 80 x 80 for packing between prop plate and the beam/lintel/slab/chajjas bottom surface as per the directions of engineer-in-charge.	Nos	70
B4	Demolishing cement concrete manually/ by mechanical means including disposal of unserviceable material within premises at a suitable stacking location at ground level including all lead & lifts as per direction of Engineer-in-charge without disturbing the other structural elements.	Cum	2
B5	Demolishing brick work in lime or cement mortar including plaster, paint, etc. manually/ by mechanical means including stacking of serviceable material and disposal of unserviceable material within 50 metres lead as per direction of Engineer-in-charge.	Cum	2
B6	Removing or destroying plants etc. growing on walls, drainage pipes, destroying roots by applying approved weedicide & reinstating the wall surface by plaster to the damage surface of the building	Sqm	20
B7	Removing existing door or windows with frame and shutters and making good etc.. to the existing surface.	Nos	25

Section 2 - Refurbishment of Office Building			
Sr. No.	Description	Unit	Quantity
B8	Breaking and removing the water proofing layers of I. P. S. with bituminous joints and brick bat concrete over the existing terrace floor, chajja, top of headroom slab and canopy including cement vata and exposing R.C.C. slab top complete.	Sqm	608
B9	Demolishing R.C.C. slab, R.C.C. wall of any thickness, R.C.C. beams, joists, R.C.C. columns, piles, pile caps etc., in any thickness and size manually/ by mechanical means including stacking of steel bars and disposal of unserviceable material within 50 metres lead as per direction of Engineer - in- charge.	Cum	1
B10	Dismantling C.I., UPVC and asbestos vent pipes and shaft, soil, waste, rain water pipe, mild steel, GI and asbestos gutters, ridge and hips with fittings and clamps including stacking the material within 50 meters lead : 100 mm dia pipe	Rmt	83
B11	Removing mosaic, cement marble, granites non-slippery, tandur, kotah, shahabad stone or Indian Pattern stone, glazed tiles in flooring and dado including bedding brick bat coba etc., and delivering materials in Ward Office and carting away unserviceable materials.	Sqm	28
B12	Disposal of building rubbish / malba / similar unserviceable, dismantled or waste materials by mechanical means including loading, transporting, unloading to contractor identified dumping ground for all loads including all lifts involved	cum	106.00
C	STRUCTURAL REPAIR WORKS		
C13	Application of Rust Converter: Providing & applying One coat of Alkaline Rust converting primer conforming to ASTM-B-117, to exposed existing rebars after removing & cleaning loose rust by wire brush and leave it for 6- 8 hours.	Sqm	560

Section 2 - Refurbishment of Office Building

Sr. No.	Description	Unit	Quantity
C14	Removing corrosion of steel reinforcement by mechanical means like wire brushing, chipping to remove loose rust and then applying rust removal solution by using brush application, leaving the surface for at least 15 to 30 minutes, then removing loose materials by scrubbing or with brush and applying polymer bond to the old concrete surface before applying Polymer mortar.	Sqm	560
C15	Anti Corrosive coating to exposed reinforcement: Providing & applying Two coats of Anti Corrosive protective coating (CBRI / CSIR technology) for reinforcement bars by brush. Sprinkle dry sand when second coat is tacky so as to get rough surface.	MT	1.00
C16	Application of Corrosion Inhibitor: Providing & applying One coat of Concrete Penetrating Corrosion Inhibitor (Surface applied) which works on Bipolar Inhibition Mechanism on entire concrete surface to be repaired by using brush or spray at 250 ml per Sq.Mt./Coat or as per manufacturer's specification and prior to application of first coat of anti corrosive coating to reinforcement.	Sqm	560
C17	Providing and applying Polymer modified cement mortar of average thickness 15-20mm using Polymer in one or more layers in proportion 1:5:15 of Polymer Cement Quartz Sand as manufacturer's specifications in specific layers, curing the surface after 72 hours of application with wet gunny bags etc. and by finishing the surface with 12mm thick (1:3) Cement sand plaster.	Sqm	336
C18	Providing and applying Polymer modified cement mortar of average thickness 30-40mm using Polymer in two layers in proportion 1:5:15 of Polymer Cement Quartz Sand as manufacturer's specifications in specific layers, curing the surface after 72 hours of application with wet gunny bags etc. and by finishing the surface with 12mm thick (1:3) Cement sand plaster.	Sqm	140

Section 2 - Refurbishment of Office Building			
Sr. No.	Description	Unit	Quantity
C19	Providing Micro Concrete jacketing to walls or beams of thickness upto 75 mm using Polymer modified cement premixed quartz sand aggregate packed in bags of standard manufacture, for high early strength of 40 N/mm sq.cm of approved brand. The dry product is to be mixed with 12.5% water by weight, along with washed and poured into rigid form work moulds & tamped properly, & cured for 3 days. [Payment is to be made by weight premixed of micro concrete product consumed as per site register records. No extra payment shall be made for shuttering or any other material.	Kg	13860
C20	Bond Coat: Providing & applying One coat of structural grade epoxy bond coat by brush conforming to ASTM-C-882- 87 to the prepared concrete surface to be repaired / strengthened. This is applied prior to the application of polymer repair mortar / epoxy mortar / Micro concrete to have monolithic action between old concrete surface and new concrete surface.	Sqm	560
C21	Shear Connectors: Make 10/12 mm dia holes using heavy duty electrically operated hammer drills in the concrete of RCC members to a depth of about 75 mm at 500 mm c/c or at suitable grid in zig-zag fashion, clean the holes using air jet and fix pre-fabricated 100 x 50 mm L-shape 8 mm dia rebar using Anti Corrosive protective coating so that 75 mm out of 100 mm is inserted inside the concrete and 25 mm remain outside along with 50 mm bend. The shear connectors are used to tie the additional reinforcement bars.	Nos	896
C22	Additional Reinforcement: Cutting, bending and fixing in position reinforcement of specified/required sizes and shapes in the form of main rebars, stirrups & rings, distribution rebars etc., and tying them to shear connectors using GI binding wire. The additional rebars should be coated with TWO coats of Anti Corrosive protective coating & dry sand to be sprinkled on second coat.	M.T	0.63

Section 2 - Refurbishment of Office Building			
Sr. No.	Description	Unit	Quantity
C23	Providing and fixing superior quality factory made phenol bonded solid core single leaf flush commercial door shutter of thickness as mentioned below and of approved make conforming to IS: 2202 (Part I, II) with 12mm thk. teak wood lipping all around, 3mm thk. commercial veneer on external face with three coats of french polish and 150mm x 60 mm or 125 mm x 75 mm C.P. teak wood frame without fanlight including, approved fixtures and fastening hooks, eyes, screws and painting the frame and interior side with one coat of primer, putty and two coats of synthetic enamel paint of approved make and colour etc.. complete as directed by Engineer in charge. 25mm thick shutter	Sqm	13
C24	Providing and fixing in position two track aluminum window of extruded modular an anodized aluminum sections of approved make and of size 61.85 mm x 45.5 mm x 1.3 mm thk (wt 1.055 kg/Rm) for bottom, 61.85 mm x 31.75 mm x 1.3 mm thk. (wt 0.659 kg/Rm) for top & sides, mounted on anodized aluminum rectangular frame of size 63mm x 38mm x 2.0mm(1.054). The shutter comprising of bearing bottom and top of size 40mm x 18 mm x 1.25 mm thk (wt. 0.417 Kg/Rm) Interlocking section of size 40mm x 26,7 mm x 1.10 mm thk. (Wt. 0469 kg./Rm) and hand sides of 40mm x 18mm x 1.25 mm thk (wt. 0.417kg/Rm) with 5 mm thick plain / frosted / tinted glass fixed in shutter including approved quality neoprene gasket, fixtures, fastenings and accessories like PVC rollers, PVC weep holes, locks, handles etc.. complete as directed by Engineer In Charge. (Note: anodic film must not be less than 15 microns i.e. AC-15 as per IS, the anodizing must be scaleted by keeping the anodized section in boiling de- anodized water for a period of one hour)	sqm	18
C25	Providing and fixing in position aluminum louvered window with anodised aluminum frame of approved make and of size 40mm x 20mm x 2.0mm (wt. 0.605 kg/Rm) including adjustable aluminum frame, 4 to 6mm thk. frosted glass, fixtures and fastenings etc.. complete as directed by by Engineer In Charge.	sqm	4
D	FINISHING, PAINTING & MISC. WORKS		

Section 2 - Refurbishment of Office Building			
Sr. No.	Description	Unit	Quantity
D26	Brick work with common burnt clay modular bricks of class designation 3.5 and above in superstructure above plinth level upto floor five level in all shapes and sizes in : Cement mortar 1:4 (1 cement : 4 coarse sand)	Cum.	2
D27	Providing and applying 12 mm thick internal plaster with neeru finish by using ready-mix mortar as per manufacturers recommendations at all heights and locations for masonry (except stone masonry) and concrete surfaces including racking out joints, hacking of concrete surface, finishing, curing, scaffolding etc.. complete.	Sqm.	289
D28	Providing and applying first single coat of approved primer and two coats of synthetic enamel paint/flat oil paint of an approved make and colour as per manufacturers specifications to surfaces specified below, at all height and locations as directed including scaffolding, cleaning and preparing surfaces for painting by any approved means etc.. complete as directed by Engineer-in charge. For plastered wall surface.	Sqm.	3249
D29	Providing and applying 20 mm thick external sand faced cement plaster by using ready-mix mortar upto 10m from ground level and at all locations in two coats for masonry (except stone masonry) and concrete surfaces including racking out joints, hacking of concrete surface, finishing, curing, scaffolding etc.. complete.	Sqm.	379
D30	Providing and applying first single coat of approved primer and two coats of anti-algal, anti-fungal, exterior paint as specified below of an approved make and colour as per manufacturers specifications to any surface, upto 10m height from ground level and at all locations as directed including preparing surfaces for painting by any approved means, scaffolding, cleaning and curing etc.. complete as directed by Engineer-in-charge. By using acrylic based exterior paint For plastered wall surface	Sqm.	1033.00

Section 2 - Refurbishment of Office Building

Sr. No.	Description	Unit	Quantity
D31	<p>Providing waterproofing treatment with Broken China mosaic flooring to the existing terrace/top slab at any floor level (including slab portion beneath overhead water tank) by 1. Removing the existing top layer of the terrace/top slab upto the top of existing brick bat coba without causing any damage to any of the structural member and cleaning the same of any loose material etc.. complete as directed. 2. Dividing the total slab area by marking grid at a spacing of 1.2m. c/c in either direction and form square panels of the size 1.2 m. x 1.2 m. and drilling the holes (by using machine) 37 mm. to 50 mm. dia upto required depth in the R.C.C. slab in staggered form at the junction of the above marked grid as specified and directed by an Engineer in charge.3. Filling the holes only at bottom portion with 10 mm size metal, inserting the grouting nozzle in the drilled hole for grouting and making the hole watertight by filling the gap between nozzle and the hole with cement mortar 1:1 or any other suitable material as a sealant.</p>	Sqm	642.00
	<p>4. Injecting the cement grout admixed with waterproofing compound (one part of cement to 2 parts of water is recommended; initially richer mix which is possible but for further grouting leaner mix is required for filling smaller voids, mix should not be leaner than 1 cement:5 water) with required pressure (as per site conditions) by grout pump so as to seal all inherent holes, honey combs, cavities and voids and making the whole structures consistent and homogeneous solid mass resistant to seepage, dampness, moisture and leakage of water, allowing the grout to overflow from the vent holes (i.e. holes at diagonally opposite corners), to ensure no pockets left. 5. Taking holes one by one in the staggered form for grouting purposes and in each case holes at the diagonally opposite end will be acting as vent holes. 6. Filling the entire area by 15 cm. deep water for ponding test. The ponding test shall be checked after 7 days by the officer of the rank not below Executive Engineer along with Zonal Executive Engineer to ensure that there is no leakage found. The certificate to this effect shall be given by the concerned engineer. 7. Repeating step 4 to 6 until the entire structure is found completely waterproof, if any leakage is found</p>		

Section 2 - Refurbishment of Office Building			
Sr. No.	Description	Unit	Quantity
	8. Laying the flooring of broken China- mosaic (broken pieces of China glazed tiles) of approved colour set in 25 mm. average bed of C.M. 1:3 with waterproofing compound to correct level and slope (1:100) well compacted and finished; such that minimum coverage of China mosaic chips is about 90% of the total area of slab. The above treatment shall continue along the inner side of parapet or the adjoining wall upto 30 cm. high as per the above specifications regarding cement mortar in shape of round vata with necessary groove etc.. complete. 9. Curing the flooring continuously for minimum ten days so as to render the surface hard and tough to withstand weather and normal domestic use. 10. Cleaning the slab and removing and carting the debris; cleaning the top of all dust, loose material, stains etc. complete as directed. NOTES : 1. No extra payment will be made for brickbat concrete if any, required to fill up the voids which are developed in the process of removing top layer. If there are any such voids; the same shall be filled up with brick bat concrete so that levelled surface is at a correct level and slope is available for laying China mosaic flooring. 2. The finished terrace surface shall be paid for the actual area treated including cement vata.		
D32	Water proofing treatment to the chajja after removing old plaster and roughening the surface and finishing the top surface with 20mm thk. 1:2 c.s. plaster with approved water proofing compounds and neat cement finish, the rate also includes for 1:3 c.s. facia of chajja to match the new surface(actual area treated will be paid).	Sqm	28.00
D33	Providing and fixing in position uPVC/SWR (Soil/Waste/Rain) pipe of type-B 110 mm dia. in any position including all fittings and accessories, making joints / connections water tight with solvent cement, scaffolding if necessary and making good the damages if any (excluding excavation and refilling the trenches) etc.. complete as specified and directed.(All fittings and accessories like clamps, etc.. should be of same brand. No separate payment shall be made for fittings and accessories).	Rmt	56

Section 2 - Refurbishment of Office Building			
Sr. No.	Description	Unit	Quantity
D34	Providing and fixing in position uPVC/SWR (Soil/Waste/Rain) pipe of type-B 75 mm dia. in any position including all fittings and accessories, making joints / connections water tight with solvent cement, scaffolding if necessary and making good the damages if any (excluding excavation and refilling the trenches) etc.. complete as specified and directed.(All fittings and accessories like Clampetts.. should be of same brand. No separate payment shall be made for fittings and accessories).	Rmt	27
D35	Providing anti-termite treatment around the periphery of the existing building conforming to IS-6313 (part III) by excavating trenches of 20cm width and exposing the sides of the columns, plinth beams and wall upto a depth of 300mm, rodding for the holes of 300mm deep and at 150m c/c in the trenches, treating with chloropyrifos EC 20 Emulsion or equivalent of 1% concentration by weight at the total rate of 2.25 Litters per meter including backfilling the trenches etc.. complete as directed by Engineer-in-Charge covering 2 years guaranty.	Rmt	140
D36	Providing and laying polished 18 mm thk. Steel Gray Granite tiles/slab as specified below (Machine cut) of an approved quality and size for paving /flooring in plain and/or diamond /approved pattern including cement mortar bedding of 25 mm thick in 1:4 proportion, cement float, machine cutting, dressing, leveling, jointing, filling the joints with neat cement slurry or with required pigment, machine polishing at site, curing, finishing, etc. complete as directed by Engineer In Charge.	sqm	28

Section 2 - Refurbishment of Office Building			
Sr. No.	Description	Unit	Quantity
D37	Providing and fixing polished 18mm thk. Steel gray Granite tiles/slab as specified below of approved quality, pattern and colour for dado including preparing the surface and levelling in the desired line, backing of 20 thk. cement mortar in proportion 1:3, square cut top edge or chamfered top edge in cement mortar 1:3, cement float, machine cutting, leveling, jointing, filling the joints with neat cement or pigment mixed with cement, polishing, finishing, curing etc. complete as directed by Engineer In Charge.	sqm	69

Section 3 -Refurbishment of Sub Office Building			
Sr. No.	Description	Unit	Quantity
A1	Removing cement plaster of any finish from the wall, complete with racking out the joints to a depth of 20 mm.	Sqm	841
A2	Chipping /removing loose concrete up to reinforcement bars, without damaging the reinforcement, removing all the loose materials and to make all the exposed surfaces free from oil, dust and all impurities etc.. complete.	Sqm	279
A3	Providing and fixing in vertical position telescopic M.S. prop under deflected beam/lintel/slab/chajjas by using teak wood battens of size 1000 x 80 x 80 for packing between prop plate and the beam/lintel/slab/chajjas bottom surface as per the directions of engineer- in-charge.	Nos	77
B4	Demolishing cement concrete manually/ by mechanical means including disposal of unserviceable material within premises at a suitable stacking location at ground level including all lead & lifts as per direction of Engineer-in-charge without disturbing the other structural elements.	Cum	2
B5	Demolishing brick work in lime or cement mortar including plaster, paint, etc.. manually/ by mechanical means including stacking of serviceable material and disposal of unserviceable material within 50 metres lead as per direction of Engineer-in-charge.	Cum	1
B6	Removing or destroying plants etc.. growing on walls, drainage pipes, destroying roots by applying approved weedicide & reinstating the wall surface by plaster to the damage surface of the building	Sqm	20

Section 3 -Refurbishment of Sub Office Building			
Sr. No.	Description	Unit	Quantity
B7	Removing existing door or windows with frame and shutters and making good etc.. to the existing surface.	Nos	11
B7-A	Dismantling steel work in built up sections in angles, tees, flats and channels of rolling shutters, grills, gates, fencing, hoardings, including all gusset plates, bolts, nuts, cutting rivets, welding etc.. including dismembering and stacking within 50metres lead.	Kg	225
B8	Breaking and removing the water proofing layers of I. P. S. with bituminous joints and brick bat concrete over the existing terrace floor, chajja, top of headroom slab and canopy including cement vata and exposing R.C.C. slab top complete.	Sqm	271
B9	Dismantling tile work in floors and roofs laid in cement mortar including stacking material within 50 metres lead. For thickness of tiles 10 mm to 25 mm	Sqm	350
B10	Demolishing R.C.C. slab, R.C.C. wall of any thickness, R.C.C. beams, joists, R.C.C. columns, piles, pile caps etc., in any thickness and size manually/ by mechanical means including stacking of steel bars and disposal of unserviceable material within 50 metres lead as per direction of Engineer - in- charge.	Cum	2
B11	Dismantling C.I., UPVC and asbestos vent pipes and shaft, soil, waste, rain water pipe, mild steel, GI and asbestos gutters, ridge and hips with fittings and clamps including stacking the material within 50 metres lead : 100 mm dia pipe	Rmt	20

Section 3 -Refurbishment of Sub Office Building			
Sr. No.	Description	Unit	Quantity
B12	Disposal of building rubbish / malba / similar unserviceable, dismantled or waste materials by mechanical means including loading, transporting, unloading to contractor identified dumping ground for all loads including all lifts involved	cum	83.00
C	STRUCTURAL REPAIR WORKS		
C13	Application of Rust Converter: Providing& applying One coat of Alkaline Rust converting primer conforming to ASTM- B-117, to exposed existing rebars after removing & cleaning loose rust by wire brush and leave it for 6- 8 hours.	Sqm	279
C14	Removing corrosion of steel reinforcement by mechanical means like wire brushing, chipping to remove loose rust and then applying rust removal solution by using brush application, leaving the surface for at least 15 to 30 minutes, then removing loose materials by scrubbing or with brush and applying polymer bond to the old concrete surface before applying Polymer mortar.	Sqm	279
C15	Anti Corrosive coating to exposed reinforcement: Providing & applying Two coats of Anti Corrosive protective coating (CBRI / CSIR technology) for reinforcement bars by brush. Sprinkle dry sand when second coat is tacky so as to get rough surface.	MT	1

Section 3 -Refurbishment of Sub Office Building			
Sr. No.	Description	Unit	Quantity
C16	Application of Corrosion Inhibitor: Providing & applying One coat of Concrete Penetrating Corrosion Inhibitor (Surface applied) which works on Bipolar Inhibition Mechanism on entire concrete surface to be repaired by using brush or spray at 250 ml per Sq. MT./Coat or as per manufacturer's specification and prior to application of first coat of anti-corrosive coating to reinforcement.	Sqm	279
C17	Providing Micro Concrete jacketing to walls or beams of thickness upto 75 mm using Polymer modified cement premixed quartz sand aggregate packed in bags of standard manufacture, for high early strength of 40 N/mm sq.cm of approved brand. The dry product is to be mixed with 12.5% water by weight, along with washed and poured into rigid form work moulds & tamped properly, & cured for 3 days. [Payment is to be made by weight premixed of micro concrete product consumed as per site register records. No extra payment shall be made for shuttering or any other material.	Kg	11509
C18	Providing and applying Polymer modified cement mortar of average thickness 15-20mm using Polymer in one or more layers in proportion 1:5:15 of Polymer Cement Quartz Sand as manufacturer's specifications in specific layers, curing the surface after 72 hours of application with wet gunny bags etc. and by finishing the surface with 12mm thick (1:3) Cement sand plaster.	Sqm	140

Section 3 -Refurbishment of Sub Office Building			
Sr. No.	Description	Unit	Quantity
C19	Providing and applying Polymer modified cement mortar of average thickness 30-40mm using Polymer in two layers in proportion 1:5:15 of Polymer Cement Quartz Sand as manufacturer's specifications in specific layers, curing the surface after 72 hours of application with wet gunny bags etc. and by finishing the surface with 12mm thick (1:3) Cement sand plaster.	Sqm	70
C20	Bond Coat: Providing & applying One coat of structural grade epoxy bond coat by brush conforming to ASTM-C-882-87 to the prepared concrete surface to be repaired / strengthened. This is applied prior to the application of polymer repair mortar / epoxy mortar / Microconcrete to have monolithic action between old concrete surface and new concrete surface.	Sqm	280
C21	Shear Connectors: Make 10/12 mm dia holes using heavy duty electrically operated hammer drills in the concrete of RCC members to a depth of about 75 mm at 500 mm c/c or at suitable grid in zig-zag fashion, clean the holes using air jet and fix pre-fabricated 100 x 50 mm L- shape 8 mm dia rebar using Anti Corrosive protective coating so that 75 mm out of 100 mm is inserted inside the concrete and 25 mm remain outside along with 50 mm bend. The shear connectors are used to tie the additional reinforcement bars.	Nos	559
C22	Additional Reinforcement: Cutting, bending and fixing in position steel reinforcement of specified/required sizes and shapes in the form of main rebars, stirrups & rings, distribution rebars etc., and tying them to shear connectors using GI binding wire. The additional rebars should be coated with TWO coats of Anti Corrosive protective coating & dry sand to be sprinkled on second coat.	M.T	0.6

Section 3 -Refurbishment of Sub Office Building			
Sr. No.	Description	Unit	Quantity
C23	<p>Providing and laying in position ready mixed design mix M-30 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying and the cost of centering, shuttering, finishing and excluding reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer-in-charge. The Mix design as per particular specifications shall be got approved by Engineer-in-Charge before execution of the item. The rate shall include cost of all specified materials and operations at all levels and heights, including the cost of centering, shuttering and excluding reinforcement which shall be paid under relevant item.(Note :- Cement content considered in this item is @ 340 kg/cum as per IS 456 table showing minimum cement content. No extra will be paid nor any amount will recovered on account of variation of cement in mix design as per specifications for controlled concrete). Slabs, Suspended floors, roofs, landings, balconies, canopy and access platform</p>	Cum	3
C24	<p>Providing and fixing in position steel bars reinforcement of various diameters for R.C.C. pile, pile caps, footings, raft, retaining wall, shear wall, lift wall, foundations, slabs, beams, columns, canopies, staircases, newels, chajjas, lintels, pardies, coping, fins, arches, etc.. as per detailed designs, drawings and bar bending schedules, including straightening, cutting, bending, hooking the bars, binding with wires or tack welding, supporting as required etc.. all complete at all levels. Corrosion Resistant Steel (500 CRS D)</p>	MT	1

Section 3 -Refurbishment of Sub Office Building			
Sr. No.	Description	Unit	Quantity
D25	Providing and laying in position plain cement concrete of specified grade cement with trap/granite/quartzite/gneiss metal mixing in concrete mixer including bailing out water, compacting, finishing surface, curing and including the cost of centering and shuttering at all level : Nominal Mix of 1:2:4 (1 cement OPC: 2 coarse sand : 4 graded stone aggregate 20 mm nominal size)	Cum	2
D26	Brick work with common burnt clay modular bricks of class designation 3.5 and above in superstructure above plinth level upto floor five level in all shapes and sizes in : Cement mortar 1:4 (1 cement : 4 coarse sand)	Cum.	1
D27	Providing and applying 12 mm thick internal plaster with neeru finish by using ready-mix mortar as per manufacturers recommendations at all heights and locations for masonry (except stone masonry) and concrete surfaces including racking out joints, hacking of concrete surface, finishing, curing, scaffolding etc.. complete.	Sqm.	243
D28	Providing and applying 20 mm thick external sand faced cement plaster by using ready-mix mortar upto 10m from ground level and at all locations in two coats for masonry (except stone masonry) and concrete surfaces including racking out joints, hacking of concrete surface, finishing, curing, scaffolding etc.. complete.	Sqm.	389

Section 3 -Refurbishment of Sub Office Building			
Sr. No.	Description	Unit	Quantity
D29	Providing and applying first single coat of approved primer and two coats of synthetic enamel paint/flat oil paint of an approved make and colour as per manufacturers specifications to surfaces specified below, at all height and locations as directed including scaffolding, cleaning and preparing surfaces for painting by any approved means etc.. complete as directed by Engineer-in charge. For plastered wall surface.	Sqm.	893
D30	Providing and applying first single coat of approved primer and two coats of anti-algal, anti-fungal, exterior paint as specified below of an approved make and colour as per manufacturers specifications to any surface, upto 10m height from ground level and at all locations as directed including preparing surfaces for painting by any approved means, scaffolding, cleaning and curing etc.. complete as directed by Engineer-in-charge. By using acrylic based exterior paint For plastered wall surface	Sqm.	335

Section 3 -Refurbishment of Sub Office Building			
Sr. No.	Description	Unit	Quantity
D31	<p>Providing waterproofing treatment with Broken China mosaic flooring to the existing terrace/top slab at any floor level (including slab portion beneath overhead water tank) by 1. Removing the existing top layer of the terrace/top slab upto the top of existing brick bat coba without causing any damage to any of the structural member and cleaning the same of any loose material etc.. complete as directed. 2. Dividing the total slab area by marking grid at a spacing of 1.2m. c/c in either direction and form square panels of the size 1.2 m. x 1.2 m. and drilling the holes (by using machine) 37 mm. to 50 mm. dia upto required depth in the R.C.C. slab in staggered form at the junction of the above marked grid as specified and directed by an Engineer in charge.3. Filling the holes only at bottom portion with 10 mm size metal, inserting the grouting nozzle in the drilled hole for grouting and making the hole watertight by filling the gap between nozzle and the hole with cement mortar 1:1 or any other suitable material as a sealant.</p>	Sqm	275

Section 3 -Refurbishment of Sub Office Building			
Sr. No.	Description	Unit	Quantity
	<p>4. Injecting the cement grout admixed with waterproofing compound (one part of cement to 2 parts of water is recommended; initially richer mix which is possible but for further grouting leaner mix is required for filling smaller voids, mix should not be leaner than 1 cement:5 water) with required pressure (as per site conditions) by grout pump so as to seal all inherent holes, honey combs, cavities and voids and making the whole structures consistent and homogeneous solid mass resistant to seepage, dampness, moisture and leakage of water, allowing the grout to overflow from the vent holes (i.e. holes at diagonally opposite corners), to ensure no pockets left. 5. Taking holes one by one in the staggered form for grouting purposes and in each case holes at the diagonally opposite end will be acting as vent holes. 6. Filling the entire area by 15 cm. deep water for ponding test. The ponding test shall be checked after 7 days by the officer of the rank not below Executive Engineer along with Zonal Executive Engineer to ensure that there is no leakage found. The certificate to this effect shall be given by the concerned engineer. 7. Repeating step 4 to 6 until the entire structure is found completely waterproof, if any leakage is found</p>		

Section 3 -Refurbishment of Sub Office Building			
Sr. No.	Description	Unit	Quantity
	<p>8. Laying the flooring of broken China- mosaic (broken pieces of China glazed tiles) of approved colour set in 25 mm. average bed of C.M. 1:3 with waterproofing compound to correct level and slope (1:100) well compacted and finished; such that minimum coverage of China mosaic chips is about 90% of the total area of slab. The above treatment shall continue along the inner side of parapet or the adjoining wall upto 30 cm. high as per the above specifications regarding cement mortar in shape of round vata with necessary groove etc.. complete. 9. Curing the flooring continuously for minimum ten days so as to render the surface hard and tough to withstand weather and normal domestic use. 10. Cleaning the slab and removing and carting the debris; cleaning the top of all dust, loose material, stains etc.. complete as directed. NOTES : 1. No extra payment will be made for brickbat concrete if any, required to fill up the voids which are developed in the process of removing top layer. If there are any such voids; the same shall be filled up with brick bat concrete so that levelled surface is at a correct level and slope is available for laying China mosaic flooring. 2. The finished terrace surface shall be paid for the actual area treated including cement vata.</p>		
D32	<p>Providing and laying water proofing treatment in sunken portion of WCs, bathroom etc., by applying cement slurry mixed with water proofing cement compound consisting of applying : a) First layer of slurry of cement @ 0.488 kg/sqm mixed with water proofing cement compound @0.253 kg/sqm. This layer will be allowed to air cure for 4 hours. b) Second layer of slurry of cement @ 0.242 kg/sqm mixed with water proofing cement compound@ 0.126 kg/sqm. This layer will be allowed to air cure for 4 hours followed with water curing for 48 hours. The rate includes preparation of surface, treatment and sealing of all joints, corners, junctions of pipes and masonry with polymer mixed slurry.</p>	Sqm.	4

Section 3 -Refurbishment of Sub Office Building			
Sr. No.	Description	Unit	Quantity
D33	Water proofing treatment to the chajja after removing old plaster and roughening the surface and finishing the top surface with 20mm thk. 1:2 c.s. plaster with approved water proofing compounds and neat cement finish, the rate also includes for 1:3 c.s. facia of chajja to match the new surface(actual area treated will be paid).	Sqm.	24
D35	Providing and fixing 8mm thk. ceramic tiles as specified below conforming to I.S.15622-2006 of approved quality, pattern and colour for dado in the dry area including preparing the surface and levelling in the desired line, backing of 20 thk. cement mortar in proportion 1:3, square cut top edge or chamfered top edge in cement mortar 1:3, cement float, machine cutting, levelling, jointing, filling the joints with neat cement slurry or approved colour grout, finishing, curing etc.. complete as directed by Engineer In Charge. Light coloured glazed ceramic tiles	Sqm	47
D36	Providing and laying 8mm thk. ceramic tiles as specified below conforming to I.S.15622-2006 for flooring of an approved, quality, make, size and pattern /design, for flooring including cement mortar bedding of 25 mm thick in 1:4 proportion, neat cement float, cutting, leveling, jointing, filling the joints by neat cement slurry or approved colour grout, curing, finishing etc. complete as directed by Engineer In Charge. Dark coloured antiskid / matt vitrified tiles	Sqm	4

Section 3 -Refurbishment of Sub Office Building			
Sr. No.	Description	Unit	Quantity
D37	Providing and fixing superior quality factory made phenol bonded solid core single leaf flush commercial door shutter of thickness as mentioned below and of approved make conforming to IS: 2202 (Part I, II) with 12mm thk. teak wood lipping all around, 3mm thk. commercial veneer on external face with three coats of french polish and 150mm x 60 mm or 125 mm x 75 mm C.P. teak wood frame without fanlight including, approved fixtures and fastening hooks, eyes, screws and painting the frame and interior side with one coat of primer, putty and two coats of synthetic enamel paint of approved make and colour etc.. complete as directed by Engineer in charge. 25mm thick shutter	Sqm	4
D38	Providing and fixing in position aluminium door fully paneled with 6mm thick Novapan BSL and made up of extruded and anodised aluminium sections of approved make and of size 63.5 mm x 38.10 mm x 2.0 mm thk, 47.62 mm x 10.16 mm x 1.74 mm thk (wt. 0.881 kg./Rm) for outer frame, 47.62 mm x 10.16 mm x 1.74 mm thk (wt. 0.881 kg/Rm) for top rail, 95.25 mm x 25.40 mm x 2.0 mm thk (wt. 1.519 kg/Rm) for bottom rail, 25.0 mm x 44.45 mm x 2.40 mm thk (wt. 0.918 kg/Rm) for lock rail, 47.62 mm x 44.45 mm x 1.88 mm thk (wt. 0.943 kg/Rm) for vertical shutter (hinge side), 47.52 mm x 44.45 mm x 1.95 mm thk (wt. 0.936 kg/Rm) for vertical shutter (latch side), clip weighing 0.097/kg/Rm., including neoprene gasket, fixtures, fastenings and accessories like hinges, locking arrangement, door closer etc.. complete as directed by Engineer In Charge. (Note: anodic film must not be less than 15 microns i.e. AC-15 as per IS, the anodizing must be scaled by keeping the anodized section in boiling de-anodized water for a period of one hour)	Sqm	3

Section 3 -Refurbishment of Sub Office Building			
Sr. No.	Description	Unit	Quantity
D39	Providing and fixing in position uPVC/SWR (Soil/Waste/Rain) pipe of type-B 110 mm dia. in any position including all fittings and accessories, making joints / connections water tight with solvent cement, scaffolding if necessary and making good the damages if any (excluding excavation and refilling the trenches) etc.. complete as specified and directed. (All fittings and accessories like clamps, etc. should be of same brand. No separate payment shall be made for fittings and accessories).	Rmt	20
D40	Providing and fixing in position two track aluminum window of extruded modular an anodized aluminum sections of approved make and of size 61.85 mm x 45.5 mm x 1.3 mm thk (wt 1.055 kg/Rm) for bottom, 61.85 mm x 31.75 mm x 1.3 mm thk. (wt 0.659 kg/Rm) for top & sides, mounted on anodized aluminum rectangular frame of size 63mm x 38mm x 2.0mm(1.054). The shutter comprising of bearing bottom and top of size 40mm x 18 mm x 1.25 mm thk (wt. 0.417 Kg/Rm) Interlocking section of size 40mm x 26,7 mm x 1.10 mm thk. (Wt. 0469 kg./Rm) and hand sides of 40mm x 18mm x 1.25 mm thk (wt. 0.417kg/Rm) with 5 mm thick plain/ frosted / tinted glass fixed in shutter including approved quality neoprene gasket, fixtures, fastenings and accessories like PVC rollers, PVC weep holes, locks, handles etc.. complete as directed by Engineer In Charge. (Note: anodic film must not be less than 15 microns i.e. AC-15 as per IS, the anodizing must be scaleted by keeping the anodized section in boiling de- anodized water for a period of one hour)	Sqm	8

Section 3 -Refurbishment of Sub Office Building			
Sr. No.	Description	Unit	Quantity
D41	Providing and fixing in position aluminum louvered window with anodised aluminum frame of approved make and of size 40mm x 20mm x2.0mm (wt. 0.605 kg/Rm) including adjustable aluminum frame, 4 to 6mm thk. frosted glass, fixtures and fastenings etc.. complete as directed by by Engineer In Charge.	Sqm	1
D42	Providing anti-termite treatment around the periphery of the existing building conforming to IS-6313 (part III) by excavating trenches of 20cm width and exposing the sides of the columns, plinth beams and wall upto a depth of 300mm, rodding for the holes of 300mm deep and at 150m c/c in the trenches, treating with chloropyrifos EC 20 Emulsion or equivalent of 1% concentration by weight at the total rate of 2.25 Litters per meter including backfilling the trenches etc.. complete as directed by Engineer-in-Charge covering 2 years guaranty.	Rmt	42
D43	Providing anti termite treatment conforming to IS-6313 (part-III) to the sides of flooring of the Existing building by punching/ drilling the holes of 16 mm dia at a distance of 300mm centre to centre and injecting 150 ml untill refusal or to a maximum of 1 Lit. per hole with chloropyrifos EC 20 Emulsion or equivalent of 1% concentration by weight, sealing the hole by filling the putty etc.. complete as directed by Engineer-In-Charge with 2 years guaranty.	Per Hole	332

Section 3 -Refurbishment of Sub Office Building			
Sr. No.	Description	Unit	Quantity
D44	Providing and Fixing MS Safety grill of weight specified below for windows as per design including fabricating the grill using M.S. square / round bar, flats and angles including painting with one coat of red oxide zinc chromate primer and two coats of synthetic enamel paint of approved colour and brand etc. complete as directed. (Grill weighing 20 to 25 kg / sqm)	Sq.m	9
D45	Providing and laying 10 to 13mm thk. heavy duty, scratch resistant, high abrasion resistant vitrified tiles (Durastone of equivalent) conforming to I.S.15622 with special hard wearing layer and water absorption less than 0.08% for flooring of an approved, quality, make, pattern and size for flooring including cement mortar bedding of 25 mm thick in 1:4 proportion, cutting, leveling, jointing, filling the joints by neat cement slurry or approved colour grout, curing, finishing etc. complete as directed by Engineer In Charge.	sqm	300
D46	Providing and fixing 10mm thk. Light coloured glazed vitrified tiles for height upto 150mm as specified below conforming to I.S. 15622-2006 of approved quality, pattern and colour for flush/projected skirting and risers including preparing the surface and levelling in the desired line, backing of 20 thk. cement mortar in proportion 1:3, square cut top edge or chamfered top edge in cement mortar 1:3, cement float, machine cutting, leveling, jointing, filling the joints with neat cement slurry or pigments mixed with cement, finishing, curing etc. complete as directed by Engineer In Charge.	rmt	140

Section 4 - Refurbishment of 22 KV Substation building and Transformer area			
Sr. No.	Description	Unit	Quantity
A1	Removing cement plaster of any finish from the wall, complete with racking out the joints to a depth of 20 mm.	Sqm	564.00
A2	Chipping /removing loose concrete up to reinforcement bars, without damaging the reinforcement, removing all the loose materials and to make all the exposed surfaces free from oil, dust and all impurities etc.. complete.	Sqm	145.00
A3	Providing and fixing in vertical position telescopic M.S. prop under deflected beam/lintel/slab/chajjas by using teak wood battens of size 1000 x 80 x 80 for packing between prop plate and the beam/lintel/slab/chajjas bottom surface as per the directions of engineer- in-charge.	Nos	34.00
B4	Demolishing cement concrete manually/ by mechanical means including disposal of unserviceable material within premises at a suitable stacking location at ground level including all lead & lifts as per direction of Engineer-in-charge without disturbing the other structural elements.	Cum	1.00
B5	Demolishing brick work in lime or cement mortar including plaster, paint, etc.. manually/ by mechanical means including stacking of serviceable material and disposal of unserviceable material within 50 metres lead as per direction of Engineer-in-charge.	Cum	1.00
B6	Removing or destroying plants etc.. growing on walls, drainage pipes, destroying roots by applying approved weedicide & reinstating the wall surface by plaster to the damage surface of the building	Sqm	20.00
B7	Removing existing door or windows with frame and shutters and making good etc.. to the existing surface.	Nos	20.00

Section 4 - Refurbishment of 22 KV Substation building and Transformer area			
Sr. No.	Description	Unit	Quantity
B8	Breaking and removing the water proofing layers of I. P. S. with bituminous joints and brick bat concrete over the existing terrace floor, chajja, top of headroom slab and canopy including cement vata and exposing R.C.C. slab top complete.	Sqm	129.00
B9	Dismantling tile work in floors and roofs laid in cement mortar including stacking material within 50 metres lead. For thickness of tiles 10 mm to 25 mm	Sqm	89.00
B10	Dismantling C.I., UPVC and asbestos vent pipes and shaft, soil, waste, rain water pipe, mild steel, GI and asbestos gutters, ridge and hips with fittings and clamps including stacking the material within 50 meters lead : 100 mm dia pipe	Rmt	10.00
B11	Dismantling steel work in built up sections in angles, tees, flats and channels of rolling shutters, grills, gates, fencing, hoardings, including all gusset plates, bolts, nuts, cutting rivets, welding etc.. including dismembering and stacking within 50metres lead.	Kg	3376.00
B12	Dismantling Asbestos sheet roofing including ridges, hips, valleys and gutters etc., and stacking the material within 50 meters lead of	sqm	146.00
B13	Demolishing R.C.C. slab, R.C.C. wall of any thickness, R.C.C. beams, joists, R.C.C. columns, piles, pile caps etc., in any thickness and size manually/ by mechanical means including stacking of steel bars and disposal of unserviceable material within 50 metres lead as per direction of Engineer - in- charge.	cum	12.00
C14	Application of Rust Converter: Providing & applying One coat of Alkaline Rust converting primer conforming to ASTM- B-117, to exposed existing rebars after removing & cleaning loose rust by wire brush and leave it for 6- 8 hours.	Sqm	145.00

Section 4 - Refurbishment of 22 KV Substation building and Transformer area			
Sr. No.	Description	Unit	Quantity
C15	Removing corrosion of steel reinforcement by mechanical means like wire brushing, chipping to remove loose rust and then applying rust removal solution by using brush application, leaving the surface for at least 15 to 30 minutes, then removing loose materials by scrubbing or with brush and applying polymer bond to the old concrete surface before applying Polymer mortar.	Sqm	145.00
C16	Anti-Corrosive coating to exposed reinforcement: Providing & applying Two coats of Anti Corrosive protective coating (CBRI / CSIR technology) for reinforcement bars by brush. Sprinkle dry sand when second coat is tacky so as to get rough surface.	MT	1.00
C17	Application of Corrosion Inhibitor: Providing & applying One coat of Concrete Penetrating Corrosion Inhibitor (Surface applied) which works on Bipolar Inhibition Mechanism on entire concrete surface to be repaired by using brush or spray at 250 ml per Sq.Mt./Coat or as per manufacturer's specification and prior to application of first coat of anti corrosive coating to reinforcement.	Sqm	145.00
C18	Providing Micro Concrete jacketing to walls or beams of thickness upto 75 mm using Polymer modified cement premixed quartz sand aggregate packed in bags of standard manufacture, for high early strength of 40 N/mm sq.cm of approved brand. The dry product is to be mixed with 12.5% water by weight, along with washed and poured into rigid form work moulds & tamped properly, & cured for 3 days. [Payment is to be made by weight premixed of micro concrete product consumed as per site register records. No extra payment shall be made for shuttering or any other material.	Kg	4785.00

Section 4 - Refurbishment of 22 KV Substation building and Transformer area			
Sr. No.	Description	Unit	Quantity
C19	Providing and applying Polymer modified cement mortar of average thickness 15-20mm using Polymer in one or more layers in proportion 1:5:15 of Polymer Cement Quartz Sand as manufacturer's specifications in specific layers, curing the surface after 72 hours of application with wet gunny bags etc. and by finishing the surface with 12mm thick (1:3) Cement sand plaster.	Sqm	80.00
C20	Providing and applying Polymer modified cement mortar of average thickness 30-40mm using Polymer in two layers in proportion 1:5:15 of Polymer Cement Quartz Sand as manufacturer's specifications in specific layers, curing the surface after 72 hours of application with wet gunny bags etc. and by finishing the surface with 12mm thick (1:3) Cement sand plaster.	Sqm	37.00
C21	Bond Coat: Providing & applying One coat of structural grade epoxy bond coat by brush conforming to ASTM-C-882-87 to the prepared concrete surface to be repaired / strengthened. This is applied prior to the application of polymer repair mortar / epoxy mortar / Micro-concrete to have monolithic action between old concrete surface and new concrete surface.	Sqm	146.00
C22	Shear Connectors: Make 10/12 mm dia holes using heavy duty electrically operated hammer drills in the concrete of RCC members to a depth of about 75 mm at 500 mm c/c or at suitable grid in zig-zag fashion, clean the holes using air jet and fix pre-fabricated 100 x 50 mm L- shape 8 mm dia rebar using Anti Corrosive protective coating so that 75 mm out of 100 mm is inserted inside the concrete and 25 mm remain outside along with 50 mm bend. The shear connectors are used to tie the additional reinforcement bars.	Nos	264.00

Section 4 - Refurbishment of 22 KV Substation building and Transformer area			
Sr. No.	Description	Unit	Quantity
C23	Additional Reinforcement: Cutting, bending and fixing in position steel reinforcement of specified/required sizes and shapes in the form of main rebars, stirrups & rings, distribution rebars etc., and tying them to shear connectors using GI binding wire. The additional rebars should be coated with TWO coats of Anti Corrosive protective coating & dry sand to be sprinkled on second coat.	M.T	2.00
D	FINISHING, PAINTING & MISC. WORKS		
D24	Providing and laying in position plain cement concrete of specified grade cement with trap/granite/quartzite/gneiss metal mixing in concrete mixer including bailing out water, compacting, finishing surface, curing and including the cost of centering and shuttering at all level : Nominal Mix of 1:2:4 (1 cement OPC: 2	Cum	1.00
	coarse sand : 4 graded stone aggregate 20 mm nominal size)		
D25	Brick work with common burnt clay modular bricks of class designation 3.5 and above in superstructure above plinth level upto floor five level in all shapes and sizes in : Cement mortar 1:4 (1 cement : 4 coarse sand)	Cum.	17.00
D26	Providing and applying 12 mm thick internal plaster with neeru finish by using ready-mix mortar as per manufacturers recommendations at all heights and locations for masonry (except stone masonry) and concrete surfaces including racking out joints, hacking of concrete surface, finishing, curing, scaffolding etc.. complete.	Sqm.	318.00

Section 4 - Refurbishment of 22 KV Substation building and Transformer area			
Sr. No.	Description	Unit	Quantity
D27	Providing and applying 20 mm thick external sand faced cement plaster by using ready-mix mortar upto 10m from ground level and at all locations in two coats for masonry (except stone masonry) and concrete surfaces including racking out joints, hacking of concrete surface, finishing, curing, scaffolding etc.. complete.	Sqm.	368.00
D28	Providing and applying first single coat of approved primer and two coats of synthetic enamel paint/flat oil paint of an approved make and colour as per manufacturers specifications to surfaces specified below, at all height and locations as directed including scaffolding, cleaning and preparing surfaces for painting by any approved means etc.. complete as directed by Engineer-in charge. For plastered wall surface.	Sqm.	583.00
D29	Providing and applying first single coat of approved primer and two coats of anti-algal, anti-fungal, exterior paint as specified below of an approved make and colour as per manufacturers specifications to any surface, upto 10m height from ground level and at all locations as directed including preparing surfaces for painting by any approved means, scaffolding, cleaning and curing etc.. complete as directed by Engineer-in-charge. By using acrylic based exterior paint	Sqm.	651.00
D30	Waterproofing the terrace slabs with average 100 mm thick, brick bats laid in cement mortar bed 1:4 filled with mortar 1:4 of total thickness 100 mm, laid to slope (1:100) with vata 15 cm, at the junction of walls and IPS flooring (1:2:3) 40 mm thick with admixture, of approved water proofing compound, as per manufacturers specification laid after grouting the slab, finishing curing etc.. complete as directed and specified. (Horizontal measurement clear between walls will be paid for). Do with broken China mosaic flooring instead of IPS set in cement mortar (1:4) 40 mm thick	Sqm	115.00

Section 4 - Refurbishment of 22 KV Substation building and Transformer area			
Sr. No.	Description	Unit	Quantity
D31	Providing and laying 25 to 30 mm thk. Kota stone tiles 25 mm to 30 mm thick of an approved quality and size for paving / flooring including cement mortar bedding of 25 mm thick in 1:4 proportion, cement float, pointing in cement mortar 1:3, cutting, dressing, leveling, jointing, pointing, curing, finishing etc. complete as directed by Engineer In Charge.	Sqm	91.00
D32	Water proofing treatment to the chajja after removing old plaster and roughening the surface and finishing the top surface with 20mm thk. 1:2 c.s. plaster with approved water proofing compounds and neat cement finish, the rate also includes for 1:3 c.s. facia of chajja to match the new surface(actual area treated will be paid).	Sqm	28.00
D33	Providing and fixing in position uPVC/SWR (Soil/Waste/Rain) pipe of type-B 110 mm dia. in any position including all fittings and accessories, making joints / connections water tight with solvent cement, scaffolding if necessary and making good the damages if any (excluding excavation and refilling the trenches) etc.. complete as specified and directed. (All fittings and accessories like clamps, etc. should be of same brand. No separate payment shall be made for fittings and accessories).	Rmt	10.00

Section 4 - Refurbishment of 22 KV Substation building and Transformer area			
Sr. No.	Description	Unit	Quantity
D34	Providing and fixing in position aluminum door fully panelled with 6mm thick Novapan BSL and made up of extruded and anodised aluminium sections of approved make and of size 63.5 mm x 38.10 mm x 2.0 mm thk, 47.62 mm x 10.16 mm x 1.74 mm thk (wt. 0.881kg./Rm) for outer frame, 47.62 mm x 10.16 mm x 1.74 mm thk (wt. 0.881 kg/Rm) for top rail, 95.25 mm x 25.40 mm x 2.0 mm thk (wt. 1.519 kg/Rm) for bottom rail, 25.0 mm x 44.45 mm x 2.40 mm thk (wt. 0.918 kg/Rm) for lock rail, 47.62 mm x 44.45 mm x 1.88 mm thk (wt. 0.943 kg/Rm) for vertical shutter (hinge side), 47.52 mm x 44.45 mm x 1.95 mm thk (wt. 0.936 kg/Rm) for vertical shutter (latch side), clip weighing 0.097/kg/Rm., including neoprene gasket, fixtures, fastenings and accessories like hinges, locking arrangement, door closer etc.. complete as directed by Engineer In Charge. (Note: anodic film must not be less than 15 microns i.e. AC-15 as per IS, the anodizing must be scaleted by keeping the anodized section in boiling de- anodized water for a period of one hour)	Sqm	3.00
D35	Providing and fixing in position side hung window with friction hinges, made up of extruded modular and anodised aluminum section of approved make and of size 38.10 mm x 25.40 mm x 1.44 mm thk (wt. 0.471 kg/Rm) for outer rectangular tube, 40 mm x 31.5 mm x 1.5 mm (wt. 0.549 kg/Rm) for outer frame, 40 mm x 31.50 mm x 1.50 mm thk (wt. 0.502 kg/Rm) for central mullion, 40 mm x 31.50 mm x 1.50 mm thk (wt. 0.549 kg/Rm) for shutter frame and 16.50 mm x 14.50 mm x 1.20 mm thk (wt. 0.157 kg/Rm) for glazing clip with 5 mm thick plain / frosted / tinted glass including neoprene gasket, fixtures, fastenings and accessories like handles, hinges, locking arrangement etc.. complete as directed by Engineer In Charge. (Note: anodic film must not be less than 15 microns i.e. AC-15 as per IS, the anodizing must be scaleted by keeping the anodized section in boiling de-anodized water for a period of one hour)	Sqm	22.00

Section 4 - Refurbishment of 22 KV Substation building and Transformer area			
Sr. No.	Description	Unit	Quantity
D36	Providing and fixing rolling shutters made out of 18 gauge steel sheets for curtains, including bottom rail, 100 mm wide guide channels for opening width up to 4.0m and 150mm wide guide channel for opening width more than 4.0m, lock plates, locking arrangement on both sides, fixing bolts, pulling handles, MS hood of appropriate size, rolling arrangement, standard make springs in brackets etc.. including fixing of frames with rag bolts, grouting of parts in position etc.. and also including two coats of red oxide zinc chromate primer and two coats of synthetic enamel paint of approved colour, shade and brand, providing ball bearing wherever required and directed etc. complete and providing mechanical device for operating rolling shutters. complete as per IS:6248 / specifications and as directed by Engineer In Charge. The shutter should withstand wind pressure of 47meters per second.	Sqm	6.00
E	Paver block & Kerb Stone		
E37	Providing & fixing in the footpath , 80mm thick Lacquer coated (Reflective) interlocking white cement concrete pavers in red (TerraCotta)Black, Brown, Lemon Yellow or any colour with vermeticular or any anti skid texture on top surface of approved pattern /shape and colour having average crushing strength not less than 50N/mm ² as per technical specifications and IS CODE 15658:2006; manufactured in double layer precast concrete blocks . The top layer of paver block should be 12 to 15 mm thick and consisting of cubical shape stone aggregate 8mm size sieve 100% passing and retained on 4.75 mm size sieve, silica sand and with pure iron oxide ultra violet stabilized pigment @5%by weight of white cement and should be coated with lacquer having hard, high abrasive resistance and water repellent. The bottom layer in grey cement should be 65 to 68mm thick having 12mm size sieve 100%passing aggregates as per technical specifications, placed on average compacted thickness of 25mm well graded sand cushioning uniformly compacted with proper capacity mechanical compact or with required level, grade	sqm	90.00

Section 4 - Refurbishment of 22 KV Substation building and Transformer area			
Sr. No.	Description	Unit	Quantity
	and camber etc.. complete as specified and as directed by the Engineer.		
E38	Providing & Fixing kerb stones 30 cm.to 40 cm. long., 15 cm. wide, 38 cm. deep medium dressed in all exposed surfaces, set in cement mortar 1:2 on a 15 cm. thick and 25 cm. wide RMC M-20 C.C. bed including filling the joints with 1:2 C.M. pointing, curing etc.. complete.	rmt	60.00
E39	Providing & fixing water tables of stone of size 30 cm. wide and 10 cm. thick, fairly dressed on a R.M.C. M-20 cement concrete bed 15 cm. thick, including filling in the joints, with cement mortar 1:2 cement pointing, curing etc.. complete as specified and as directed by the Engineer.	rmt	60.00
E40	Providing and fixing non-asbestos fiber cement high impact polypropylene reinforced roofing accessories in all colours with polymer coated J or L hooks, bolts and nuts and or G.I. seam bolts and nuts, G.I. plain and bitumen washers or with self drilling fastener and EPDM washer etc.. complete as directed. Corrugated serrated adjustable ridges	sqm	120
E41	Excavation in all types of soils (for sewerage works),such as Earth, Marine clay, Marshy land, Running sand, Garbage, Slush, Murum, Rock boulders etc. as directed by the engineer. The rate includes dewatering, backfilling, removing the rank vegetation and removing the excavated materials within a lead of 150M as directed including levelling, ramming, etc. complete, and measured from the edge of cutting including all lifts and stacking in layers and removing the surplus excavated materials as directed for lift upto 2M{Records to be maintained properly}.The rate also includes supporting public utilities such as cables, drains, pipe water mains, but shall not include the cost of shoring etc. as specified and directed.1) The rate includes the handling/supporting the existing utilities such as cables, drains, pipes, water mains etc.. 2) It also includes the royalty and other taxes if any.- Lift from 0 m to2m	cum	275.00

Section 4 - Refurbishment of 22 KV Substation building and Transformer area			
Sr. No.	Description	Unit	Quantity
E42	Lead upto contractors dumping ground Note :1.This lead will be admissible only within BMC limits. The distance between centerlines shall be taken as the lead which shall be measured by the shortest route on the plan and not the actual route taken by the Contractor. Here Centerlines represents the center point (for area/mass excavation) and the center chainage for linear excavation.2. The Engineer In Charge shall exclusively include these directions in the Tender/Bid document and the Tenders/Bidders shall be insisted to make the declaration of the dumping plot at the time of submission of Bid.3. The Engineer In Charge shall take the quantity in account for the disposal only upto Municipal Limits for the Shortest Route and payment will be made as per the actual distance within municipal limit. The payment will be restricted to the shortest distance upto the Municipal limit for the plot identified outside the Municipal limit.	cum	85.00
E43	Providing & Laying dry stone Rubble Soling with average 230 mm size hard stone set in regular lines, handpacked and interstices thoroughly filled with small chips including filling in with good quality murum brought from outside, compacting with iron rammers, watering, sand spreading 12mm thk. layer of grit on top etc. complete as directed by Engineer In Charge. (Note: The rate includes the royalty and other taxes if any)	cum	84.00

Section 4 - Refurbishment of 22 KV Substation building and Transformer area			
Sr. No.	Description	Unit	Quantity
E44	Providing and laying in position M-15 grade plain cement concrete (cement content considered @ 240 kg/cum as per IS 456 table, with cement content as per approved design mix by and manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for plain cement concrete work, including pumping of R.M.C. from transit mixer to site of laying and curing, including the cost of centering, shuttering and finishing, including cost of curing, admixtures in recommended proportions as per IS : 9103 to accelerate/ retard setting of concrete, improve workability without impairing strength and durability as per direction of the Engineer.	cum	16.00
E45	Providing and laying in position ready mixed design mix M-35 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying and the cost of centering, shuttering, finishing and excluding reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer-in-charge. The Mix design as per particular specifications shall be got approved by Engineer-in-Charge before execution of the item. The rate shall include cost of all specified materials and operations at all levels and heights, including the cost of centering, shuttering and and excluding reinforcement which shall be paid under relevant item.(Note :- Cement content considered in this item is @ 350 kg/cum as per IS 456 table showing minimum cement content. No extra will be paid nor any amount will recovered on account of variation of cement in mix design as per specifications for controlled concrete).		
a	Pedestal	cum	83.00
b	Columns	cum	9.00
c	Walls	cum	18.00
d	Beams	cum	9.00

Section 4 - Refurbishment of 22 KV Substation building and Transformer area			
Sr. No.	Description	Unit	Quantity
E46	Providing and fixing in position steel bars reinforcement of various diameters for R.C.C. pile, pile caps, footings, raft, retaining wall, shear wall, lift wall, foundations, slabs, beams, columns, canopies, staircases, newels, chajjas, lintels, pardies, coping, fins, arches, etc.. as per detailed designs, drawings and bar bending schedules, including straightening, cutting, bending, hooking the bars, binding with wires or tack welding, supporting as required etc.. all complete at all levels. Corrosion Resistant Steel (500 CRS D)	MT	10.00
E47	Providing anti-termite treatment around the periphery of the existing building conforming to IS-6313 (part III) by excavating trenches of 20cm width and exposing the sides of the columns, plinth beams and wall upto a depth of 300mm, rodding for the holes of 300mm deep and at 150m c/c in the trenches, treating with chloropyrifos EC 20 Emulsion or equivalent of 1% concentration by weight at the total rate of 2.25 Litters per meter including backfilling the trenches etc.. complete as directed by Engineer-in-Charge covering 2 years guaranty.	Rmt	50
E48	Providing anti termite treatment conforming to IS- 6313 (part-III) to the sides of flooring of the Existing building by punching/ drilling the holes of 16 mm dia at a distance of 300mm centre to centre and injecting 150 ml untill refusal or to a maximum of 1 Lit. per hole with chloropyrifos EC 20 Emulsion or equivalent of 1% concentration by weight, sealing the hole by filling the putty etc.. complete as directed by Engineer-In-Charge with 2 years guaranty.	Per Hole	332.00

Section 4 - Refurbishment of 22 KV Substation building and Transformer area			
Sr. No.	Description	Unit	Quantity
E49	Providing, detailing, fabricating and fixing at desired location using hot rolled sections and MS Plates of grade Fe 250 as per specifications and approved fabrication drawings (which are to be prepared by Contractor and got approved from Engineer), transporting to site and erecting structural steel members for all heights & at all levels including provision of necessary erection bolts, fixing bolts, nuts, washers, cleats, stiffeners, gussets, base plate, and all necessary fixtures and operations like preheating as per specifications, straightening, bending, cutting, drilling, grinding, machining if specified, welding, grinding and removing the welding burr and preparing surface for painting with wire brush cleaning and applying two coats of epoxy red oxide zinc phosphate primer of 30 microns each and two coats of Epoxy Corrosion Resistant Enamel paint of 30 microns after fabrication including touching up with spray painting after erection etc. complete as directed by Engineer In Charge. (The qty. for this item shall be measured for gusset plates, base plates, bolts in M.T.)	MT	4.00
E50	FRP Fencing Made Using GI Structure and FRP Gratings 12 X 50 X 50 MM with provision of Door FRP Flat sheet thickness 4 MM to be used instead of Grating in the top 2000 MM to block rain water during monsoon. GI Structure should have average 100 Micron Coating MOC of FRP : Glas fiber reinforced Isophthalic Polyester Resin, Flame Retardant, UV Resistant, Color : RAL 7040 GI Structure to be mounted with wall using M12 X 100 SS304 Anchor & Fastener at every 2000 MM all hardware should be SS304. GI Structure to be made using Angle frame 65 X 65 X 8 MM and Tee 130 X 65 X 8 MM minimum.	sqm	256.00

Section 4 - Refurbishment of 22 KV Substation building and Transformer area			
Sr. No.	Description	Unit	Quantity
E51	Disposal of building rubbish / malba / similar unserviceable, dismantled or waste materials by mechanical means including loading, transporting, unloading to contractor identified dumping ground for all loads including all lifts involved	cum	55.00

Section 5 - Refurbishment of Riser Chamber			
Sr. No.	Description	Unit	Quantity
A1	Removing cement plaster of any finish from the wall, complete with racking out the joints to a depth of 20 mm.	Sqm	423.00
A2	Chipping /removing loose concrete up to reinforcement bars, without damaging the reinforcement, removing all the loose materials and to make all the exposed surfaces free from oil, dust and all impurities etc.. complete.	Sqm	186.00
A3	Providing and fixing in vertical position telescopic M.S. prop under deflected beam/lintel/slab/chajjas by using teak wood battens of size 1000 x 80 x 80 for packing between prop plate and the beam/lintel/slab/chajjas bottom surface as per the directions of engineer- in-charge.	Nos	29.00
B4	Demolishing cement concrete manually/ by mechanical means including disposal of unserviceable material within premises at a suitable stacking location at ground level including all lead & lifts as per direction of Engineer-in-charge without disturbing the other structural elements.	Cum	1.00
B5	Demolishing brick work in lime or cement mortar including plaster, paint, etc.. manually/ by mechanical means including stacking of serviceable material and disposal of unserviceable material within 50 metres lead as per direction of Engineer-in-charge.	Cum	3.00
B6	Removing or destroying plants etc.. growing on walls, drainage pipes, destroying roots by applying approved weedicide & reinstating the wall surface by plaster to the damage surface of the building	Sqm	10.00

Section 5 - Refurbishment of Riser Chamber			
Sr. No.	Description	Unit	Quantity
B7	Breaking and removing the water proofing layers of I. P. S. with bituminous joints and brick bat concrete over the existing terrace floor, chajja, top of headroom slab and canopy including cement vata and exposing R.C.C. slab top complete.	Sqm	18.00
B8	Demolishing R.C.C. slab, R.C.C. wall of any thickness, R.C.C. beams, joists, R.C.C. columns, piles, pile caps etc., in any thickness and size manually/ by mechanical means including stacking of steel bars and disposal of unserviceable material within 50 metres lead as per direction of Engineer - in- charge.	Cum	1.00
B9	Dismantling roofing including ridges, hips, valleys and gutters etc., and stacking the material within 50 metres lead of : Asbestos sheet	Sqm	370.00
B10	Dismantling steel work in built up sections in angles, tees, flats and channels of rolling shutters, grills, gates, fencing, hoardings, including all gusset plates, bolts, nuts, cutting rivets, welding etc.. including dismembering and stacking within 50metres lead.	Kg	8,175.00
B10A	Disposal of building rubbish / malba / similar unserviceable,dismantled or waste materials by mechanical means including loading, transporting, unloading to contractor identified dumping ground for all loads including all lifts involved	cum	78.00
C11	Application of Rust Converter: Providing & applying One coat of Alkaline Rust converting primer conforming to ASTM- B-117, to exposed existing rebars after removing & cleaning loose rust by wire brush and leave it for 6- 8 hours.	Sqm	186.00

Section 5 - Refurbishment of Riser Chamber			
Sr. No.	Description	Unit	Quantity
C12	Removing corrosion of steel reinforcement by mechanical means like wire brushing, chipping to remove loose rust and then applying rust removal solution by using brush application, leaving the surface for at least 15 to 30 minutes, then removing loose materials by scrubbing or with brush and applying polymer bond to the old concrete surface before applying Polymer mortar.	Sqm	186.00
C13	Anti Corrosive coating to exposed reinforcement: Providing & applying Two coats of Anti Corrosive protective coating (CBRI / CSIR technology) for reinforcement bars by brush. Sprinkle dry sand when second coat is tacky so as to get rough surface.	MT	0.75
C14	Application of Corrosion Inhibitor: Providing & applying One coat of Concrete Penetrating Corrosion Inhibitor (Surface applied) which works on Bipolar Inhibition Mechanism on entire concrete surface to be repaired by using brush or spray at 250 ml per Sq.Mt./Coat or as per manufacturer's specification and prior to application of first coat of anti corrosive coating to reinforcement.	Sqm	186.00
C15	Providing Micro Concrete jacketing to walls or beams of thickness upto 75 mm using Polymer modified cement premixed quartz sand aggregate packed in bags of standard manufacture, for high early strength of 40 N/mm sq.cm of approved brand. The dry product is to be mixed with 12.5% water by weight, along with washed and poured into rigid form work moulds & tamped properly, & cured for 3 days. [Payment is to be made by weight premixed of micro concrete product consumed as per site register records. No extra payment shall be made for shuttering or any other material.	Kg	6,138.00

Section 5 - Refurbishment of Riser Chamber			
Sr. No.	Description	Unit	Quantity
C16	Providing and applying Polymer modified cement mortar of average thickness 15-20mm using Polymer in one or more layers in proportion 1:5:15 of Polymer Cement Quartz Sand as manufacturer's specifications in specific layers, curing the surface after 72 hours of application with wet gunny bags etc. and by finishing the surface with 12mm thick (1:3) Cement sand plaster.	Sqm	93.00
C17	Providing and applying Polymer modified cement mortar of average thickness 30-40mm using Polymer in two layers in proportion 1:5:15 of Polymer Cement Quartz Sand as manufacturer's specifications in specific layers, curing the surface after 72 hours of application with wet gunny bags etc. and by finishing the surface with 12mm thick (1:3) Cement sand plaster.	Sqm	56.00
C18	Bond Coat: Providing & applying One coat of structural grade epoxy bond coat by brush conforming to ASTM-C-882-87 to the prepared concrete surface to be repaired / strengthened. This is applied prior to the application of polymer repair mortar / epoxy mortar / Micro concrete to have monolithic action between old concrete surface and new concrete surface.	Sqm	187.00
C19	Shear Connectors: Make 10/12 mm dia holes using heavy duty electrically operated hammer drills in the concrete of RCC members to a depth of about 75 mm at 500 mm c/c or at suitable grid in zig-zag fashion, clean the holes using air jet and fix pre-fabricated 100 x 50 mm L- shape 8 mm dia rebar using Anti Corrosive protective coating so that 75 mm out of 100 mm is inserted inside the concrete and 25 mm remain outside along with 50 mm bend. The shear connectors are used to tie the additional reinforcement bars.	Nos	373.00

Section 5 - Refurbishment of Riser Chamber			
Sr. No.	Description	Unit	Quantity
C20	Additional Reinforcement: Cutting, bending and fixing in position steel reinforcement of specified/required sizes and shapes in the form or main rebars, stirrups & rings, distribution rebars etc., and tying them to shear connectors using GI binding wire. The additional rebars should be coated with TWO coats of Anti Corrosive protective coating & dry sand to be sprinkled on second coat.	M.T	0.5
C21	Providing and applying 100 % solid , flexible , elastomeric , UV stable, 2- component , water proof , fast setting (within 45 seconds) , specific grade Polyurea Coating at 1.2 mm nominal thickness on concrete surface on inner side of reservoir forming a seamless & monolithic membrane over compatible epoxy primer . The coating should have been tested and conform to various standards as mentioned in Data Sheet of the manufacturer. The coating shall be carried out in a single application with multiple passes using high pressure plural component reactor strictly as per manufacturers specifications including all necessary tools , tackles , high pressure spray machine , primer application , surface cleaning by sweep blasting/ grinding and filling up opened up bug holes etc. using epoxy primer mixed with fine silica sand (FQ 75). Application to be carried out by trained applicator certified by the principal. Necessary safety gadgets for worker using high pressure equipment & spray painting such as Boiler suit, helmet , safety shoes, nose mask, goggles, hand gloves to be provided by the painting contractor . Testing of the coating for DFT, Adhesion , Hardness and finally by filling water in the tank (water filling not in the scope of painting applicator) and checking against any leakage. The coating to carry a warranty for 10 year against material and application fault. Surface to be coated with Poloyurea to be handed over to Painting Contractor by Civil Contractor should be bone dry (with surface moisture preferably below5% and maximum limit at localized area up to 8%) and repaired of construction surface blemishes if any with suitable repairing compound (polymeric mortar/ epoxy mortar) etc.. complete as directed.	Sqm	676.00

Section 5 - Refurbishment of Riser Chamber			
Sr. No.	Description	Unit	Quantity
D22	Providing, detailing, fabricating and fixing at desired location using M.S. chequered Plates of any thickness and of grade Fe 250 as per specifications and approved fabrication drawings (which are to be prepared by Contractor and got approved from Engineer), including transportation of the same to site, erection at all heights and levels, provision of necessary erection bolts, fixing bolts, nuts, washers, cleats, stiffeners, and all necessary operations like preheating as per specifications, straightening, bending, cutting, drilling, grinding, machining if specified, welding, grinding and removing the welding burr and preparing surface for painting with wire brush cleaning and applying two coats of epoxy red oxide zinc phosphate primer of 30 microns each and two coats of Epoxy Corrosion Resistant Enamel paint of 30 microns after fabrication including touching up with spray painting after erection etc. complete as directed by Engineer In Charge.	M.T	0.6
D23	Providing and laying in position plain cement concrete of specified grade cement with trap/granite/quartzite/gneiss metal mixing in concrete mixer including bailing out water, compacting, finishing surface, curing and including the cost of centering and shuttering at all level : Nominal Mix of 1:2:4 (1 cement OPC: 2 coarse sand : 4 graded stone aggregate 20 mm nominal size)	Cum	1.00
D24	Brick work with common burnt clay modular bricks of class designation 3.5 and above in superstructure above plinth level upto floor five level in all shapes and sizes in : Cement mortar 1:4 (1 cement : 4 coarse sand)	Cum.	2.00
D25	Providing and applying 12 mm thick internal plaster with neeru finish by using ready-mix mortar as per manufacturers recommendations at all heights and locations for masonry (except stone masonry) and concrete surfaces including racking out joints, hacking of concrete surface, finishing, curing, scaffolding etc.. complete.	Sqm.	296.00

Section 5 - Refurbishment of Riser Chamber			
Sr. No.	Description	Unit	Quantity
D26	Providing and applying first single coat of approved primer and two coats of synthetic enamel paint/flat oil paint of an approved make and colour as per manufacturers specifications to surfaces specified below, at all height and locations as directed including scaffolding, cleaning and preparing surfaces for painting by any approved means etc.. complete as directed by Engineer-in charge. For plastered wall surface.	Sqm.	326.00
D27	Providing and applying 20 mm thick external sand faced cement plaster by using ready-mix mortar upto 10m from ground level and at all locations in two coats for masonry (except stone masonry) and concrete surfaces including racking out joints, hacking of concrete surface, finishing, curing, scaffolding etc.. complete.	Sqm.	165.00
D28	Providing and applying first single coat of approved primer and two coats of anti-algal, anti-fungal, exterior paint as specified below of an approved make and colour as per manufacturers specifications to any surface, upto 10m height from ground level and at all locations as directed including preparing surfaces for painting by any approved means, scaffolding, cleaning and curing etc.. complete as directed by Engineer-in-charge. By using acrylic based exterior paint For plastered wall surface	Sqm.	587.00
D29	Providing and applying first single coat of approved primer and two coats of synthetic enamel paint/flat oil paint of an approved make and colour as per manufacturers specifications to surfaces specified below, at all height and locations as directed including scaffolding, cleaning and preparing surfaces for painting by any approved means etc. complete as directed by Engineer-in-charge. For steelwork	Sqm	42.00

Section 5 - Refurbishment of Riser Chamber			
Sr. No.	Description	Unit	Quantity
D30	Providing and applying first single coat of approved primer and two coats of synthetic enamel paint/flat oil paint of an approved make and colour as per manufacturers specifications to the metal purlins not more the 150mm in height, at all height and locations as directed including removing the existing paint by burning, cleaning, preparing the surface for painting etc.. complete as directed by Engineer-in-charge.	Rmt	9.00
D31	Providing and laying damp-proof course 50mm thick with cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 12.5mm nominal size) including water proofing material in cement concrete work in doses by weight of cement as per manufacturer's specification.	Sqm	20.00
D32	Providing and fixing 6 mm thick Non- asbestos high impact Polypropylene reinforced cement corrugated sheet of approved make conforming to IS: 14871-2000 laying the same in position as per the stipulation in IS: 3007-1991 using 8m dia polymer coated iron L or J hook bolts, galvanized iron & bituminous washers, or self drilling fasteners and EPDM washers, galvanized iron clamps, nuts and bolts etc.. complete and as directed. (Net Area covered by sheeting will be measured. Laps will not be paid separately)	Sqm	397.00
D33	Providing and fixing non-asbestos fiber cement high impact polypropylene reinforced roofing accessories in all colours with polymer coated J or L hooks, bolts and nuts and or G.I. seam bolts and nuts, G.I. plain and bitumen washers or with self drilling fastener and EPDM washer etc.. complete as directed. Corrugated serrated adjustable ridges	rmt	19.00

Section 5 - Refurbishment of Riser Chamber			
Sr. No.	Description	Unit	Quantity
D35	Providing, detailing, and fabricating as per specifications, transporting to site and erecting ladder / railing using stainless steel hollow pipes of grade 304 including, S.S. fixtures and fastenings, cleats, stiffeners, gussets etc. and all necessary operations straightening, bending, like cutting, drilling, welding, grinding and removing the welding burr, machining if specified, finishing, cleaning etc. complete as directed by Engineer In Charge.	kg	1750
D36	Providing and laying 18 mm thk., heavy duty metallic topping for flooring in cement mortar 1:2, with 4 Kg / Sqmt ironite or equivalent over existing concrete bed and as per manufacturers specifications including leveling, curing, finishing etc. complete as directed by Engineer In Charge.	Sqm	20
	Paver block & Kerb Stone		

Section 5 - Refurbishment of Riser Chamber			
Sr. No.	Description	Unit	Quantity
D37	Providing & fixing in the footpath, 80mm thick Lacquer coated (Reflective) interlocking white cement concrete pavers in red (TerraCotta)Black, Brown, Lemon Yellow or any colour with vermeticular or any anti skid texture on top surface of approved pattern /shape and colour having average crushing strength not less than 50N/mm ² as per technical specifications and IS CODE 15658:2006; manufactured in double layer precast concrete blocks . The top layer of paver block should be 12 to 15 mm thick and consisting of cubical shape stone aggregate 8mm size sieve 100% passing and retained on 4.75 mm size sieve, silica sand and with pure iron oxide ultra violet stabilized pigment @5%by weight of white cement and should be coated with lacquer having hard, high abrasive resistance and water repellent. The bottom layer in grey cement should be 65 to 68mm thick having 12mm size sieve 100%passing aggregates as per technical specifications, placed on average compacted thickness of 25mm well graded sand cushioning uniformly compacted with proper capacity mechanical compact or with required level, grade and camber etc.. complete as specified and as directed by the Engineer.	sqm	100
D38	Providing & Fixing kerb stones 30 cm.to 40 cm. long., 15 cm. wide, 38 cm. deep medium dressed in all exposed surfaces, set in cement mortar 1:2 on a 15 cm. thick and 25 cm. wide RMC M-20 C.C. bed including filling the joints with 1:2 C.M. pointing, curing etc.. complete.	rmt	80
D39	Providing & fixing water tables of stone of size 30 cm. wide and 10 cm. thick, fairly dressed on a R.M.C. M-20 cement concrete bed 15 cm. thick, including filling in the joints, with cement mortar 1:2 cement pointing, curing etc.. complete as specified and as directed by the Engineer.	rmt	80

Section 6 - Refurbishment of Screen Chamber			
Sr. No.	Description	Unit	Quantity
A1	Removing cement plaster of any finish from the wall, complete with racking out the joints to a depth of 20 mm.	Sqm	260
A2	Chipping /removing loose concrete up to reinforcement bars, without damaging the reinforcement, removing all the loose materials and to make all the exposed surfaces free from oil, dust and all impurities etc.. complete.	Sqm	152
A3	Providing and fixing in vertical position telescopic M.S. prop under deflected beam/lintel/slab/chajjas by using teak wood battens of size 1000 x 80 x 80 for packing between prop plate and the beam/lintel/slab/chajjas bottom surface as per the directions of engineer- in-charge.	Nos	8
B4	Dismantling steel work in built up sections in angles, tees, flats and channels of rolling shutters, grills, gates, fencing, hoardings, including all gusset plates, bolts, nuts, cutting rivets, welding etc.. including dismembering and stacking within 50metres lead.	Kg	1039
B5	Demolishing brick work in lime or cement mortar including plaster, paint, etc.. manually/ by mechanical means including stacking of serviceable material and disposal of unserviceable material within 50 metres lead as per direction of Engineer-in-charge.	Cum	7
B6	Removing or destroying plants etc.. growing on walls, drainage pipes, destroying roots by applying approved weedicide & reinstating the wall surface by plaster to the damage surface of the building	Sqm	3
B7	Breaking and removing the water proofing layers of I. P. S. with bituminous joints and brick bat concrete over the existing terrace floor, chajja, top of headroom slab and canopy including cement vata and exposing R.C.C. slab top complete.	Sqm	328

Section 6 - Refurbishment of Screen Chamber			
Sr. No.	Description	Unit	Quantity
B8	Removing existing door or windows with frame and shutters and making good etc.. to the existing surface.	Nos	4
B9	Demolishing cement concrete manually/ by mechanical means including disposal of material within 50 metres lead as per direction of Engineer - in - charge.	Cum	2
B10	Dismantling roofing including ridges, hips, valleys and gutters etc., and stacking the material within 50 metres lead of : Asbestos sheet	Sqm	495
	Dismantling of steel roof structure (Dismantling of roofing sheet is considered in item B10)		
B11	Dismantling steel work in built up sections in angles, tees, flats and channels of rolling shutters, grills, gates, fencing, hoardings, including all gusset plates, bolts, nuts, cutting rivets, welding etc.. including dismembering and stacking within 50metres lead. Including dismantling trusses members, rafters, purlins etc.. of steel work for every additional span of one metre or part thereof beyond 10 metres & dismantling trusses members, rafters, purlins etc.. of steel work for every additional height of one metre or part thereof beyond 5 metres.	kg	15553
B12	Disposal of building rubbish / malba / similar unserviceable, dismantled or waste materials by mechanical means including loading, transporting, unloading to contractor identified dumping ground for all loads including all lifts involved	cum	78
C13	Application of Rust Converter: Providing & applying One coat of Alkaline Rust converting primer conforming to ASTM- B-117, to exposed existing rebars after removing & cleaning loose rust by wire brush and leave it for 6- 8 hours.	Sqm	152

Section 6 - Refurbishment of Screen Chamber			
Sr. No.	Description	Unit	Quantity
C14	Removing corrosion of steel reinforcement by mechanical means like wire brushing, chipping to remove loose rust and then applying rust removal solution by using brush application, leaving the surface for at least 15 to 30 minutes, then removing loose materials by scrubbing or with brush and applying polymer bond to the old concrete surface before applying Polymer mortar.	Sqm	152
C15	Anti Corrosive coating to exposed reinforcement: Providing & applying Two coats of Anti Corrosive protective coating (CBRI / CSIR technology) for reinforcement bars by brush. Sprinkle dry sand when second coat is tacky so as to get rough surface.	MT	0.6
C16	Application of Corrosion Inhibitor: Providing & applying One coat of Concrete Penetrating Corrosion Inhibitor (Surface applied) which works on Bipolar Inhibition Mechanism on entire concrete surface to be repaired by using brush or spray at 250 ml per Sq.Mt./Coat or as per manufacturer's specification and prior to application of first coat of anti corrosive coating to reinforcement.	Sqm	152
C17	Providing Micro Concrete jacketing to walls or beams of thickness upto 75 mm using Polymer modified cement premixed quartz sand aggregate packed in bags of standard manufacture, for high early strength of 40 N/mm sq.cm of approved brand. The dry product is to be mixed with 12.5% water by weight, along with washed and poured into rigid form work moulds & tamped properly, & cured for 3 days. [Payment is to be made by weight premixed of micro concrete product consumed as per site register records. No extra payment shall be made for shuttering or any other material.	Kg	2508

Section 6 - Refurbishment of Screen Chamber			
Sr. No.	Description	Unit	Quantity
C18	Providing and applying Polymer modified cement mortar of average thickness 15-20mm using Polymer in one or more layers in proportion 1:5:15 of Polymer Cement Quartz Sand as manufacturer's specifications in specific layers, curing the surface after 72 hours of application with wet gunny bags etc. and by finishing the surface with 12mm thick (1:3) Cement sand plaster.	Sqm	99
C19	Providing and applying Polymer modified cement mortar of average thickness 30-40mm using Polymer in two layers in proportion 1:5:15 of Polymer Cement Quartz Sand as manufacturer's specifications in specific layers, curing the surface after 72 hours of application with wet gunny bags etc. and by finishing the surface with 12mm thick (1:3) Cement sand plaster.	Sqm	38
C20	Bond Coat: Providing & applying One coat of structural grade epoxy bond coat by brush conforming to ASTM-C-882-87 to the prepared concrete surface to be repaired / strengthened. This is applied prior to the application of polymer repair mortar / epoxy mortar / Micro concrete to have monolithic action between old concrete surface and new concrete surface.	Sqm	153
C21	Shear Connectors: Make 10/12 mm dia holes using heavy duty electrically operated hammer drills in the concrete of RCC members to a depth of about 75 mm at 500 mm c/c or at suitable grid in zig-zag fashion, clean the holes using air jet and fix pre-fabricated 100 x 50 mm L- shape 8 mm dia rebar using Anti Corrosive protective coating so that 75 mm out of 100 mm is inserted inside the concrete and 25 mm remain outside along with 50 mm bend. The shear connectors are used to tie the additional reinforcement bars.	Nos	213

Section 6 - Refurbishment of Screen Chamber			
Sr. No.	Description	Unit	Quantity
C22	Additional Reinforcement: Cutting, bending and fixing in position steel reinforcement of specified/required sizes and shapes in the form of main rebars, stirrups & rings, distribution rebars etc., and tying them to shear connectors using GI binding wire. The additional rebars should be coated with TWO coats of Anti Corrosive protective coating & dry sand to be sprinkled on second coat.	M.T	0.16
D23	Brick work with common burnt clay modular bricks of class designation 3.5 and above in superstructure above plinth level upto floor five level in all shapes and sizes in : Cement mortar 1:4 (1 cement : 4 coarse sand)	Cum.	7
D24	Providing and applying 12 mm thick internal plaster with neeru finish by using ready-mix mortar as per manufacturers recommendations at all heights and locations for masonry (except stone masonry) and concrete surfaces including racking out joints, hacking of concrete surface, finishing, curing, scaffolding etc.. complete.	Sqm.	40
D25	Providing and applying first single coat of approved primer and two coats of synthetic enamel paint/flat oil paint of an approved make and colour as per manufacturers specifications to surfaces specified below, at all height and locations as directed including scaffolding, cleaning and preparing surfaces for painting by any approved means etc.. complete as directed by Engineer-in charge. For plastered wall surface.	Sqm.	760
D26	Providing and applying 20 mm thick external sand faced cement plaster by using ready-mix mortar upto 10m from ground level and at all locations in two coats for masonry (except stone masonry) and concrete surfaces including racking out joints, hacking of concrete surface, finishing, curing, scaffolding etc.. complete.	Sqm.	85

Section 6 - Refurbishment of Screen Chamber			
Sr. No.	Description	Unit	Quantity
D27	Providing and applying first single coat of approved primer and two coats of anti-algal, anti-fungal, exterior paint as specified below of an approved make and colour as per manufacturers specifications to any surface, upto 10m height from ground level and at all locations as directed including preparing surfaces for painting by any approved means, scaffolding, cleaning and curing etc.. complete as directed by Engineer-in-charge. By using acrylic based exterior paint For plastered wall surface	Sqm.	72
D28	Providing waterproofing treatment with Broken China mosaic flooring to the existing terrace/top slab at any floor level (including slab portion beneath overhead water tank) by 1. Removing the existing top layer of the terrace/top slab upto the top of existing brick bat coba without causing any damage to any of the structural member and cleaning the same of any loose material etc.. complete as directed. 2. Dividing the total slab area by marking grid at a spacing of 1.2m. c/c in either direction and form square panels of the size 1.2 m. x 1.2 m. and drilling the holes (by using machine) 37 mm. to 50 mm. dia upto required depth in the R.C.C. slab in staggered form at the junction of the above marked grid as specified and directed by an Engineer in charge.3. Filling the holes only at bottom portion with 10 mm size metal, inserting the grouting nozzle in the drilled hole for grouting and making the hole watertight by filling the gap between nozzle and the hole with cement mortar 1:1 or any other suitable material as a sealant.	Sqm	224

Section 6 - Refurbishment of Screen Chamber			
Sr. No.	Description	Unit	Quantity
	<p>4. Injecting the cement grout admixed with waterproofing compound (one part of cement to 2 parts of water is recommended; initially richer mix which is possible but for further grouting leaner mix is required for filling smaller voids, mix should not be leaner than 1 cement:5 water) with required pressure (as per site conditions) by grout pump so as to seal all inherent holes, honey combs, cavities and voids and making the whole structures consistent and homogeneous solid mass resistant to seepage, dampness, moisture and leakage of water, allowing the grout to overflow from the vent holes (i.e. holes at diagonally opposite corners), to ensure no pockets left. 5. Taking holes one by one in the staggered form for grouting purposes and in each case holes at the diagonally opposite end will be acting as vent holes. 6. Filling the entire area by 15 cm. deep water for ponding test. The ponding test shall be checked after 7 days by the officer of the rank not below Executive Engineer along with Zonal Executive Engineer to ensure that there is no leakage found. The certificate to this effect shall be given by the concerned engineer. 7. Repeating step 4 to 6 until the entire structure is found completely waterproof, if any leakage is found</p>		

Section 6 - Refurbishment of Screen Chamber			
Sr. No.	Description	Unit	Quantity
	<p>8. Laying the flooring of broken China- mosaic (broken pieces of China glazed tiles) of approved colour set in 25 mm. average bed of C.M. 1:3 with waterproofing compound to correct level and slope (1:100) well compacted and finished; such that minimum coverage of China mosaic chips is about 90% of the total area of slab. The above treatment shall continue along the inner side of parapet or the adjoining wall upto 30 cm. high as per the above specifications regarding cement mortar in shape of round vata with necessary groove etc.. complete. 9. Curing the flooring continuously for minimum ten days so as to render the surface hard and tough to withstand weather and normal domestic use. 10. Cleaning the slab and removing and carting the debris; cleaning the top of all dust, loose material, stains etc.. complete as directed. NOTES : 1. No extra payment will be made for brickbat concrete if any, required to fill up the voids which are developed in the process of removing top layer. If there are any such voids; the same shall be filled up with brick bat concrete so that levelled surface is at a correct level and slope is available for laying China mosaic flooring. 2. The finished terrace surface shall be paid for the actual area treated including cement vata.</p>		
D29	<p>Providing and laying damp-proof course 50mm thick with cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 12.5mm nominal size) including water proofing material in cement concrete work in doses by weight of cement as per manufacturer's specification.</p>	Sqm	137

Section 6 - Refurbishment of Screen Chamber			
Sr. No.	Description	Unit	Quantity
D30	Providing and fixing in position side hung window with friction hinges, made up of extruded modular and anodised aluminum section of approved make and of size 38.10 mm x 25.40 mm x 1.44 mm thk (wt. 0.471 kg/Rm) for outer rectangular tube, 40 mm x 31.5 mm x 1.5 mm (wt. 0.549 kg/Rm) for outer frame, 40 mm x 31.50 mm x 1.50 mm thk (wt. 0.502 kg/Rm) for central mullion, 40 mm x 31.50 mm x 1.50 mm thk (wt. 0.549 kg/Rm) for shutter frame and 16.50 mm x 14.50 mm x 1.20 mm thk (wt. 0.157 kg/Rm) for glazing clip with 5 mm thick plain / frosted / tinted glass including neoprene gasket, fixtures, fastenings and accessories like handles, hinges, locking arrangement etc.. complete as directed by Engineer In Charge. (Note: anodic film must not be less than 15 microns i.e. AC-15 as per IS, the anodizing must be scaled by keeping the anodized section in boiling de-anodized water for a period of one hour)	Sqm	8
D31	Providing, detailing, fabricating and fixing at desired location using M.S. chequered Plates of any thickness and of grade Fe 250 as per specifications and approved fabrication drawings (which are to be prepared by Contractor and got approved from Engineer), including transportation of the same to site, erection at all heights and levels, provision of necessary erection bolts, fixing bolts, nuts, washers, cleats, stiffeners, and all necessary operations like preheating as per specifications, straightening, bending, cutting, drilling, grinding, machining if specified, welding, grinding and removing the welding burr and preparing surface for painting with wire brush cleaning and applying two coats of epoxy red oxide zinc phosphate primer of 30 microns each and two coats of Epoxy Corrosion Resistant Enamel paint of 30 microns after fabrication including touching up with spray painting after erection etc. complete as directed by Engineer In Charge	MT	0.69
	Paver block & Kerb Stone		

Section 6 - Refurbishment of Screen Chamber			
Sr. No.	Description	Unit	Quantity
D32	Providing & fixing in the footpath , 80mm thick Lacquer coated (Reflective) interlocking white cement concrete pavers in red (TerraCotta)Black, Brown, Lemon Yellow or any colour with vermeticular or any anti skid texture on top surface of approved pattern /shape and colour having average crushing strength not less than 50N/mm ² as per technical specifications and IS CODE 15658:2006; manufactured in double layer precast concrete blocks . The top layer of paver block should be 12 to 15 mm thick and consisting of cubical shape stone aggregate 8mm size sieve 100% passing and retained on 4.75 mm size sieve, silica sand and with pure iron oxide ultra violet stabilized pigment @5%by weight of white cement and should be coated with lacquer having hard, high abrasive resistance and water repellent. The bottom layer in grey cement should be 65 to 68mm thick having 12mm size sieve 100%passing aggregates as per technical specifications, placed on average compacted thickness of 25mm well graded sand cushioning uniformly compacted with proper capacity mechanical compact or with required level, grade and camber etc.. complete as specified and as directed by the Engineer.	sqm	106
D33	Providing & Fixing kerb stones 30 cm.to 40 cm. long., 15 cm. wide, 38 cm. deep medium dressed in all exposed surfaces, set in cement mortar 1:2 on a 15 cm. thick and 25 cm. wide RMC M-20 C.C. bed including filling the joints with 1:2 C.M. pointing, curing etc.. complete.	rmt	71
D34	Providing & fixing water tables of stone of size 30 cm. wide and 10 cm. thick, fairly dresed on a R.M.C. M-20 cement concrete bed 15 cm. thick, including filling in the joints, with cement mortar 1:2 cement pointing, curing etc.. complete as specified and as directed by the Engineer.	rmt	71
	Railings		

Section 6 - Refurbishment of Screen Chamber			
Sr. No.	Description	Unit	Quantity
D35	Providing, detailing, and fabricating as per specifications, transporting to site and erecting ladder / railing using stainless steel hollow pipes of grade 304 including, S.S. fixtures and fastenings, cleats, stiffeners, gussets etc.. and all necessary operations straightening, bending, like cutting, drilling, welding, grinding and removing the welding burr, machining if specified, finishing, cleaning etc.. complete as directed by Engineer In Charge.	kg	350
D36	Providing and laying 18 mm thk., heavy duty metallic topping for flooring in cement mortar 1:2, with 4 Kg / Sqmt ironite or equivalent over existing concrete bed and as per manufacturers specifications including leveling, curing, finishing etc. complete as directed by Engineer In Charge.	Sqm	30

Section 7 - New Surge tank			
Sr No.	Description	Unit	Quantity
1	Excavation		
a	Excavation in all types of soils (for sewerage works), such as Earth, Marine clay, Marshy land, Running sand, Garbage, Slush, Murum, Rock boulders etc. as directed by the engineer. The rate includes dewatering, backfilling, removing the rank vegetation and removing the excavated materials within a lead of 150M as directed including levelling, ramming, etc. complete, and measured from the edge of cutting including all lifts and stacking in layers and removing the surplus excavated materials as directed for lift upto 2M{Records to be maintained properly}.The rate also includes supporting public utilities such as cables, drains, pipe water mains, but shall not include the cost of shoring etc. as specified and directed.1) The rate includes the handling/supporting the existing utilities such as cables, drains, pipes, water mains etc.. 2) It also includes the royalty and other taxes if any.- Lift from 0 m to 2m	Cum	254.00
b	Excavation in all types of soils (for sewerage works),such as Earth, Marine clay, Marshy land, Running sand, Garbage, Slush, Murum, Rock boulders etc. as directed by the engineer. The rate includes dewatering, backfilling, removing the rank vegetation and removing the excavated materials within a lead of 150M as directed including levelling, ramming, etc. complete, and measured from the edge of cutting including all lifts and stacking in layers and removing the surplus excavated materials as directed for lift upto 2M-4M{Records to be maintained properly}.The rate also includes supporting public utilities such as cables, drains, pipe water mains, but shall not include the cost of shoring etc. as specified and directed.1) The rate includes the handling/supporting the existing utilities such as cables, drains, pipes, water mains etc.. 2) It also includes the royalty and other taxes if any.- Lift from 2 m to 4m	Cum	254.00

Section 7 - New Surge tank			
Sr No.	Description	Unit	Quantity
c	Excavation in all types of soils (for sewerage works), such as Earth, Marine clay, Marshy land, Running sand, Garbage, Slush, Murum, Rock boulders etc. as directed by the engineer. The rate includes dewatering, backfilling, removing the rank vegetation and removing the excavated materials within a lead of 150M as directed including levelling, ramming, etc. complete, and measured from the edge of cutting including all lifts and stacking in layers and removing the surplus excavated materials as directed for lift upto 4M-6M{Records to be maintained properly}. The rate also includes supporting public utilities such as cables, drains, pipe water mains, but shall not include the cost of shoring etc. as specified and directed. 1) The rate includes the handling/supporting the existing utilities such as cables, drains, pipes, water mains etc.. 2) It also includes the royalty and other taxes if any. - Lift from 4 m to 6m	Cum	144.00
2	Excavated surplus earth shall be carted away to contractors dumping ground. Tenderers/Bidders shall be instructed to make the declaration of the dumping plot at the time of submission of Bid.	Cum	415.00
	Rubble Soling		
3	Providing & Laying dry stone Rubble Soling with average 230 mm size hard stone set in regular lines, handpacked and interstices thoroughly filled with small chips including filling in with good quality murum brought from outside, compacting with iron rammers, watering, sand spreading 12mm thk. layer of grit on top etc. complete as directed by Engineer In Charge. (Note: The rate includes the royalty and other taxes if any)	Cum	26.00
4	PCC		

Section 7 - New Surge tank			
Sr No.	Description	Unit	Quantity
	Providing and laying in position M-15 grade plain cement concrete (cement content considered @ 240 kg/cum as per IS 456 table, with cement content as per approved design mix by and manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for plain cement concrete work, including pumping of R.M.C. from transit mixer to site of laying and curing, including the cost of centering, shuttering and finishing, including cost of curing, admixtures in recommended proportions as per IS : 9103 to accelerate/ retard setting of concrete, improve workability without impairing strength and durability as per direction of the Engineer.	Cum	11.00
5	CONCRETE		
	Providing and laying in position ready mixed design mix M-20 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying and the cost of centering, shuttering, finishing and excluding reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer-in-charge. The Mix design as per particular specifications shall be got approved by Engineer before execution of the item. The rate shall include cost of all specified materials and operations at all levels and heights, including the cost of centering, shuttering and excluding reinforcement which shall be paid under relevant item.(Note :- Cement content considered in this item is @ 300 kg/cum as per IS 456 table showing minimum cement content. No extra will be paid nor any amount will be recovered on account of variation of cement in mix design as per specifications for controlled concrete). All works (including Centering & Shuttering)	Cum	8.00

Section 7 - New Surge tank			
Sr No.	Description	Unit	Quantity
	Providing and laying in position ready mixed design mix M-35 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying and the cost of centering, shuttering, finishing and excluding reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer-in-charge. The Mix design as per particular specifications shall be got approved by Engineer before execution of the item. The rate shall include cost of all specified materials and operations at all levels and heights, including the cost of centering, shuttering and and excluding reinforcement which shall be paid under relevant item. (Note :- Cement content considered in this item is @ 350 kg/cum as per IS 456 table showing minimum cement content. No extra will be paid nor any amount will recovered on account of variation of cement in mix design as per specifications for controlled concrete). All works (including Centering & Shuttering)	Cum	
a	Base slab/pile cap	Cum	83.00
b	Wall	Cum	318.00
c	passage slab	Cum	11.00
d	Beam	Cum	2.00
6	Reinforcement		
	Providing and fixing in position steel bars reinforcement of various diameters for R.C.C. pile, pile caps, footings, raft, retaining wall, shear wall, lift wall, foundations, slabs, beams, columns, canopies, staircases, newels, chajjas, lintels, pardies, coping, fins, arches, etc.. as per detailed designs, drawings and bar bending schedules, including straightening, cutting, bending, hooking the bars, binding with wires or tack welding, supporting as required etc.. all complete at all levels. Corrosion Resistant Steel (500 CRS D)	M-T	73.4
7	Piles		

Section 7 - New Surge tank			
Sr No.	Description	Unit	Quantity
	Providing and Casting RCC bored cast in-situ Vertical pile as per IS 2911 (Part 1, Section 2) by boring through all kinds of soils/ Sand /Rock by rotary hydraulic rigs using temporary casing up to stable strata / bentonite mud circulation as specified, from tip to cut-off elevation of piles. Reinforced Cement Concrete work of filling the bore (after placement of reinforcement cage as per drawing) with M25 and above grade Ready Mix Concrete using 43 Grade Ordinary Portland Cement conforming to IS : 8112, of approved make and brand with minimum cement content of 400 kg/m ³ and with water -cement ratio, including the water contained in aggregates (10mm to max 20mm size), not exceeding 0.45, with approved plasticizer as specified, including placing of concrete from tip to minimum of 600mm above the specified cut-off level, breaking pile head to cutoff level and exposing pile reinforcement for embedment in pile cap, Disposing & levelling of bored/excavated material suitably at locations approved by the local authorities including all lead and lifts, all complete for piles having diameter of (Pile will be measured for payment for length between pile tip to cut-off level along the pile axis. Reinforcement shall be paid separately) -600 diameter pile	Rmt	273.00
8	Providing and installing in position permanent M.S. liners for piles of specified diameter and fabricated from 6.0mm to 8.0mm thick plates as per detailed drawings and designs including cutting, bending to required shape, welding, painting with Red Oxide paint etc.. complete as specified and directed. - 6mm thick	MT	16.00
9	Supply and placing in position high strength deformed steel bars reinforcement of grade Fe-500 conforming to IS:1786 (latest version) for RCC Cast-in-situ piles for full length of pile including transporting the same from source to site of work, straightening, cleaning, decoiling, cutting, bending to required shape and lengths as per details, binding with 16 SWG black soft annealed binding wire, supplying and placing with proper cover blocks, supports, chairs, spacers, welding, if required, to form a grid cage etc., complete as per instruction of the Engineer-in-Charge (steel supplied	MT	10.60

Section 7 - New Surge tank			
Sr No.	Description	Unit	Quantity
	by contractor at his own cost and duly approved by Engineer in charge)		
10	Protective coatings-outside of tank wall		
	Providing & laying 1.6mm THK SBS modified self-adhesive, cross laminated HDPE valeron lining waterproofing membrane, conforming to IS 16471:2017 Type A, requirements of UG waterproofing structures, over the solvent based bituminous primer @ 4 sqm/litre. The lap with Hydroflex membrane shall be 100mm treated with double sided tape. This shall includes Surface Preparation by cleaning work, removal of loose concrete and filling cracks with polymer modified mortar & treatment of tie rod holes, bracing angle etc. with plugging mortar Hydroblok 300 or equivalent, which are anchored in shuttering for holding the same and other projections as per manufacturers' recommendation, followed by the installation of 8mm THK polyethylene dimpled drainboard having compressive strength > 400kN/m ² (as per ISO 25619-2) and puncture resistance of 1250N as per ISO 12236 over the waterproofing membrane for vertical surface stuck to the membrane by spot bonding method, using synthetic adhesive with butt joints to protect the membrane from damages from back-filling materials, all followed by termination of the membrane minimum 200mm above FGL with aluminum termination bar shall be fixed with non corrosive fastener @ 4 nos per RM, sealing of termination bar with PU Sealant / epoxy mortar / putty, as per manufacturer specification, etc.. complete.	Sqm	189.00
11	Protective coatings below raft		

Section 7 - New Surge tank			
Sr No.	Description	Unit	Quantity
	Providing and installing 2mm thick preformed pre-applied fully bonded Keyed Preformed Hydroflex synthetic based sheet membrane with T-key spacing 70 - 75mm c/c, conforming to IS 16471:2017 Type A, requirements of UG waterproofing structures, as per manufacturer's recommendation, with end laps of 60mm including heat welding with leister machine of all the joints and electrical spark testing of joints for water-tightness. All overlaps and joints should be welded using hot air welding with leister machine and the membrane should get bonded to the raft/grade slab bottom after pouring the concrete. The flexible pre-lock membrane having T height minimum of 8mm shall be loosely laid onto the PCC surface and shall be capable of receiving the structural reinforcement & concrete directly over the membrane without any protection layers/screed. The membrane shall be laid as per the manufacturer's specification and shall be turned up on the vertical surfaces to minimum 300mm height from the bottom of the raft / foundation within the shutter of the raft / foundation sides to ensure no joint/overlap in the membrane at the corner. The cost shall include necessary surface cleaning, removal of sharp objects, preparing the P.C.C. Substrate for laying of waterproofing system, etc., complete.	Sqm	98.60
12	Painting		
	Providing and applying first coat of approved waterproof cement paint and one coat of textured exterior paint of an approved make and colour as per manufacturers specifications to textured sand faced or other surfaces, upto 10m height from ground level and at all locations as directed including preparing surfaces for painting by any approved means, scaffolding, cleaning and curing etc.. complete as directed by Engineer-in-charge.	Sqm	943.70
13	Protective coatings-inside of tank		

Section 7 - New Surge tank			
Sr No.	Description	Unit	Quantity
	Cleaning the surface of the internal concrete surface of the floor as well as walls thoroughly by wire brushing and washing with high pressure water jet, to remove any loose laitance as well as contaminates, thereafter inspecting the concrete surface to identify any honeycombs, crack, voids or defects in the concrete such as cracks, construction joints etc., and sealing all such locations with solvent free epoxy mortar all as per manufacturer's recommendation. Thereafter providing and applying Hydro-shield EP containment membrane system consisting of combination of epoxy and polysulphide formulation, which shall be applied in 2 coats by way of spray or roller to provide a minimum wet film thickness of 0.25 mm per coat with material consumption of approx. 0.3 Kg per Sq.Mt. per coat so as to achieve a total system thickness of 0.5mm (500 micron) DFT, all as per manufacturer's recommendation etc.. complete. Tropical membrane shall be applied on the entire horizontal surface as well as on the vertical surface upto full height & shall have resistance to Acids & Alkalis.	Sqm	420.00
14	All Outlet / Inlet / Cutouts Treatment		
	All inlet/outlet/cutouts, etc., shall be treated with Liquid Applied flashing of Flexi PU with reinforcing polyester mesh embedded between the two coats of Flexi PU, at the junction of the inlet/outlet/cutlout and RCC surface, including proper cleaning of the junctions and sealing the junction with PU sealant conforming to ASTM C-920-S, NS, 25 & BS EN ISO—11600: 2003 Type F & G as per manufacturers' specification, etc., complete.	Nos.	4.00
15	Sheet Piles		

Section 7 - New Surge tank			
Sr No.	Description	Unit	Quantity
	<p>Supplying Hot Rolled steel sheet piles having properties described in respective specifications or/ and shown in drawings (Z or U type with sectional modulus of minimum 2500 cm³, steel grade S430 GP with minimum yield strength of 430 MPa, minimum thickness 12.0 mm thickness, with Larssen interlocks and applying recommended sealant for complete watertightness (if required) & using suitable corner sections as per site condition) .Installing the same to line and level including making reformed steel sheet piles at required positions as corners, junction, wedges etc.. as per approved drawing and specification in single or group jointing by welding properly, installing vertically along the alignment with the help of equipment's like air compressors, excavator mounted / crane mounted vibro hammers / Impact Hammers / Hydraulic Pressing Hammers / vibrating drives powered by electric or hydraulic motor or combination of both based on the site requirements through the grooves to interlock together, wedges to make up for the permissible deviation of piles from the plumb lines caused during pile driving, slipped piles with the adjacent ones are found or loosened or dislocated during or after installation , sheet piles shall be pulled out and replaced with new ones or redone including necessary modification to the sheet pile to suit the grove of existing sheet piles , including cost and conveyance of all materials, hire charges of equipments, hire charges of crane/rigs, cost of electrodes, mobilization and demobilization charges, all labour, other incidentals etc. complete. (No extra payment shall be made for cost of extraction and replacement for installing of sheet pile deviating the specification or rejected by Engineer -in-charge. The rate is inclusive of providing guide frames, cost of installation pit, formation and removal of earthen bund etc..). Payment shall be made on actual depth of sheet pile installation. For permanently keeping the sheet pile in position</p>	Sqm	272.00
16	Structural Steel		

Section 7 - New Surge tank			
Sr No.	Description	Unit	Quantity
	Providing, detailing, fabricating and fixing at desired location using hot rolled sections and MS Plates of grade Fe 250 as per specifications and approved fabrication drawings (which are to be prepared by Contractor and got approved from Engineer), transporting to site and erecting structural steel members for all heights & at all levels including provision of necessary erection bolts, fixing bolts, nuts, washers, cleats, stiffeners, gussets, base plate, and all necessary fixtures and operations like preheating as per specifications, straightening, bending, cutting, drilling, grinding, machining if specified, welding, grinding and removing the welding burr and preparing surface for painting with wire brush cleaning and applying two coats of epoxy red oxide zinc phosphate primer of 30 microns each and two coats of Epoxy Corrosion Resistant Enamel paint of 30 microns after fabrication including touching up with spray painting after erection etc. complete as directed by Engineer In Charge. (The qty. for this item shall be measured for gusset plates, base plates, bolts in M.T.)	M-T	6.00
17	Water Stops and Construction Joints		
	Providing and Placing in position suitable PVC water stops conforming to IS:12200 for construction/ expansion joints between two RCC members and fixed to the reinforcement with binding wire before		
a	Serrated with central bulb (225 mm wide, 8-11 mm thick)	Rmt	204.00
b	Kickers (320 mm wide, 5 mm thick)	Rmt	9.00
18	Hand rail		
	Providing, detailing, and fabricating as per specifications, transporting to site and erecting ladder / railing using stainless steel hollow pipes of grade 304 including, S.S. fixtures and fastenings, cleats, stiffeners, gussets etc.. and all necessary operations straightening, bending, like cutting, drilling, welding, grinding and removing the welding burr, machining if specified, finishing, cleaning etc.. complete as directed by Engineer In Charge.	Kg	943.00
19	Dewatering of Existing surge tank		

Section 7 - New Surge tank			
Sr No.	Description	Unit	Quantity
	Dewatering the excavated trenches/pits, pools of water, well works by using pumps and other devices including disposing off water to safe distance as directed by Engineer-in-charge including cost of machinery, labour, fuel, pipe and it's accessories etc.. complete. Note : This item will be operated/executed with the prior specific sanction of the Head of department.	HP/Hr	120.00
20	Roof covering for Existing surge tank		
	Providing and fixing 6 mm thick Non-asbestos high impact Polypropylene reinforced cement corrugated sheet of approved make conforming to IS: 14871-2000 laying the same in position as per the stipulation in IS: 3007-1991 using 8m dia polymer coated iron L or J hook bolts, galvanized iron & bituminous washers, or self drilling fasteners and EPDM washers, galvanized iron clamps, nuts and bolts etc.. complete and as directed. (Net Area covered by sheeting will be measured. Laps will not be paid separately)	Sqm	78.50

Section 8 - Laying of new 1800 dia pipeline work			
Sr. No.	Description	Unit	Quantity
1	Excavation		
a	Excavation in all types of soils (for sewerage works), such as Earth, Marine clay, Marshy land, Running sand, Garbage, Slush, Murum, Rock boulders etc. as directed by the engineer. The rate includes dewatering, backfilling, removing the rank vegetation and removing the excavated materials within a lead of 150M as directed including levelling, ramming, etc. complete, and measured from the edge of cutting including all lifts and stacking in layers and removing the surplus excavated materials as directed for lift upto 2M{Records to be maintained properly}. The rate also includes supporting public utilities such as cables, drains, pipe water mains, but shall not include the cost of shoring etc. as specified and directed. 1) The rate includes the handling/supporting the existing utilities such as cables, drains, pipes, water mains etc.. 2) It also includes the royalty and other taxes if any.- Lift from 0 m to 2m	Cum	6633
b	Excavation in all types of soils (for sewerage works), such as Earth, Marine clay, Marshy land, Running sand, Garbage, Slush, Murum, Rock boulders etc. as directed by the engineer. The rate includes dewatering, backfilling, removing the rank vegetation and removing the excavated materials within a lead of 150M as directed including levelling, ramming, etc. complete, and measured from the edge of cutting including all lifts and stacking in layers and removing the surplus excavated materials as directed for lift upto 2M-4M{Records to be maintained properly}. The rate also includes supporting public utilities such as cables, drains, pipe water mains, but shall not include the cost of shoring etc. as specified and directed. 1) The rate includes the handling/supporting the existing utilities such as cables, drains, pipes, water mains etc.. 2) It also includes the royalty and other taxes if any.- Lift from 2 m to 4m	Cum	6633

Section 8 - Laying of new 1800 dia pipeline work			
Sr. No.	Description	Unit	Quantity
c	Excavation in all types of soils (for sewerage works), such as Earth, Marine clay, Marshy land, Running sand, Garbage, Slush, Murum, Rock boulders etc. as directed by the engineer. The rate includes dewatering, backfilling, removing the rank vegetation and removing the excavated materials within a lead of 150M as directed including levelling, ramming, etc. complete, and measured from the edge of cutting including all lifts and stacking in layers and removing the surplus excavated materials as directed for lift upto 4M-6M{Records to be maintained properly}. The rate also includes supporting public utilities such as cables, drains, pipe water mains, but shall not include the cost of shoring etc. as specified and directed. 1) The rate includes the handling/supporting the existing utilities such as cables, drains, pipes, water mains etc.. 2) It also includes the royalty and other taxes if any.- Lift from 4 m to 6m	Cum	743

Section 8 - Laying of new 1800 dia pipeline work			
Sr. No.	Description	Unit	Quantity
2	Excavation in soft/disintegrated rock, road carriageway, sand stone, stiff clay, gravel, cobblestone, hard laterite, water bound macadam, wet mix macadam, asphalt mix carpet of any type, pitching, soling, paths and hardcore, lime concrete, plain cement concrete, stone masonry and all types of brick/ block masonry below ground level. The rate includes dewatering, backfilling, removing the rank vegetation and removing the material within a lead of 150m as directed including levelling ramming etc. complete. and measured from the edge of cutting including all lifts and stacking in layers and removing the surplus excavated material as directed for lift upto 2m (Records to be maintained properly) The rate also includes supporting public utilities such as cables, drains, pipe water mains, but shall not include the cost of shoring and as specified and directed 1) The rate includes the handling/supporting the existing utilities such as cables, drains, pipes, water mains etc.. 2) It also includes the royalty and other taxes if any.	Cum	5163
3	Excavation in hard rock and reinforced concrete by chiseling for sewerage works by manual operations, pneumatic breaker, hammer, driller, compressor breaker, etc.. including dressing/trimming the sides, leveling of bottoms. The rate includes dewatering, backfilling, removing the rank vegetation and removing the material within a lead of 150m as directed including levelling ramming etc. complete. and measured from the edge of cutting including all lifts and stacking in layers and removing the surplus excavated material as directed for lift upto 2m (Records to be maintained properly) The rate also includes supporting public utilities such as cables, drains, pipe water mains, but shall not include the cost of shoring and as specified and directed 1) The rate includes the handling/supporting the existing utilities such as cables, drains, pipes, water mains etc.. 2) It also includes the royalty and other taxes if any.	Cum	2213

Section 8 - Laying of new 1800 dia pipeline work			
Sr. No.	Description	Unit	Quantity
4	Excavated surplus earth shall be carted away to contractors dumping ground. Tenderers/Bidders shall be instructed to make the declaration of the dumping plot at the time of submission of Bid.	Cum	3445
5	Supply & filling sand metal ,GRAVELLY SAND, corresponded to CLASSII / CLASSIII GRADING of TABLE 100 .1 of BMC road specifications for road works in trenches upto required depth & watering , ramming etc.. complete as directed.	Cum	1244.00
6	Rubble soling		
	Providing & Laying dry stone Rubble Soling with average 230 x 2 layers mm size hard stone set in regular lines, handpacked and interstices thoroughly filled with small chips including filling in with good quality murum brought from outside, compacting with iron rammers, watering, sand spreading 12mm thk. layer of grit on top etc. complete as directed by Engineer In Charge. (Note: The rate includes the royalty and other taxes if any)	Cum	1203.000
7	PCC		

Section 8 - Laying of new 1800 dia pipeline work			
Sr. No.	Description	Unit	Quantity
	Providing and laying in position ready mixed plain cement concrete, using fly ash and cement content as per approved design mix from Engineer-in-charge and fly ash conforming to grade I of IS 3812 (Part-1) only be used as part replacement of OPC as per IS 456 and uniform blending with cement is to be ensured in accordance with clauses 5.2 and 5.2.1 of IS: 456-2000 in the items of ready mixed concrete and manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for plain cement concrete work, including pumping of R.M.C. from transit mixer to site of laying and curing, including the cost of centering, shuttering and finishing, including cost of curing, admixtures in recommended proportions as per IS : 9103 to accelerate/ retard setting of concrete, improve workability without impairing strength and durability as per direction of the Engineer - in - charge. - M-15 grade plain cement concrete (cement content considered @ 240 kg/cum).	Cum	262

Section 8 - Laying of new 1800 dia pipeline work			
Sr. No.	Description	Unit	Quantity
8	Providing and laying in position ready mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying and the cost of centering, shuttering, finishing and excluding reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer-in-charge. The Mix design as per particular specifications shall be got approved by Engineer-in-Charge before execution of the item. The rate shall include cost of all specified materials and operations at all levels and heights, including the cost of centering, shuttering and excluding reinforcement which shall be paid under relevant item.(Note :- Cement content considered in this item is @ 330 kg/cum as per IS 456 table showing minimum cement content. No extra will be paid nor any amount will recovered on account of variation of cement in mix design as per specifications for controlled concrete).	Cum	2891
10	Reinforcement		
	Corrosion Resistant Steel (500 CRS D)		
	Providing and fixing in position steel bars reinforcement of various diameters for R.C.C. pile, pile caps, footings, raft, retaining wall, shear wall, lift wall, foundations, slabs, beams, columns, canopies, staircases, newels, chajjas, lintels, pardies, coping, fins, arches, etc.. as per detailed designs, drawings and bar bending schedules, including straightening, cutting, bending, hooking the bars, binding with wires or tack welding, supporting as required etc.. all complete at all levels. Corrosion Resistant Steel (500 CRS D)	MT	132
11	Sheet Piling		

Section 8 - Laying of new 1800 dia pipeline work			
Sr. No.	Description	Unit	Quantity
	<p>Supplying Hot Rolled steel sheet piles having properties described in respective specifications or/ and shown in drawings (Z or U type with sectional modulus of minimum 2500 cm³, steel grade S430 GP with minimum yield strength of 430 MPa, minimum thickness 12.0 mm thickness, with Larssen interlocks and applying recommended sealant for complete watertightness (if required) & using suitable corner sections as per site condition) .Installing the same to line and level including making reformed steel sheet piles at required positions as corners, junction, wedges etc.. as per approved drawing and specification in single or group jointing by welding properly, installing vertically along the alignment with the help of equipment's like air compressors, excavator mounted / crane mounted vibro hammers / Impact Hammers / Hydraulic Pressing Hammers / vibrating drives powered by electric or hydraulic motor or combination of both based on the site requirements through the grooves to interlock together, wedges to make up for the permissible deviation of piles from the plumb lines caused during pile driving, slipped piles with the adjacent ones are found or loosened or dislocated during or after installation , sheet piles shall be pulled out and replaced with new ones or redone including necessary modification to the sheet pile to</p>	Sqm	
	<p>suit the grove of existing sheet piles , including cost and conveyance of all materials, hire charges of Equipments, hire charges of crane/rigs, cost of electrodes, mobilization and demobilisation charges, all labour, other incidentals etc. complete. (No extra payment shall be made for cost of extraction and replacement for installing of sheet pile deviating the specification or rejected by Engineer -in-charge. The rate is inclusive of providing guide frames, cost of installation pit, formation and removal of earthen bund etc..). Payment shall be made on actual depth of sheet pile installation.</p>		
a	For permanently keeping the sheet pile in position		200

Section 8 - Laying of new 1800 dia pipeline work			
Sr. No.	Description	Unit	Quantity
b	sheet pile to be reused upto 3 times		8904
12	Temporary road		
	P/L earth work in embankments & /filling low-lying ground in layers not exceeding 25cm in loose thickness & compacting each layer with a 10/12 tonnes power roller including levelling, watering etc. complete in conformity with there quired lines, grades & cross sections & also cleaning & grubbing the ground etc. complete	Cum	3900

Section 9-Refurbishment of Pump Room			
Sr. No.	Description	Unit	Quantity
A1	Removing cement plaster of any finish from the wall, complete with racking out the joints to a depth of 20 mm.	Sqm	140
A2	Chipping /removing loose concrete up to reinforcement bars, without damaging the reinforcement, removing all the loose materials and to make all the exposed surfaces free from oil, dust and all impurities etc.. complete.	Sqm	51
A3	Providing and fixing in vertical position telescopic M.S. prop under deflected beam/lintel/slab/chajjas by using teak wood battens of size 1000 x 80 x 80 for packing between prop plate and the beam/lintel/slab/chajjas bottom surface as per the directions of engineer- in-charge.	Nos	7
B4	Demolishing cement concrete manually/ by mechanical means including disposal of unserviceable material within premises at a suitable stacking location at ground level including all lead & lifts as per direction of Engineer-in-charge without disturbing the other structural elements.	Cum	0.5
B5	Demolishing brick work in lime or cement mortar including plaster, paint, etc.. manually/ by mechanical means including stacking of serviceable material and disposal of unserviceable material within 50 meters lead as per direction of Engineer-in-charge.	Cum	0.5
B6	Removing or destroying plants etc.. growing on walls, drainage pipes, destroying roots by applying approved weedicide & reinstating the wall surface by plaster to the damage surface of the building	Sqm	10

Section 9-Refurbishment of Pump Room			
Sr. No.	Description	Unit	Quantity
B7	Removing existing door or windows with frame and shutters and making good etc.. to the existing surface.	Nos	3
B7-A	Dismantling steel work in built up sections in angles, tees, flats and channels of rolling shutters, grills, gates, fencing, hoardings, including all gusset plates, bolts, nuts, cutting rivets, welding etc.. including dismembering and stacking within 50metres lead.	Kg	75
B8	Breaking and removing the water proofing layers of I. P. S. with bituminous joints and brick bat concrete over the existing terrace floor, chajja, top of headroom slab and canopy including cement vata and exposing R.C.C. slab top complete.	Sqm	30.6
B9	Dismantling tile work in floors and roofs laid in cement mortar including stacking material within 50 meters lead. For thickness of tiles 10 mm to 25 mm	Sqm	30.6
B11	Dismantling C.I., UPVC and asbestos vent pipes and shaft, soil, waste, rain water pipe, mild steel, GI and asbestos gutters, ridge and hips with fittings and clamps including stacking the material within 50 meters lead : 100 mm dia pipe	Rmt	20
B11A	Disposal of building rubbish / malba / similar unserviceable, dismantled or waste materials by mechanical means including loading, transporting, unloading to contractor identified dumping ground for all loads including all lifts involved	cum	33.4

Section 9-Refurbishment of Pump Room			
Sr. No.	Description	Unit	Quantity
C12	Application of Rust Converter: Providing & applying One coat of Alkaline Rust converting primer conforming to ASTM- B-117, to exposed existing rebars after removing & cleaning loose rust by wire brush and leave it for 6- 8 hours.	Sqm	51
C13	Removing corrosion of steel reinforcement by mechanical means like wire brushing, chipping to remove loose rust and then applying rust removal solution by using brush application, leaving the surface for at least 15 to 30 minutes, then removing loose materials by scrubbing or with brush and applying polymer bond to the old concrete surface before applying Polymer mortar.	Sqm	51
C14	Anti Corrosive coating to exposed reinforcement: Providing & applying Two coats of Anti Corrosive protective coating (CBRI / CSIR technology) for reinforcement bars by brush. Sprinkle dry sand when second coat is tacky so as to get rough surface.	MT	1
C15	Application of Corrosion Inhibitor: Providing & applying One coat of Concrete Penetrating Corrosion Inhibitor (Surface applied) which works on Bipolar Inhibition Mechanism on entire concrete surface to be repaired by using brush or spray at 250 ml per Sq.Mt./Coat or as per manufacturer's specification and prior to application of first coat of anti corrosive coating to reinforcement.	Sqm	51

Section 9-Refurbishment of Pump Room			
Sr. No.	Description	Unit	Quantity
C16	Providing Micro Concrete jacketing to walls or beams of thickness upto 75 mm using Polymer modified cement premixed quartz sand aggregate packed in bags of standard manufacture, for high early strength of 40 N/mm sq.cm of approved brand. The dry product is to be mixed with 12.5% water by weight, along with washed and poured into rigid form work moulds & tamped properly, & cured for 3 days. [Payment is to be made by weight premixed of micro concrete product consumed as per site register records. No extra payment shall be made for shuttering or any other material.	Kg	2104
C17	Providing and applying Polymer modified cement mortar of average thickness 15-20mm using Polymer in one or more layers in proportion 1:5:15 of Polymer Cement Quartz Sand as manufacturer's specifications in specific layers, curing the surface after 72 hours of application with wet gunny bags etc. and by finishing the surface with 12mm thick (1:3) Cement sand plaster.	Sqm	26
C18	Providing and applying Polymer modified cement mortar of average thickness 30-40mm using Polymer in two layers in proportion 1:5:15 of Polymer Cement Quartz Sand as manufacturer's specifications in specific layers, curing the surface after 72 hours of application with wet gunny bags etc. and by finishing the surface with 12mm thick (1:3) Cement sand plaster.	Sqm	13
C19	Bond Coat: Providing & applying One coat of structural grade epoxy bond coat by brush conforming to ASTM-C-882-87 to the prepared concrete surface to be repaired / strengthened. This is applied prior to the application of polymer repair mortar / epoxy mortar / Micro concrete to have monolithic action between old concrete surface and new concrete surface.	Sqm	52

Section 9-Refurbishment of Pump Room			
Sr. No.	Description	Unit	Quantity
C20	Shear Connectors: Make 10/12 mm dia holes using heavy duty electrically operated hammer drills in the concrete of RCC members to a depth of about 75 mm at 500 mm c/c or at suitable grid in zig-zag fashion, clean the holes using air jet and fix pre-fabricated 100 x 50 mm L- shape 8 mm dia rebar using Anti Corrosive protective coating so that 75 mm out of 100 mm is inserted inside the concrete and 25 mm remain outside along with 50 mm bend. The shear connectors are used to tie the additional reinforcement bars.	Nos	104
C21	Additional Reinforcement: Cutting, bending and fixing in position steel reinforcement of specified/required sizes and shapes in the form of main rebars, stirrups & rings, distribution rebars etc., and tying them to shear connectors using GI binding wire. The additional rebars should be coated with TWO coats of Anti Corrosive protective coating & dry sand to be sprinkled on second coat.	M.T	0.1

Section 9-Refurbishment of Pump Room			
Sr. No.	Description	Unit	Quantity
C22	<p>Providing and laying in position ready mixed design mix M-30 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying and the cost of centering, shuttering, finishing and excluding reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer-in-charge. The Mix design as per particular specifications shall be got approved by Engineer-in-Charge before execution of the item. The rate shall include cost of all specified materials and operations at all levels and heights, including the cost of centering, shuttering and excluding reinforcement which shall be paid under relevant item.(Note :- Cement content considered in this item is @ 340 kg/cum as per IS 456 table showing minimum cement content. No extra will be paid nor any amount will recovered on account of variation of cement in mix design as per specifications for controlled concrete). Slabs, Suspended floors, roofs, landings, balconies, canopy and access platform</p>	Cum	0.5
C23	<p>Providing and fixing in position steel bars reinforcement of various diameters for R.C.C. pile, pile caps, footings, raft, retaining wall, shear wall, lift wall, foundations, slabs, beams, columns, canopies, staircases, newels, chajjas, lintels, pardies, coping, fins, arches, etc.. as per detailed designs, drawings and bar bending schedules, including straightening, cutting, bending, hooking the bars, binding with wires or tack welding, supporting as required etc.. all complete at all levels. Corrosion Resistant Steel (500 CRS D)</p>	MT	0.5

Section 9-Refurbishment of Pump Room			
Sr. No.	Description	Unit	Quantity
D24	Providing and laying in position plain cement concrete of specified grade cement with trap/granite/quartzite/gneiss metal mixing in concrete mixer including bailing out water, compacting, finishing surface, curing and including the cost of centering and shuttering at all level : Nominal Mix of 1:2:4 (1 cement OPC: 2 coarse sand : 4 graded stone aggregate 20 mm nominal size)	Cum	0.5
D25	Brick work with common burnt clay modular bricks of class designation 3.5 and above in superstructure above plinth level upto floor five level in all shapes and sizes in : Cement mortar 1:4 (1 cement : 4 coarse sand)	Cum.	0.5
D26	Providing and applying 12 mm thick internal plaster with neeru finish by using ready-mix mortar as per manufacturers recommendations at all heights and locations for masonry (except stone masonry) and concrete surfaces including racking out joints, hacking of concrete surface, finishing, curing, scaffolding etc.. complete.	Sqm.	72
D27	Providing and applying 20 mm thick external sand faced cement plaster by using ready-mix mortar upto 10m from ground level and at all locations in two coats for masonry (except stone masonry) and concrete surfaces including racking out joints, hacking of concrete surface, finishing, curing, scaffolding etc.. complete.	Sqm.	81

Section 9-Refurbishment of Pump Room			
Sr. No.	Description	Unit	Quantity
D28	Providing and applying first single coat of approved primer and two coats of synthetic enamel paint/flat oil paint of an approved make and colour as per manufacturers specifications to surfaces specified below, at all height and locations as directed including scaffolding, cleaning and preparing surfaces for painting by any approved means etc.. complete as directed by Engineer-in charge. For plastered wall surface.	Sqm.	192
D29	Providing and applying first single coat of approved primer and two coats of anti-algal, anti-fungal, exterior paint as specified below of an approved make and colour as per manufacturers specifications to any surface, upto 10m height from ground level and at all locations as directed including preparing surfaces for painting by any approved means, scaffolding, cleaning and curing etc.. complete as directed by Engineer-in-charge. By using acrylic based exterior paint For plastered wall surface	Sqm.	71

Section 9-Refurbishment of Pump Room			
Sr. No.	Description	Unit	Quantity
D30	<p>Providing waterproofing treatment with Broken China mosaic flooring to the existing terrace/top slab at any floor level (including slab portion beneath overhead water tank) by 1. Removing the existing top layer of the terrace/top slab upto the top of existing brick bat coba without causing any damage to any of the structural member and cleaning the same of any loose material etc.. complete as directed. 2. Dividing the total slab area by marking grid at a spacing of 1.2m. c/c in either direction and form square panels of the size 1.2 m. x 1.2 m. and drilling the holes (by using machine) 37 mm. to 50 mm. dia upto required depth in the R.C.C. slab in staggered form at the junction of the above marked grid as specified and directed by an Engineer in charge.3. Filling the holes only at bottom portion with 10 mm size metal, inserting the grouting nozzle in the drilled hole for grouting and making the hole watertight by filling the gap between nozzle and the hole with cement mortar 1:1 or any other suitable material as a sealant.</p>	Sqm	33.7

Section 9-Refurbishment of Pump Room			
Sr. No.	Description	Unit	Quantity
	<p>4. Injecting the cement grout admixed with waterproofing compound (one part of cement to 2 parts of water is recommended; initially richer mix which is possible but for further grouting leaner mix is required for filling smaller voids, mix should not be leaner than 1 cement:5 water) with required pressure (as per site conditions) by grout pump so as to seal all inherent holes, honey combs, cavities and voids and making the whole structures consistent and homogeneous solid mass resistant to seepage, dampness, moisture and leakage of water, allowing the grout to overflow from the vent holes (i.e. holes at diagonally opposite corners), to ensure no pockets left. 5. Taking holes one by one in the staggered form for grouting purposes and in each case holes at the diagonally opposite end will be acting as vent holes. 6. Filling the entire area by 15 cm. deep water for ponding test. The ponding test shall be checked after 7 days by the officer of the rank not below Executive Engineer along with Zonal Executive Engineer to ensure that there is no leakage found. The certificate to this effect shall be given by the concerned engineer. 7. Repeating step 4 to 6 until the entire structure is found completely waterproof, if any leakage is found</p>		

Section 9-Refurbishment of Pump Room			
Sr. No.	Description	Unit	Quantity
	<p>8. Laying the flooring of broken China- mosaic (broken pieces of China glazed tiles) of approved colour set in 25 mm. average bed of C.M. 1:3 with waterproofing compound to correct level and slope (1:100) well compacted and finished; such that minimum coverage of China mosaic chips is about 90% of the total area of slab. The above treatment shall continue along the inner side of parapet or the adjoining wall upto 30 cm. high as per the above specifications regarding cement mortar in shape of round vata with necessary groove etc.. complete. 9. Curing the flooring continuously for minimum ten days so as to render the surface hard and tough to withstand weather and normal domestic use. 10. Cleaning the slab and removing and carting the debris; cleaning the top of all dust, loose material, stains etc.. complete as directed. NOTES : 1. No extra payment will be made for brickbat concrete if any, required to fill up the voids which are developed in the process of removing top layer. If there are any such voids; the same shall be filled up with brick bat concrete so that levelled surface is at a correct level and slope is available for laying China mosaic flooring. 2. The finished terrace surface shall be paid for the actual area treated including cement vata.</p>		
D31	<p>Providing and laying 25 to 30 mm thk. Kota stone tiles 25 mm to 30 mm thick of an approved quality and size for paving / flooring including cement mortar bedding of 25 mm thick in 1:4 proportion, cement float, pointing in cement mortar 1:3, cutting, dressing, leveling, jointing, pointing, curing, finishing etc. complete as directed by Engineer In Charge.</p>	Sqm	33

Section 9-Refurbishment of Pump Room			
Sr. No.	Description	Unit	Quantity
D33	Providing and fixing superior quality factory made phenol bonded solid core single leaf flush commercial door shutter of thickness as mentioned below and of approved make conforming to IS: 2202 (Part I, II) with 12mm thk. teak wood lipping all around, 3mm thk. commercial veneer on external face with three coats of french polish and 150mm x 60 mm or 125 mm x 75 mm C.P. teak wood frame without fanlight including, approved fixtures and fastening hooks, eyes, screws and painting the frame and interior side with one coat of primer, putty and two coats of synthetic enamel paint of approved make and colour etc.. complete as directed by Engineer in charge. 25mm thick shutter	Sqm	2
D34	Providing and fixing in position aluminum door fully panelled with 6mm thick Novapan BSL and made up of extruded and anodised aluminium sections of approved make and of size 63.5 mm x 38.10 mm x 2.0 mm thk, 47.62 mm x 10.16 mm x 1.74 mm thk (wt. 0.881kg./Rm) for outer frame, 47.62 mm x 10.16 mm x 1.74 mm thk (wt. 0.881 kg/Rm) for top rail, 95.25 mm x 25.40 mm x 2.0 mm thk (wt. 1.519 kg/Rm) for bottom rail, 25.0 mm x 44.45 mm x 2.40 mm thk (wt. 0.918 kg/Rm) for lock rail, 47.62 mm x 44.45 mm x 1.88 mm thk (wt. 0.943 kg/Rm) for vertical shutter (hinge side), 47.52 mm x 44.45 mm x 1.95 mm thk (wt. 0.936 kg/Rm) for vertical shutter (latch side), clip weighing 0.097/kg/Rm., including neoprene gasket, fixtures, fastenings and accessories like hinges, locking arrangement, door closer etc.. complete as directed by Engineer In Charge. (Note: anodic film must not be less than 15 microns i.e. AC-15 as per IS, the anodizing must be scaleted by keeping the anodized section in boiling de-anodized water for a period of one hour)	Sqm	2

Section 9-Refurbishment of Pump Room			
Sr. No.	Description	Unit	Quantity
D35	Providing and fixing in position uPVC/SWR (Soil/Waste/Rain) pipe of type-B 110 mm dia. in any position including all fittings and accessories, making joints / connections water tight with solvent cement, scaffolding if necessary and making good the damages if any (excluding excavation and refilling the trenches) etc.. complete as specified and directed.(All fittings and accessories like clamps, etc.. should be of same brand. No separate payment shall be made for fittings and accessories).	Rmt	20
D36	Providing and fixing in position two track aluminum window of extruded modular anodized aluminum sections of approved make and of size 61.85 mm x 45.5 mm x 1.3 mm thk (wt 1.055 kg/Rm) for bottom, 61.85 mm x 31.75 mm x 1.3 mm thk. (wt 0.659 kg/Rm) for top & sides, mounted on anodized aluminum rectangular frame of size 63mm x 38mm x 2.0mm(1.054). The shutter comprising of bearing bottom and top of size 40mm x 18 mm x 1.25 mm thk (wt. 0.417 Kg/Rm) Interlocking section of size 40mm x 26,7 mm x 1.10 mm thk. (Wt. 0469 kg./Rm) and hand sides of 40mm x 18mm x 1.25 mm thk (wt. 0.417kg/Rm) with 5 mm thick plain / frosted / tinted glass fixed in shutter including approved quality neoprene gasket, fixtures, fastenings and accessories like PVC rollers, PVC weep holes, locks, handles etc.. complete as directed by Engineer In Charge. (Note: anodic film must not be less than 15 microns i.e. AC-15 as per IS, the anodizing must be scaleted by keeping the anodized section in boiling de- anodized water for a period of one hour)	Sqm	3

Section 9-Refurbishment of Pump Room			
Sr. No.	Description	Unit	Quantity
D37	Providing anti-termite treatment around the periphery of the existing building conforming to IS-6313 (part III) by excavating trenches of 20cm width and exposing the sides of the columns, plinth beams and wall upto a depth of 300mm, rodding for the holes of 300mm deep and at 150m c/c in the trenches, treating with chloropyrifos EC 20 Emulsion or equivalent of 1% concentration by weight at the total rate of 2.25 Litters per meter including backfilling the trenches etc.. complete as directed by Engineer-in-Charge covering 2 years guaranty.	Rmt	24.2
D38	Providing and Fixing MS Safety grill of weight specified below for windows as per design including fabricating the grill using M.S. square / round bar, flats and angles including painting with one coat of red oxide zinc chromate primer and two coats of synthetic enamel paint of approved colour and brand etc. complete as directed. (Grill weighing 20 to 25 kg / sqm)	Sq.m	3

Section 10 -New Valve Chamber and Thrust block			
Sr. No.	Description	Unit	Quantity
1	Excavation		
a	Excavation in all types of soils (for sewerage works),such as Earth, Marine clay, Marshy land, Running sand, Garbage, Slush, Murum, Rock boulders etc. as directed by the engineer. The rate includes dewatering, backfilling, removing the rank vegetation and removing the excavated materials within a lead of 150M as directed including levelling, ramming, etc. complete, and measured from the edge of cutting including all lifts and stacking in layers and removing the surplus excavated materials as directed for lift upto 2M{Records to be maintained properly}.The rate also includes supporting public utilities such as cables, drains, pipe water mains, but shall not include the cost of shoring etc. as specified and directed.1) The rate includes the handling/supporting the existing utilities such as cables, drains, pipes, water mains etc.. 2) It also includes the royalty and other taxes if any.- lift from 0 m to2m	Cum	500
b	Excavation in all types of soils (for sewerage works),such as Earth, Marine clay, Marshy land, Running sand, Garbage, Slush, Murum, Rock boulders etc. as directed by the engineer. The rate includes dewatering, backfilling, removing the rank vegetation and removing the excavated materials within a lead of 150M as directed including levelling, ramming, etc. complete, and measured from the edge of cutting including all lifts and stacking in layers and removing the surplus excavated materials as directed for lift upto 2M-4M{Records to be maintained properly}.The rate also includes supporting public utilities such as cables, drains, pipe water mains, but shall not include the cost of shoring etc. as specified and directed.1) The rate includes the handling/supporting the existing utilities such as cables, drains, pipes, water mains etc.. 2) It also includes the royalty and other taxes if any.- lift from 2 m to 4 m	Cum	356

Section 10 -New Valve Chamber and Thrust block			
Sr. No.	Description	Unit	Quantity
c	Excavation in all types of soils (for sewerage works),such as Earth, Marine clay, Marshy land, Running sand, Garbage, Slush, Murum, Rock boulders etc. as directed by the engineer. The rate includes dewatering, backfilling, removing the rank vegetation and removing the excavated materials within a lead of 150M as directed including levelling, ramming, etc. complete, and measured from the edge of cutting including all lifts and stacking in layers and removing the surplus excavated materials as directed for lift upto 4M-6M{Records to be maintained properly}.The rate also includes supporting public utilities such as cables, drains, pipe water mains, but shall not include the cost of shoring etc. as specified and directed.1) The rate includes the handling/supporting the existing utilities such as cables, drains, pipes, water mains etc.. 2) It also includes the royalty and other taxes if any.- lift from 4 m to 6 m	Cum	265
d	Excavation in all types of soils (for sewerage works),such as Earth, Marine clay, Marshy land, Running sand, Garbage, Slush, Murum, Rock boulders etc. as directed by the engineer. The rate includes dewatering, backfilling, removing the rank vegetation and removing the excavated materials within a lead of 150M as directed including levelling, ramming, etc. complete, and measured from the edge of cutting including all lifts and stacking in layers and removing the surplus excavated materials as directed for lift upto 6M-8M{Records to be maintained properly}.The rate also includes supporting public utilities such as cables, drains, pipe water mains, but shall not include the cost of shoring etc. as specified and directed.1) The rate includes the handling/supporting the existing utilities such as cables, drains, pipes, water mains etc.. 2) It also includes the royalty and other taxes if any.- Lift from 6 m to 8 m	Cum	229

Section 10 -New Valve Chamber and Thrust block			
Sr. No.	Description	Unit	Quantity
e	Excavation in all types of soils (for sewerage works),such as Earth, Marine clay, Marshy land, Running sand, Garbage, Slush, Murum, Rock boulders etc. as directed by the engineer. The rate includes dewatering, backfilling, removing the rank vegetation and removing the excavated materials within a lead of 150M as directed including levelling, ramming, etc. complete, and measured from the edge of cutting including all lifts and stacking in layers and removing the surplus excavated materials as directed for lift upto 2M{Records to be maintained properly}.The rate also includes supporting public utilities such as cables, drains, pipe water mains, but shall not include the cost of shoring etc. as specified and directed.1) The rate includes the handling/supporting the existing utilities such as cables, drains, pipes, water mains etc.. 2) It also includes the royalty and other taxes if any.- Lift from 8 m to 10 m	Cum	229
f	Excavation in all types of soils (for sewerage works),such as Earth, Marine clay, Marshy land, Running sand, Garbage, Slush, Murum, Rock boulders etc. as directed by the engineer. The rate includes dewatering, backfilling, removing the rank vegetation and removing the excavated materials within a lead of 150M as directed including levelling, ramming, etc. complete, and measured from the edge of cutting including all lifts and stacking in layers and removing the surplus excavated materials as directed for lift upto 2M{Records to be maintained properly}.The rate also includes supporting public utilities such as cables, drains, pipe water mains, but shall not include the cost of shoring etc. as specified and directed.1) The rate includes the handling/supporting the existing utilities such as cables, drains, pipes, water mains etc.. 2) It also includes the royalty and other taxes if any.- Lift from 10 m to 12m	Cum	50

Section 10 -New Valve Chamber and Thrust block			
Sr. No.	Description	Unit	Quantity
2	Excavation in soft/disintegrated rock, road carriageway, sand stone, stiff clay, gravel, cobblestone, hard laterite, water bound macadam, wet mix macadam, asphalt mix carpet of any type, pitching, soling, paths and hardcore, lime concrete, plain cement concrete, stone masonry and all types of brick/ block masonry below ground level. The rate includes dewatering, backfilling, removing the rank vegetation and removing the material within a lead of 150m as directed including levelling ramming etc. complete. and measured from the edge of cutting including all lifts and stacking in layers and removing the surplus excavated material as directed for lift upto 2m (Records to be maintained properly) The rate also includes supporting public utilities such as cables, drains, pipe water mains, but shall not include the cost of shoring and as specified and directed 1) The rate includes the handling/supporting the existing utilities such as cables, drains, pipes, water mains etc.. 2) It also includes the royalty and other taxes if any.	Cum	773
3	Excavation in hard rock and reinforced concrete by chiseling for sewerage works by manual operations, pneumatic breaker, hammer, driller, compressor breaker, etc.. including dressing/trimming the sides, leveling of bottoms. The rate includes dewatering, backfilling, removing the rank vegetation and removing the material within a lead of 150m as directed including levelling ramming etc. complete. and measured from the edge of cutting including all lifts and stacking in layers and removing the surplus excavated material as directed for lift upto 2m (Records to be maintained properly) The rate also includes supporting public utilities such as cables, drains, pipe water mains, but shall not include the cost of shoring and as specified and directed 1) The rate includes the handling/supporting the existing utilities such as cables, drains, pipes, water mains etc.. 2) It also includes the royalty and other taxes if any.	Cum	387

Section 10 -New Valve Chamber and Thrust block			
Sr. No.	Description	Unit	Quantity
4	Excavated surplus earth shall be carted away to contractors dumping ground. Tenderers/Bidders shall be instructed to make the declaration of the dumping plot at the time of submission of Bid.	cum	489
5	Rubble soling		
	Providing & Laying dry stone Rubble Soling with average 230 mm size hard stone set in regular lines, handpacked and interstices thoroughly filled with small chips including filling in with good quality murum brought from outside, compacting with iron rammers, watering, sand spreading 12mm thk. layer of grit on top etc. complete as directed by Engineer In Charge. (Note: The rate includes the royalty and other taxes if any)	Cum	59
6	PCC		
	Providing and laying in position ready mixed plain cement concrete, using fly ash and cement content as per approved design mix from Engineer-in-charge and fly ash conforming to grade I of IS 3812 (Part-1) only be used as part replacement of OPC as per IS 456 and uniform blending with cement is to be ensured in accordance with clauses 5.2 and 5.2.1 of IS: 456-2000 in the items of ready mixed concrete and manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for plain cement concrete work, including pumping of R.M.C. from transit mixer to site of laying and curing, including the cost of centering, shuttering and finishing, including cost of curing, admixtures in recommended proportions as per IS : 9103 to accelerate/ retard setting of concrete, improve workability without impairing strength and durability as per direction of the Engineer - in - charge. M-15 grade plain cement concrete (cement content considered @ 240 kg/cum).	Cum	28
7	RCC		

Section 10 -New Valve Chamber and Thrust block			
Sr. No.	Description	Unit	Quantity
	Providing and laying in position ready mixed design mix M-35 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying and the cost of centering, shuttering, finishing and excluding reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer-in-charge. The Mix design as per particular specifications shall be got approved by Engineer before execution of the item. The rate shall include cost of all specified materials and operations at all levels and heights, including the cost of centering, shuttering and and excluding reinforcement which shall be paid under relevant item.(Note :- Cement content considered in this item is @ 350 kg/cum as per IS 456 table showing minimum cement content. No extra will be paid nor any amount will recovered on account of variation of cement in mix design as per specifications for controlled concrete). All works (including Centering & Shuttering)		
a	Base slab, Thrust block + pipe supports	Cum	277.5
b	Walls	Cum	117
8	Reinforcement		
	Corrosion Resistant Steel (500 CRS D)		
	Providing and fixing in position steel bars reinforcement of various diameters for R.C.C. pile, pile caps, footings, raft, retaining wall, shear wall, lift wall, foundations, slabs, beams, columns, canopies, staircases, newels, chajjas, lintels, pardies, coping, fins, arches, etc.. as per detailed designs, drawings and bar bending schedules, including straightening, cutting, bending, hooking the bars, binding with wires or tack welding, supporting as required etc.. all complete at all levels. Corrosion Resistant Steel (500 CRS D)	M-T	34
9	Structural Steel		

Section 10 -New Valve Chamber and Thrust block			
Sr. No.	Description	Unit	Quantity
	Providing, detailing, fabricating and fixing at desired location using hot rolled sections and MS Plates of grade Fe 250 as per specifications and approved fabrication drawings (which are to be prepared by Contractor and got approved from Engineer), transporting to site and erecting structural steel members for all heights & at all levels including provision of necessary erection bolts, fixing bolts, nuts, washers, cleats, stiffeners, gussets, base plate, and all necessary fixtures and operations like preheating as per specifications, straightening, bending, cutting, drilling, grinding, machining if specified, welding, grinding and removing the welding burr and preparing surface for painting with wire brush cleaning and applying two coats of epoxy red oxide zinc phosphate primer of 30 microns each and two coats of Epoxy Corrosion Resistant Enamel paint of 30 microns after fabrication including touching up with spray painting after erection etc. complete as directed by Engineer In Charge. (The qty. for this item shall be measured for gusset plates, base plates, bolts in M.T.)	M-T	9.1
10	Water stops		
	Providing and Placing in position suitable PVC water stops conforming to IS:12200 for construction/ expansion joints between two RCC members and fixed to the reinforcement with binding wire before - Dumb bell with central bulb (180 mm wide, 8 mm thick) Rmt	Rmt	75
11	Protective coatings-inside of tank		
	Lining of internal concrete surfaces with HDPE / Polyurea / Mineral based surface coating.	Sqm	234
12	Protective coatings-outside of tank		
	Coating of concrete surfaces in contact with earth/soil with 2 coats of coal tar epoxy paint (150 micron thick) over one coat of primer.	Sqm	523
13	Sheet Piling		

Section 10 -New Valve Chamber and Thrust block			
Sr. No.	Description	Unit	Quantity
	<p>Supplying Hot Rolled steel sheet piles having properties described in respective specifications or/ and shown in drawings (Z or U type with sectional modulus of minimum 2500 cm³, steel grade S430 GP with minimum yield strength of 430 MPa, minimum thickness 12.0 mm thickness, with Larssen interlocks and applying recommended sealant for complete watertightness (if required) & using suitable corner sections as per site condition) .Installing the same to line and level including making reformed steel sheet piles at required positions as corners, junction, wedges etc.. as per approved drawing and specification in single or group jointing by welding properly, installing vertically along the alignment with the help of equipment's like air compressors, excavator mounted / crane mounted vibro hammers / Impact Hammers / Hydraulic Pressing Hammers / vibrating drives powered by electric or hydraulic motor or combination of both based on the site requirements through the grooves to interlock together, wedges to make up for the permissible deviation of piles from the plumb lines caused during pile driving, slipped piles with the adjacent ones are found or loosened or dislocated during or after installation , sheet piles shall be pulled out and replaced with new ones or redone including necessary modification to the sheet pile to suit the grove of existing sheet piles , including cost and conveyance of all materials, hire charges of equipment's, hire charges of crane/rigs, cost of electrodes, mobilization and demobilization charges, all labour, other incidentals etc.</p>	Sqm	479
	<p>complete. (No extra payment shall be made for cost of extraction and replacement for installing of sheet pile deviating the specification or rejected by Engineer -in-charge. The rate is inclusive of providing guide frames, cost of installation pit, formation and removal of earthen bund etc..). Payment shall be made on actual depth of sheet pile installation. -Sheet pile to be reused upto 3 times for pipe</p>		

Section 11 - Plant Internal Concrete Road			
Sr. No.	Description	Unit	Quantity
1	Scarifying the existing bituminous road surface to a depth of 150mm, removing the scarified material, including transportation anywhere & bringing the existing road to proper grade, level & camber & /as per super elevation, rolling with 10/12Tonnes power roller & binding the scarified layer with stone dust /grit / sand, watering ,brushing ,rolling ,etc.. complete as specified and directed by the Engineer.	sqm	2000.00
2	Providing & laying, spreading & compacting specified crushed stone in granular subbase course including premixing the material in mechanical mixer (pug mill or approved type), spreading of mixed material in uniform layer of 100mm to 75mm (compacted thickness each) with motor grader or paver on prepared murum surface & compacting with 10 tonne vibratory roller to achieve desired density including all material, labour, machinery, lighting barricading to all lifts & lead maintenance of diversion etc.. complete (metal gradation from 75mm to 75 micron as per prevailing BMC specification for Roadwork clause no.210).	cum	400.00
3	Providing and laying Dry Lean Concrete base including providing coarse and fine aggregate to the specified gradation using minimum cement content 150kg/cum of concrete with OPC 43 grade cement, mixing of concrete as per approved design mix using mechanised batch mix plant of appropriate capacity, transporting and laying and compacting with vibratory roller of minimum 80-100KN static weight to give desired compacted density and average compressive strength of 10MPa at 7days and curing with liquid curing compound and sprinkling water and covering with moist hessian cloth or ponding of water for 7 days including providing construction joints, including all material, labour, machinery with all leads and lifts etc.. complete as specified and as directed by the Engineer. A) Laying by manually.	Cum	300.00
4	Providing & laying water proof paper of 40GSM including overlap (to be not less than 10cm) etc.. complete as specified as directed.	sqm	2000.00

Section 11 - Plant Internal Concrete Road			
Sr. No.	Description	Unit	Quantity
5	Providing & laying M-40 cement concrete having avg. compressive strength 45Mpa, flextural strength 4.8 Mpa including formwork, mixing in non-tilting mechanical mixer (with Weigh Batcher), compacting by internal & surface vibrator, finishing, curing & tarring the sides of slabs with hot bitumen / black Japan Paint as specified and as directed (cement mortar vata will be paid separately). Contractor shave to make their own arrangement for potable water for construction / curing, etc.. & will be not paid separately.	cum	391.00
6	Cutting of construction & dummy joints of M-35C.C.& above slab by mechanical means within 10 to16 hrs of casting of bay / slab as directed. A)transverse dummy joints 100mm deep or 1/3 thickness of concrete pavement & 6 mm wide.	rmt	800.00
7	Cutting of construction & dummy joints of M-35 C.C.& above slab by mechanical means within 10 to 16 hrs of casting of bay / slab as directed. B) Longitudinal construction joints 100mm deep or 1/3 rd thickness of slab & 6 mm wide	rmt	800.00
8	Dressing of M-35& above new C.C. pavement, dummy, transverse, longitudinal & expansion joints with hot rubberised sealing compound conforming to IS1834-1984 after proper cleaning with compressed air, applying required primer & providing a layer of lime powder over hot sealing compound etc.. complete as directed. A) Sealing 6mm wide dummy / transverse joints with a depth of 100mm or 1/3 rd thickness of concrete pavement.	rmt	800.00
9	Dressing of M-35 & above new C.C. pavement, dummy, transverse, longitudinal & expansion joints with hot rubberised sealing compound conforming to IS1834-1984 after proper cleaning with compressed air, applying required primer & providing a layer of lime powder over hot sealing compound etc.. complete as directed. B)Sealing of 6mm wide longitudinal joint with depth of 100mm or 1/3rd thickness of concrete pavement.	rmt	800.00

Section 11 - Plant Internal Concrete Road			
Sr. No.	Description	Unit	Quantity
10	Providing & fixing in the footpath , 80mm thick Lacquer coated (Reflective) interlocking white cement concrete pavers in red (TerraCotta)Black, Brown, Lemon Yellow or any colour with vermeticular or any anti skid texture on top surface of approved pattern /shape and colour having average crushing strength not less than 50N/mm ² as per technical specifications and IS CODE 15658:2006; manufactured in double layer precast concrete blocks . The top layer of paver block should be 12 to 15 mm thick and consisting of cubical shape stone aggregate 8mm size sieve 100% passing and retained on 4.75 mm size sieve, silica sand and with pure iron oxide ultra violet stabilized pigment @5%by weight of white cement and should be coated with lacquer having hard, high abrasive resistance and water repellent. The bottom layer in grey cement should be 65 to 68mm thick having 12mm size sieve 100%passing aggregates as per technical specifications, placed on average compacted thickness of 25mm well graded sand cushioning uniformly compacted with proper capacity mechanical compact or with required level, grade and camber etc.. complete as specified and as directed by the Engineer.	Sqm	48.00
11	Providing and applying 20 mm thick external sand faced cement plaster by using ready-mix mortar upto 10m from ground level and at all locations in two coats for masonry (except stone masonry) and concrete surfaces including racking out joints, hacking of concrete surface, finishing, curing, scaffolding etc.. complete.	sqm	79.00
12	Brick work with common burnt clay F.P.S. (non modular) bricks of class designation 3.5 and above in foundation and plinth in: Cement mortar 1:3 (1 cement : 3 coarse sand)	cum	19.00

Section 12- Road Restoration work (From IPS to WwTF)			
Sr. No.	Description	Unit	Quantity
	BASE ITEMS		
1	Levelling, watering and rolling to 95% Standard Proctor Density with a power roller weighing not less than 10 tonnes and preparing the ground to the required grade and camber as specified as directed by the Engineer.	Sqm	4800
	SUBBASE AND BASE ITEMS		
2	Providing & laying, spreading & compacting specified crushed stone in granular subbase course including premixing the material in mechanical mixer (pug mill or approved type), spreading of mixed material in uniform layer of 100mm to 75mm (compacted thickness each) with motor grader or paver on prepared murum surface & compacting with 10 tonne vibratory roller to achieve desired density including all material, labour, machinery, lighting barricading to all lifts & lead maintenance of diversion etc.. complete	cum	1440
4	Providing & laying, spreading & compacting graded crushed stone aggregate to wet mix macadam satisfaction including premixing the material with water to OMC in mechanical mix (pug mill) carriage of mix material by tipper to site laying in uniform layer of 75mm to 100mm (compacted thickness each) with sensor paver finisher on prepared subbase & compacting with vibratory roller (10 tonne) to achieve desired density including lighting, guarding barricading & maintenance of diversion etc.. as directed by the Engineer, (Rebate for not using sensor paver should be taken, (metal gradation from 53mm to 75mm micron as per prevailing BMC specification for Roadwork	Cum	960
	BITUMINOUS ITEMS		

Section 12- Road Restoration work (From IPS to WwTF)			
Sr. No	Description	Unit	Quantity
5	Providing and applying PRIME COAT with CATIONIC BITUMEN EMULSION (SS) @ 12 to 15 Kg. of 10Sqmt. over prepared surface to receive bituminous mix by applying PRIMER with mechanical spray bitumen, including cleaning of road surface etc.. completed, as directed For High Porosity surface & the primed surface shall be allowed to cure for at least 24 hours or any other higher period, as is found to be necessary to allow all the moisture or volatiles to evaporate before any subsequent bituminous surface treatment or mix is laid (As per prevailing BMC specification for Roadwork)	Sqm	4800
6	Providing and applying TACK COAT with CATIONIC BITUMEN EMULSION (RS) @ 0.25 to 0.30 Kg. of Sq.mt. over prepared surface to receive bituminous mix by applying TACK COAT with mechanical spray bitumen, including cleaning of road surface etc.. completed, as directed For DRY & HUNGRY BITUMINOUS SURFACES	Sqm	4800
7	P/L Premix Bituminous concrete with 6.00% content by weight of mix with polymer modified bitumen (surface coat to thickness of about 40mm(compacted thickness) using new material to the required grade, level & camber rolling with vibratory roller & power roller, pneumatic roller & using sensor paver etc.. complete as specified as directed with addition of lime filler etc.. complete.(bitumen of grade PMB-40). (As per prevailing BMC specification for Roadwork)	Sqm	4800

Section 12- Road Restoration work (From IPS to WwTF)			
Sr. No	Description	Unit	Quantity
8	P/L hot Premix Dense bituminous macadam with 4.50% bitumen content of grade VG-40 to the required line, level, and camber rolling with 10/12 M.T. power ,vibratory roller & sensor paver etc.. complete as specified and as directed to thickness of 75 mm. with antistripping agent at 1% by weight of bitumen using grading II of "MORTH"(per prevailing BMC specification for Roadwork)	Sqm	4800

<u>Section 13 Refurbishment of compound wall</u>			
Sr. No.	Description	Unit	Quantity
1	EXCAVATION		
a	Excavation in all types of soils (for sewerage works), such as Earth, Marine clay, Marshy land, Running sand, Garbage, Slush, Murum, Rock boulders etc. as directed by the engineer. The rate includes dewatering, backfilling, removing the rank vegetation and removing the excavated materials within a lead of 150M as directed including levelling, ramming, etc. complete, and measured from the edge of cutting including all lifts and stacking in layers and removing the surplus excavated materials as directed for lift upto 2M{Records to be maintained properly}. The rate also includes supporting public utilities such as cables, drains, pipe water mains, but shall not include the cost of shoring etc. as specified and directed. 1) The rate includes the handling/supporting the existing utilities such as cables, drains, pipes, water mains etc.. 2) It also includes the royalty and other taxes if any.- Lift from 0 m to 2m	Cum	10
b	Excavation in all types of soils (for sewerage works), such as Earth, Marine clay, Marshy land, Running sand, Garbage, Slush, Murum, Rock boulders etc. as directed by the engineer. The rate includes dewatering, backfilling, removing the rank vegetation and removing the excavated materials within a lead of 150M as directed including levelling, ramming, etc. complete, and measured from the edge of cutting including all lifts and stacking in layers and removing the surplus excavated materials as directed for lift upto 2M-4M{Records to be maintained properly}. The rate also includes supporting public utilities such as cables, drains, pipe water mains, but shall not include the cost of shoring etc. as specified and directed. 1) The rate includes the handling/supporting the existing utilities such as cables, drains, pipes, water mains etc.. 2) It also includes the royalty and other taxes if any.- Lift from 2 m to 4m	Cum	4
2	RUBBLE SOLING		

<u>Section 13 Refurbishment of compound wall</u>			
Sr. No.	Description	Unit	Quantity
	Providing & Laying dry stone Rubble Soling with average 230 mm size hard stone set in regular lines, handpacked and interstices thoroughly filled with small chips including filling in with good quality murum brought from outside, compacting with iron rammers, watering, sand spreading 12mm thk. layer of grit on top etc. complete as directed by Engineer In Charge. (Note: The rate includes the royalty and other taxes if any)	Cum	1
3	PCC		
	Providing and laying in position M-15 grade plain cement concrete (cement content considered @ 240 kg/cum as per IS 456 table, with cement content as per approved design mix by and manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for plain cement concrete work, including pumping of R.M.C. from transit mixer to site of laying and curing, including the cost of centering, shuttering and finishing, including cost of curing, admixtures in recommended proportions as per IS : 9103 to accelerate/ retard setting of concrete, improve workability without impairing strength and durability as per direction of the Engineer.	Cum	1
4	RCC		

<u>Section 13 Refurbishment of compound wall</u>			
Sr. No.	Description	Unit	Quantity
	Providing and laying in position ready mixed design mix M-20 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying and the cost of centering, shuttering, finishing and excluding reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer-in-charge. The Mix design as per particular specifications shall be got approved by Engineer before execution of the item. The rate shall include cost of all specified materials and operations at all levels and heights, including the cost of centering, shuttering and excluding reinforcement which shall be paid under relevant item.(Note :- Cement content considered in this item is @ 300 kg/cum as per IS 456 table showing minimum cement content. No extra will be paid nor any amount will recovered on account of variation of cement in mix design as per specifications for controlled concrete). All works (including Centering & Shuttering)	Cum	
a	Base slab	Cum	0.35
b	columns	Cum	1.8
5	Reinforcement		
	Corrosion Resistant Steel (500 CRS D)		
	Providing and fixing in position steel bars reinforcement of various diameters for R.C.C. pile, pile caps, footings, raft, retaining wall, shear wall, lift wall, foundations, slabs, beams, columns, canopies, staircases, newels, chajjas, lintels, pardies, coping, fins, arches, etc.. as per detailed designs, drawings and bar bending schedules, including straightening, cutting, bending, hooking the bars, binding with wires or tack welding, supporting as required etc.. all complete at all levels.- Corrosion Resistant Steel (500 CRS D)	MT	0.3
6	Demolishing brick Work		

Section 13 Refurbishment of compound wall			
Sr. No.	Description	Unit	Quantity
	Demolishing brick work in lime or cement mortar including plaster, paint, etc.. manually/ by mechanical means including stacking of serviceable material and disposal of unserviceable material within 50 meters lead as per direction of Engineer-in-charge.	Cum	7
7	Brick work		
	Brick work with common burnt clay modular bricks of class designation 3.5 and above in superstructure above plinth level upto floor five level in all shapes and sizes in : Cement mortar 1:4 (1 cement : 4 coarse sand)	Cum.	7
8	Plastering		
	Providing and applying 20 mm thick external sand faced cement plaster by using ready-mix mortar upto 10m from ground level and at all locations in two coats for masonry (except stone masonry) and concrete surfaces including racking out joints, hacking of concrete surface, finishing, curing, scaffolding etc.. complete.	Sqm.	627
9	Painting		
	Providing and applying first single coat of approved primer and two coats of anti-algal, anti-fungal, exterior paint as specified below of an approved make and colour as per manufacturers specifications to any surface, upto 10m height from ground level and at all locations as directed including preparing surfaces for painting by any approved means, scaffolding, cleaning and curing etc.. complete as directed by Engineer-in-charge. By using acrylic based exterior paint For plastered wall surface	Sqm.	3840
10	Barbed wire fencing		

<u>Section 13 Refurbishment of compound wall</u>			
Sr. No.	Description	Unit	Quantity
	Providing and fixing 750mm dia concertina barbed razer type coil of 19mm wide ribbon with thickness 5 SWG and central core wire of 12 SWG with anti rust coating, supported over 5 rows of barbed wires of 14 SWG having two ply four points at 75 mm c/c, fixed to Y shape angle bracket placed at 2.5m c/c (leg of Y should be 0.51 m long and 0.23 m embedded in concrete, wing of Y should be 0.475 m long having a distance of 0.58 m between the two wing on the top) made up of 50mm x 6 mm M.S. angle embedded in cement concrete bed block of size 300mm x 300mm x 300mm. The concertina coil should be fixed to angle with M.S. Flat 25mm x 5mm thick on both the sides as runner all steel work shall be applied with one coat of red oxide zinc chromate primer and two coat of Synthetic Enamel paint etc.. complete as directed by Engineer In Charge.	Rmt	630
11	MS Gate		
	Providing, detailing, and fabricating as per specifications, transporting to site and erecting MS Openable / Sliding / Ornamental Entrance Gates including track and wheel, locking arrangement, fixing bolts, nuts, washers, cleats, stiffeners, gussets decorative balusters, arrow heads etc.. and all necessary operations like straightening, bending, cutting, drilling, grinding, machining if specified, welding etc.. complete weighing 60 to 65 kg/Sqm, including cleaning, Grinding and removing the welding burr and preparing surface and applying one coat of red oxide zinc chromate primer and one coat of Synthetic Enamel paint after fabrication and second coat of Synthetic Enamel paint after erection, with approved colour, shade and brand etc.. including touching up with primer etc. complete as directed by Engineer In Charge.	Sqm.	21
12	Dismantling work		
	Dismantling steel work in built up sections in angles, tees, flats and channels of rolling shutters, grills, gates, fencing, hoardings, including all gusset plates, bolts, nuts, cutting rivets, welding etc.. including dismembering and stacking within 50metres lead.	Kg	2988
13	Dismantling work		

<u>Section 13 Refurbishment of compound wall</u>			
Sr. No.	Description	Unit	Quantity
	Dismantling barbed wire or flexible wire rope in fencing including making rolls and stacking within 50 meters lead.	Kg	768

Section 14 - Laying of new 2200 dia pipeline work			
Sr. No.	Description	Unit	Quantity
1	Excavation		
a	Excavation in all types of soils (for sewerage works), such as Earth, Marine clay, Marshy land, Running sand, Garbage, Slush, Murum, Rock boulders etc. as directed by the engineer. The rate includes dewatering, backfilling, removing the rank vegetation and removing the excavated materials within a lead of 150M as directed including levelling, ramming, etc. complete, and measured from the edge of cutting including all lifts and stacking in layers and removing the surplus excavated materials as directed for lift upto 2M{Records to be maintained properly}. The rate also includes supporting public utilities such as cables, drains, pipe water mains, but shall not include the cost of shoring etc. as specified and directed. 1) The rate includes the handling/supporting the existing utilities such as cables, drains, pipes, water mains etc.. 2) It also includes the royalty and other taxes if any. - Lift from 0 m to 2m	Cum	282
b	Excavation in all types of soils (for sewerage works), such as Earth, Marine clay, Marshy land, Running sand, Garbage, Slush, Murum, Rock boulders etc. as directed by the engineer. The rate includes dewatering, backfilling, removing the rank vegetation and removing the excavated materials within a lead of 150M as directed including levelling, ramming, etc. complete, and measured from the edge of cutting including all lifts and stacking in layers and removing the surplus excavated materials as directed for lift upto 2M-4M{Records to be maintained properly}. The rate also includes supporting public utilities such as cables, drains, pipe water mains, but shall not include the cost of shoring etc. as specified and directed. 1) The rate includes the handling/supporting the existing utilities such as cables, drains, pipes, water mains etc.. 2) It also includes the royalty and other taxes if any. - Lift from 2 m to 4m	Cum	220

Section 14 - Laying of new 2200 dia pipeline work			
Sr. No.	Description	Unit	Quantity
c	Excavation in all types of soils (for sewerage works), such as Earth, Marine clay, Marshy land, Running sand, Garbage, Slush, Murum, Rock boulders etc. as directed by the engineer. The rate includes dewatering, backfilling, removing the rank vegetation and removing the excavated materials within a lead of 150M as directed including levelling, ramming, etc. complete, and measured from the edge of cutting including all lifts and stacking in layers and removing the surplus excavated materials as directed for lift upto 4M-6M{Records to be maintained properly}. The rate also includes supporting public utilities such as cables, drains, pipe water mains, but shall not include the cost of shoring etc. as specified and directed. 1) The rate includes the handling/supporting the existing utilities such as cables, drains, pipes, water mains etc.. 2) It also includes the royalty and other taxes if any. - Lift from 4 m to 6m	Cum	96.9
d	Excavation in all types of soils (for sewerage works), such as Earth, Marine clay, Marshy land, Running sand, Garbage, Slush, Murum, Rock boulders etc. as directed by the engineer. The rate includes dewatering, backfilling, removing the rank vegetation and removing the excavated materials within a lead of 150M as directed including levelling, ramming, etc. complete, and measured from the edge of cutting including all lifts and stacking in layers and removing the surplus excavated materials as directed for lift upto 6M-8M{Records to be maintained properly}. The rate also includes supporting public utilities such as cables, drains, pipe water mains, but shall not include the cost of shoring etc. as specified and directed. 1) The rate includes the handling/supporting the existing utilities such as cables, drains, pipes, water mains etc.. 2) It also includes the royalty and other taxes if any. - Lift from 6 m to 8m	Cum	56.6

Section 14 - Laying of new 2200 dia pipeline work			
Sr. No.	Description	Unit	Quantity
2	Excavation in soft/disintegrated rock, road carriageway, sand stone, stiff clay, gravel, cobblestone, hard laterite, water bound macadam, wet mix macadam, asphalt mix carpet of any type, pitching, soling, paths and hardcore, lime concrete, plain cement concrete, stone masonry and all types of brick/ block masonry below ground level. The rate includes dewatering, backfilling, removing the rank vegetation and removing the material within a lead of 150m as directed including levelling ramming etc. complete. and measured from the edge of cutting including all lifts and stacking in layers and removing the surplus excavated material as directed for lift upto 2m (Records to be maintained properly) The rate also includes supporting public utilities such as cables, drains, pipe water mains, but shall not include the cost of shoring and as specified and directed 1) The rate includes the handling/supporting the existing utilities such as cables, drains, pipes, water mains etc.. 2) It also includes the royalty and other taxes if any.	Cum	262
3	Excavation in hard rock and reinforced concrete by chiseling for sewerage works by manual operations, pneumatic breaker, hammer, driller, compressor breaker, etc.. including dressing/trimming the sides, leveling of bottoms. The rate includes dewatering, backfilling, removing the rank vegetation and removing the material within a lead of 150m as directed including levelling ramming etc. complete. and measured from the edge of cutting including all lifts and stacking in layers and removing the surplus excavated material as directed for lift upto 2m (Records to be maintained properly) The rate also includes supporting public utilities such as cables, drains, pipe water mains, but shall not include the cost of shoring and as specified and directed 1) The rate includes the handling/supporting the existing utilities such as cables, drains, pipes, water mains etc.. 2) It also includes the royalty and other taxes if any.	Cum	113

Section 14 - Laying of new 2200 dia pipeline work			
Sr. No.	Description	Unit	Quantity
4	Excavated surplus earth shall be carted away to contractors dumping ground. Tenderers/Bidders shall be instructed to make the declaration of the dumping plot at the time of submission of Bid.	Cum	425.00
5	Supply & filling sand metal ,GRAVELLY SAND, corresponded to CLASSII / CLASSIII GRADING of TABLE 100 .1 of BMC road specifications for road works in trenches upto required depth & watering , ramming etc.. complete as directed.	Cum	30.00
6	Rubble soling Providing & Laying dry stone Rubble Soling with average 230 x 2 layers mm size hard stone set in regular lines, handpacked and interstices thoroughly filled with small chips including filling in with good quality murum brought from outside, compacting with iron rammers, watering, sand spreading 12mm thk. layer of grit on top etc. complete as directed by Engineer In Charge. (Note: The rate includes the royalty and other taxes if any)	Cum	30
7	PCC		

Section 14 - Laying of new 2200 dia pipeline work			
Sr. No.	Description	Unit	Quantity
	<p>Providing and laying in position ready mixed plain cement concrete, using fly ash and cement content as per approved design mix from Engineer-in-charge and fly ash conforming to grade I of IS 3812 (Part-1) only be used as part replacement of OPC as per IS 456 and uniform blending with cement is to be ensured in accordance with clauses 5.2 and 5.2.1 of IS: 456-2000 in the items of ready mixed concrete and manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for plain cement concrete work, including pumping of R.M.C. from transit mixer to site of laying and curing, including the cost of centering, shuttering and finishing, including cost of curing, admixtures in recommended proportions as per IS : 9103 to accelerate/ retard setting of concrete, improve workability without impairing strength and durability as per direction of the Engineer - in - charge.-M-15 grade plain cement concrete (cement content considered @ 240 kg/cum).</p>	Cum	7

Section 14 - Laying of new 2200 dia pipeline work			
Sr. No.	Description	Unit	Quantity
8	Providing and laying in position ready mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying and the cost of centering, shuttering, finishing and excluding reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer-in-charge. The Mix design as per particular specifications shall be got approved by Engineer-in-Charge before execution of the item. The rate shall include cost of all specified materials and operations at all levels and heights, including the cost of centering, shuttering and and excluding reinforcement which shall be paid under relevant item.(Note :- Cement content considered in this item is @ 330 kg/cum as per IS 456 table showing minimum cement content. No extra will be paid nor any amount will recovered on account of variation of cement in mix design as per specifications for controlled concrete).	Cum	89
9	Reinforcement		
	Corrosion Resistant Steel (500 CRS D)		
	Providing and fixing in position steel bars reinforcement of various diameters for R.C.C. pile, pile caps, footings, raft, retaining wall, shear wall, lift wall, foundations, slabs, beams, columns, canopies, staircases, newels, chajjas, lintels, pardies, coping, fins, arches, etc.. as per detailed designs, drawings and bar bending schedules, including straightening, cutting, bending, hooking the bars, binding with wires or tack welding, supporting as required etc.. all complete at all levels.- Corrosion Resistant Steel (500 CRS D)	MT	5
10	Sheet Piling		

Section 14 - Laying of new 2200 dia pipeline work			
Sr. No.	Description	Unit	Quantity
	<p>Supplying Hot Rolled steel sheet piles having properties described in respective specifications or/ and shown in drawings (Z or U type with sectional modulus of minimum 2500 cm³, steel grade S430 GP with minimum yield strength of 430 MPa, minimum thickness 12.0 mm thickness, with Larssen interlocks and applying recommended sealant for complete watertightness (if required) & using suitable corner sections as per site condition) .Installing the same to line and level including making reformed steel sheet piles at required positions as corners, junction, wedges etc.. as per approved drawing and specification in single or group jointing by welding properly, installing vertically along the alignment with the help of equipments like air compressors, excavator mounted / crane mounted vibro hammers / Impact Hammers / Hydraulic Pressing Hammers / vibrating drives powered by electric or hydraulic motor or combination of both based on the site requirements through the grooves to interlock together, wedges to make up for the permissible deviation of piles from the plumb lines caused during pile driving, slipped piles with the adjacent ones are found or loosened or dislocated during or after installation , sheet piles shall be pulled out and replaced with new ones or redone including necessary modification to the sheet pile to suit the groove of existing sheet piles , including cost and conveyance of all materials, hire charges of equipments, hire charges of crane/rigs, cost of electrodes, mobilisation and demobilisation charges, all labour, other incidentals etc.</p>		
	<p>complete. (No extra payment shall be made for cost of extraction and replacement for installing of sheet pile deviating the specification or rejected by Engineer -in-charge. The rate is inclusive of providing guide frames, cost of installation pit, formation and removal of earthen bund etc..). Payment shall be made on actual depth of sheet pile installation. -Sheet pile to be reused upto 3 times_for pipe</p>	Sqm	384

Section 14 - Laying of new 2200 dia pipeline work			
Sr. No.	Description	Unit	Quantity
11	Demolishing cement concrete manually/ by mechanical means including disposal of unserviceable material within premises at a suitable stacking location at ground level including all lead & lifts as per direction of Engineer-in-charge without disturbing the other structural elements.	Cum	9.3

Section 15_ Creek pipe crossing			
Sr. No.	Description	Unit	Quantity
1	Excavation		
a)	Excavation in all types of soils (for sewerage works), such as Earth, Marine clay, Marshy land, Running sand, Garbage, Slush, Murum, Rock boulders etc. as directed by the engineer. The rate includes dewatering, backfilling, removing the rank vegetation and removing the excavated materials within a lead of 150M as directed including levelling, ramming, etc. complete, and measured from the edge of cutting including all lifts and stacking in layers and removing the surplus excavated materials as directed for lift upto 2M{Records to be maintained properly}. The rate also includes supporting public utilities such as cables, drains, pipe water mains, but shall not include the cost of shoring etc. as specified and directed. 1) The rate includes the handling/supporting the existing utilities such as cables, drains, pipes, water mains etc.. 2) It also includes the royalty and other taxes if any.- Lift from 0 m to 2m	Cum	100.00

Section 15_Creek pipe crossing			
Sr. No.	Description	Unit	Quantity
b)	Excavation in all types of soils (for sewerage works),such as Earth, Marine clay, Marshy land, Running sand, Garbage, Slush, Murum, Rock boulders etc. as directed by the engineer. The rate includes dewatering, backfilling, removing the rank vegetation and removing the excavated materials within a lead of 150M as directed including levelling, ramming, etc. complete, and measured from the edge of cutting including all lifts and stacking in layers and removing the surplus excavated materials as directed for lift upto 2M-4M{Records to be maintained properly}.The rate also includes supporting public utilities such as cables, drains, pipe water mains, but shall not include the cost of shoring etc. as specified and directed.1) The rate includes the handling/supporting the existing utilities such as cables, drains, pipes, water mains etc.. 2) It also includes the royalty and other taxes if any.- Lift from 2 m to 4m	Cum	50.00

Section 15_Creek pipe crossing			
Sr. No.	Description	Unit	Quantity
2	Excavation in hard rock and reinforced concrete by chiseling for sewerage works by manual operations, pneumatic breaker, hammer, driller, compressor breaker, etc.. including dressing/trimming the sides, leveling of bottoms. The rate includes dewatering, backfilling, removing the rank vegetation and removing the material within a lead of 150m as directed including levelling ramming etc. complete. and measured from the edge of cutting including all lifts and stacking in layers and removing the surplus excavated material as directed for lift upto 2m (Records to be maintained properly) The rate also includes supporting public utilities such as cables, drains, pipe water mains, but shall not include the cost of shoring and as specified and directed 1) The rate includes the handling/supporting the existing utilities such as cables, drains, pipes, water mains etc.. 2) It also includes the royalty and other taxes if any.	Cum	50.00
3	Excavated surplus earth shall be carted away to contractors dumping ground. Tenderers/Bidders shall be instructed to make the declaration of the dumping plot at the time of submission of Bid.	cum	150.00
4	Rubble soling Providing & Laying dry stone Rubble Soling with average 230 mm size hard stone set in regular lines, handpacked and interstices thoroughly filled with small chips including filling in with good quality murum brought from outside, compacting with iron rammers, watering, sand spreading 12mm thk. layer of grit on top etc. complete as directed by Engineer In Charge. (Note: The rate includes the royalty and other taxes if any)	Cum	15.00
5	PCC		

Section 15_Creek pipe crossing			
Sr. No.	Description	Unit	Quantity
	<p>Providing and laying in position ready mixed plain cement concrete, using fly ash and cement content as per approved design mix from Engineer-in-charge and fly ash conforming to grade I of IS 3812 (Part-1) only be used as part replacement of OPC as per IS 456 and uniform blending with cement is to be ensured in accordance with clauses 5.2 and 5.2.1 of IS: 456-2000 in the items of ready mixed concrete and manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for plain cement concrete work, including pumping of R.M.C. from transit mixer to site of laying and curing, including the cost of centering, shuttering and finishing, including cost of curing, admixtures in recommended proportions as per IS : 9103 to accelerate/ retard setting of concrete, improve workability without impairing strength and durability as per direction of the Engineer - in - charge.-M-15 grade plain cement concrete (cement content considered @ 240 kg/cum).</p>	Cum	7.00
6	RCC		

Section 15_Creek pipe crossing			
Sr. No.	Description	Unit	Quantity
	Providing and laying in position ready mixed design mix M-35 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying and the cost of centering, shuttering, finishing and excluding reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer-in-charge. The Mix design as per particular specifications shall be got approved by Engineer before execution of the item. The rate shall include cost of all specified materials and operations at all levels and heights, including the cost of centering, shuttering and excluding reinforcement which shall be paid under relevant item.(Note :- Cement content considered in this item is @ 330 kg/cum as per IS 456 table showing minimum cement content. No extra will be paid nor any amount will recovered on account of variation of cement in mix design as per specifications for controlled concrete). All works (including Centering & Shuttering)		
a	Pile cap	Cum	56.00
b	Pedestal	Cum	135.00
7	Reinforcement		
	Corrosion Resistant Steel (500 CRS D)		

Section 15_Creek pipe crossing			
Sr. No.	Description	Unit	Quantity
	Providing and fixing in position steel bars reinforcement of various diameters for R.C.C. pile, pile caps, footings, raft, retaining wall, shear wall, lift wall, foundations, slabs, beams, columns, canopies, staircases, newels, chajjas, lintels, pardies, coping, fins, arches, etc.. as per detailed designs, drawings and bar bending schedules, including straightening, cutting, bending, hooking the bars, binding with wires or tack welding, supporting as required etc.. all complete at all levels. Corrosion Resistant Steel (500 CRS D)	M-T	35.30
8	Structural Steel		
	Providing, detailing, fabricating and fixing at desired location using hot rolled sections and MS Plates of grade Fe 250 as per specifications and approved fabrication drawings (which are to be prepared by Contractor and got approved from Engineer), transporting to site and erecting structural steel members for all heights & at all levels including provision of necessary erection bolts, fixing bolts, nuts, washers, cleats, stiffeners, gussets, base plate, and all necessary fixtures and operations like preheating as per specifications, straightening, bending, cutting, drilling, grinding, machining if specified, welding, grinding and removing the welding burr and preparing surface for painting with wire brush cleaning and applying two coats of epoxy red oxide zinc phosphate primer of 30 microns each and two coats of Epoxy Corrosion Resistant Enamel paint of 30 microns after fabrication including touching up with spray painting after erection etc. complete as directed by Engineer In Charge. (The qty. for this item shall be measured for gusset plates, base plates, bolts in M.T.)	M-T	31.50

Section 15_Creek pipe crossing			
Sr. No.	Description	Unit	Quantity
9	Providing and Fixing of Foundation Bolts and nuts in RCC column / pedestal / beam at any level including maintaining the accuracy towards line, level & position including making and using the template etc. complete as directed by Engineer In Charge. (Contractor will take due care for its threads and rusting by applying grease and cotton waste.	M-T	0.20
10	Painting		
	Coating of concrete surfaces in contact with earth/soil with 2 coats of coal tar epoxy paint (150 micron thick) over one coat of primer.	Sqm	354.00
11	Piles		
	Providing and Casting RCC bored cast in-situ Vertical as per IS 2911 (Part 1, Section 2) by boring through all kinds of soils/ Sand /Rock by rotary hydraulic rigs using temporary casing up to stable strata / bentonite mud circulation as specified, from tip to cut-off elevation of piles. Reinforced Cement Concrete work of filling the bore (after placement of reinforcement cage as per drawing) with M25 grade Ready Mix Concrete using 43 Grade Ordinary Portland Cement confirming to IS : 8112, of approved make and brand with minimum cement content of 400 kg/m ³ and with water -cement ratio, including the water contained in aggregates (10mm to max 20mm size), not exceeding 0.45, with approved plasticizer as specified, including placing of concrete from tip to minimum of 600mm above the specified cut-off level, breaking pile head to cutoff level and exposing pile reinforcement for embedment in pile cap, Disposing & levelling of bored/excavated material suitably at locations approved by the local authorities including all lead and lifts, all complete for piles having diameter of (Pile will be measured for payment for length between pile tip to cut-off level along the pile axis. Reinforcement shall be paid separately) - 600 dia piles	RMT	160.00

Section 15_Creek pipe crossing			
Sr. No.	Description	Unit	Quantity
12	Providing and installing in position permanent M.S. liners for piles of specified diameter and fabricated from 6.0mm to 8.0mm thick plates as per detailed drawings and designs including cutting, bending to required shape, welding, painting with Red Oxide paint etc. complete as specified and directed.	MT	8.10
13	Supply and placing in position high strength deformed steel bars reinforcement of grade Fe-500 conforming to IS:1786 (latest version) for RCC Cast-in-situ piles for full length of pile including transporting the same from source to site of work, straightening, cleaning, de coiling, cutting, bending to required shape and lengths as per details, binding with 16 SWG black soft annealed binding wire, supplying and placing with proper cover blocks, supports, chairs, spacers, welding, if required, to form a grid cage etc., complete as per instruction of the Engineer-in-Charge (steel supplied by contractor at his own cost and duly approved by Engineer in charge)	MT	5.90
14	Timber Shoring		
	Providing and removing close shoring and strutting in the trenches / pits for all depths as per specifications/drawings and or as directed by Engineer-in-charge by including walling, struts, open poling boards, horizontal sheeting, runners, dog spikes by using timber etc. .complete.	Sqm	100.00
15	Coffer dam		
	Constructing cofferdams of puddle bags completely new with clay/silt/impervious materials core including diversion of flow removing and pumping out water etc.. complete to keep working space dry as specified and as directed. (This item includes maintenance during the work in progress and removal of the same after completion of work.).	Cum	1,300.00

Section 16 - Rising Main Piping Work			
Sr. No.	Description	Unit	Quantity
1	Providing and fabricating dished closures such as domes of required size and shape from M. S. Plates and other structural steel. The rate to include procurement of plates and other structural steel, transport, cutting the plates and structural steel to the required size, shape and thickness rolling, bending, tack welding, assembling in desired size and shape, welding on automatic welding machine or manually and forming 'V' edge with or without shoulder cut/root face to both ends wherever required. The rate shall also include transporting specials and fixtures by adopting suitable means without any damage, intact to the site of work including all loading and unloading etc.. complete as specified and directed by Engineer-in -Charge. The rate to include cold pressing etc.. complete. The M.S. Plates shall confirm to IS 2062 Grade E250		
a)	1800 NB, Domes (4 Nos.) for surge tank isolation	MT	2.77
b)	600 NB, Dome (1 Nos.) for Manhole	MT	0.03
c)	2200 NB, Dome (1 Nos.) for pipeline near WwTF	MT	0.85
2	Providing, fabricating, M.S. pipes including short pipes (shorter than one strake length) as per specification of required diameters and shell thicknesses given below. The rate to include procurement of MS plates, transport, cutting the plates to the required size rolling, tack welding , assembling in desired lengths to form pipes, welding on automatic welding machine forming 'V' edge with or without shoulder cut/root face on both the ends of pipe. The rate should also include hydraulic testing of pipes to the required pressure as per the specifications, transporting pipes with or without stiffener rings mounted on it as required by adopting suitable transporting means without any damage, from the fabrication factory to the laying site of work intact , including loading and unloading at the site, stacking them as directed, fixing of accrow type props etc. complete as specified and directed by Engineer-in -Charge. The shop paint shall be paid separately as per quoted rates and shall not be included under this item. The M.S. Plates shall confirm to IS 2062 Grade E250		
a)	1800 NB, 1829 mm OD (14.2 mm Thick)	Rmt	1000.00

Section 16 - Rising Main Piping Work			
Sr. No.	Description	Unit	Quantity
b)	2200 NB, 2235 mm OD (17.5 mm Thick)	Rmt	50.00
c)	600 NB, 610 mm OD (5.8 mm Thick)	Rmt	1.00
3	Providing and fabricating, M.S. composite bends of required diameter and shell thickness. The rate to include procurement of M.S. plates, transport, cutting the plates to the required size, rolling, tack welding, assembling in desired lengths to form composite bend, welding on automatic welding machine or manually and forming `V' edge with or without shoulder cut/root face to both ends of the composite bend. The rate shall also include transporting composite bends with or without stiffener rings mounted on it, as required, by adopting suitable transporting means without any damage, from the fabrication factory to the site of work intact, including all loading and unloading fixing of accrow type props etc.. complete as specified and directed by Engineer-in -Charge The shop paint shall be paid separately as per quoted rates and shall not be included under this item. The M.S. Plates shall confirm to IS 2062 Grade E250		
a	2200 NB, 90 degree Miter Bend (1 Nos.)	MT	6.1
b	1800 NB, 45 degree Miter Bend (5 Nos.)	MT	5.6
c)	1800 NB, 90 degree Miter Bend (6 Nos.)	MT	13.4

Section 16 - Rising Main Piping Work			
Sr. No.	Description	Unit	Quantity
4	Providing and fabricating, T-junctions and Y junctions of required size and shape from M. S. Plates and other structural steel. The rate to include procurement of plates and other structural steel, transport, cutting the plates and structural steel to the required size, rolling, bending, tack welding, assembling in desired size and shape, welding on automatic welding machine or manually and forming 'V' edge with or without shoulder cut/root face to both ends wherever required. The rate shall also include transporting specials with or without stiffener rings, fixtures mounted on it, as required, by adopting suitable means without any damage, intact to the site of work including all loading and unloading, fixing of accrow type props etc.. complete as specified and directed by Engineer in -Charge. The M.S. Plates shall confirm to IS 2062 Grade E250		
a)	1800 NB Equal Tees (2 Nos.)	MT	6.00
b)	1800 X 1800 X 2200 NB Tees (1 Nos.)	MT	3.80
5	Providing and fabricating, M. S. tapers of required diameter and shell thickness. The rate to include procurement of M.S. plate, transport, cutting the plates to the required size, rolling, tack welding assembling in desired lengths to form tapers, welding on automatic welding machine or manually and forming 'V' edge with or without shoulder cut/ root face to both ends of the taper. The rate also includes providing and welding stiffener rings of required size as directed. The rate also include transporting specials and fixtures by adopting suitable means without any damage, intact to the site of work including all loading and unloading, fixing of accrow type props etc.. complete as specified and directed by Engineer-in -Charge. The shop paint shall be paid separately as per quoted rates and shall not be included under this item. The M.S. Plates shall confirm to IS 2062 Grade E250		
a)	1800 X 2200 NB Concentric Expander (1 Nos.)	MT	0.89

Section 16 - Rising Main Piping Work			
Sr. No.	Description	Unit	Quantity
6	Making 600 mm. dia. manhole access opening on all sizes of underground pipeline. The work includes excavation, shoring, dewatering, providing doublers of required size but includes cutting pipes, welding back the pipe pieces, and painting with one coat of zinc rich epoxy primer and 3 coats of inertol of 49 W thick or equivalent approved paint internally as per specification and direction complete as directed by Engineer's Representative.	Nos.	1.00
7	Providing and Applying Cement mortar lining of specified thickness with proportion of cement-sand ratio (1:1) by weight for underground and aboveground pipeline by mechanical troweling i.e. with the use of mortar lining machine and including curing etc.. complete as per specification and as directed by Engineer-in -Charge		
a)	10 mm thick inside all the rising main piping works	sqm	7156.00
8	Providing Cement mortar lining of specified thickness of 12mm on the internal surface of the pipeline with proportion of cement sand ratio (1: 1) by weight for underground and aboveground pipeline such as bends, tapers, cross connections, dipping where machine lining is not possible, by hand lining including curing etc.as per specification and as directed by Engineer's Representative.		
a)	Inside all the fittings	sqm	735.00
9	Blast cleaning the surface of the pipes at factory/ Site externally to remove all rust etc. as directed by Engineer's Representative	sqm	7271.00
10	Blast cleaning the surface of the pipes at factory / Site internally to remove all rust etc. as directed by Engineer's Representative.	sqm	7156.00
11	Providing & applying one coat of Zinc Rich Epoxy Primer of 50 microns thick, to the external surface of pipes at factory / Site as per specifications and as directed by Engineer's Representative.	sqm	7271.00
12	Providing & applying one coat of Zinc Rich Epoxy Primer of 50 microns thick, to the internal surface of pipes at factory / Site as per specifications and as directed by Engineer's Representative.	sqm	230.00

Section 16 - Rising Main Piping Work			
Sr. No.	Description	Unit	Quantity
13	Providing and applying two component high build epoxy barrier/tie coat after curing of previous epoxy primer coat on internal surface of water trunk main, ring girders, stools and roller cover etc.. using best quality brush / roller and spray with best workmanship and in approved manner as per detailed technical specification and directions at site to get uniform film with Dry film thickness of 125 micron throughout exterior surface. etc.. complete as per specifications and as directed by Engineer's Representative.	sqm	230.00
14	Field welding in all position with required number of runs, for M.S. pipes internally and/or externally including gausing wherever necessary, fixing appurtenances and other accessories in connection of pipe laying work as directed by Engineer-in - Charge		
	A)Butt Joints		
a)	i) 16 mm (for 1800 NB pipe)	Rmt	1615.00
b)	j) 18 mm (for 2200 NB pipe)	Rmt	100.00
15	Field welding in all position with required number of runs, for M.S. pipes internally and/or externally including gausing wherever necessary, fixing appurtenances and other accessories in connection of pipe laying work as directed by Engineer-in - Charge	Rmt	10.00
16	Hydraulic testing of M.S. Pipeline to the specified pressure for the length upto 1 km. using reciprocating type pumps which should be able to provide specified test pressure, pressure gauges, & other necessary equipment labour, operation charges, etc.. required testing. The rate under this item shall also include cost of re-testing if necessary. Water to be arranged by the contractor and water charges for first testing and retesting shall be borne by contractor.		
a)	1800 NB dia.	km	1.00
b)	2200 NB dia.	km	0.05

Section 16 - Rising Main Piping Work			
Sr. No.	Description	Unit	Quantity
17	Transporting within 500 m., laying in position to the correct line and level, M.S. Pipes with/without any out- coating on pedestals or chairs upon prepared formation. The rate to include loading, unloading, hoisting, marginal cutting wherever required, assembling and tack-welding complete as directed by Engineer's Representative. The diameter mentioned shall be considered as clear internal diameter of pipe.		
a)	1800 NB, 1829 mm OD (14.2 mm Thick)	Rmt	1000.00
b)	2200 NB, 2235 mm OD (17.5 mm Thick)	Rmt	50.00
c)	600 NB, 610 mm OD (5.8 mm Thick)	Rmt	1.00
18	Transporting within 500 mtrs. and laying in position to the correct line and level, M.S.specials with/without any out coating such as distance pieces, straps, bends, tapers, etc..as per specification on pedestals or chairs upon formation. The rate to include loading, unloading, hoisting, marginal cutting wherever required, assembling and tack welding, complete directed by Engineer's Representative. The diameter mentioned shall be considered as clear internal diameter of pipe		
a)	1800 NB (14.2 mm Thick) Fittings	Rmt	40.00
b)	2200 NB (17.5 mm Thick) (1800 X 2200 NB Expander)	Rmt	2.00
19	Providing and fabricating ring girder supports (stools) as per drawing and specifications complete with top plates, base plates, side flats for fixing rollers wherever necessary, grease box covers, rack bolts, guide rods etc.. Including welding wherever necessary. The rate to include procurement of plates and other structural steel, transport, cutting to the required size and shape, tack welding, assembling in desired size and shape, welding either on automatic welding machine or manually. The rate shall also include transporting stools by using suitable means without any damage, intact to the site of work inclusive of loading and unloading etc.. complete as directed by Engineer in-Charge. The Material shall conform to IS 2062 Grade E250		
a)	Supports for 1800 NB rising main near creek supported over the bridge (20 Nos.)	MT	9.76

Section 17_ Outdoor electrical cable trench			
Sr. No.	Description	Unit	Quantity
1	Excavation		
	Excavation		
a)	Excavation in all types of soils (for sewerage works), such as Earth, Marine clay, Marshy land, Running sand, Garbage, Slush, Murum, Rock boulders etc.. as directed by the engineer. The rate includes dewatering, backfilling, removing the rank vegetation and removing the excavated materials within a lead of 150M as directed including levelling, ramming, etc.. complete, and measured from the edge of cutting including all lifts and stacking in layers and removing the surplus excavated materials as directed for lift upto 2M{Records to be maintained properly}.The rate also includes supporting public utilities such as cables, drains, pipe water mains, but shall not include the cost of shoring etc.. as specified and directed.1) The rate includes the handling/supporting the existing utilities such as cables, drains, pipes, water mains etc.. 2) It also includes the royalty and other taxes if any. - Lift from 0 m to 2m	Cum	597.0
2	Excavated surplus earth shall be carted away to contractors dumping ground.Tenderers/Bidders shall be instructed to make the declaration of the dumping plot at the time of submission of Bid.	cum	349.0
3	Rubble soling		
	Providing & Laying dry stone Rubble Soling with average 230 mm size hard stone set in regular lines, handpacked and interstices thoroughly filled with small chips including filling in with good quality Murum brought from outside, compacting with iron rammers, watering, sand spreading 12mm thk. layer of grit on top etc.. complete as directed by Engineer InCharge. (Note: The rate includes the royalty and other taxes if any)	Cum	65.00
4	PCC		

Section 17_ Outdoor electrical cable trench			
Sr. No.	Description	Unit	Quantity
	Providing and laying in position ready mixed plain cement concrete, using fly ash and cement content as per approved design mix from Engineer-in-charge and fly ash conforming to grade I of IS 3812 (Part-1) only be used as part replacement of OPC as per IS 456 and uniform blending with cement is to be ensured in accordance with clauses 5.2 and 5.2.1 of IS: 456-2000 in the items of ready mixed concrete and manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for plain cement concrete work, including pumping of R.M.C. from transit mixer to site of laying and curing, including the cost of centering, shuttering and finishing, including cost of curing, admixtures in recommended proportions as per IS : 9103 to accelerate/ retard setting of concrete, improve workability without impairing strength and durability as per direction of the Engineer - in - charge.- M-15 grade plain cement concrete (cement content considered @ 240 kg/cum).	Cum	28
5	RCC		

Section 17_ Outdoor electrical cable trench			
Sr. No.	Description	Unit	Quantity
	Providing and laying in position ready mixed design mix M-25 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying and the cost of centering, shuttering, finishing and excluding reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer-in-charge. The Mix design as per particular specifications shall be got approved by Engineer before execution of the item. The rate shall include cost of all specified materials and operations at all levels and heights, including the cost of centering, shuttering and excluding reinforcement which shall be paid under relevant item. (Note: - Cement content considered in this item is @ 330 kg/cum as per IS 456 table showing minimum cement content. No extra will be paid nor any amount will recovered on account of variation of cement in mix design as per specifications for controlled concrete). All works (including Centering & Shuttering)		
a	Base slab	Cum	51.0
b	Walls	Cum	71.0
6	Reinforcement		
	Corrosion Resistant Steel (500 CRS D)		
	Providing and fixing in position steel bars reinforcement of various diameters for R.C.C. pile, pile caps, footings, raft, retaining wall, shear wall, lift wall, foundations, slabs, beams, columns, canopies, staircases, newels, chajjas, lintels, pardies, coping, fins, arches, etc.. as per detailed designs, drawings and bar bending schedules, including straightening, cutting, bending, hooking the bars, binding with wires or tack welding, supporting as required etc.. all complete at all levels.- Corrosion Resistant Steel (500 CRS D)	M-T	11.6
7	Structural Steel		

Section 17_ Outdoor electrical cable trench			
Sr. No.	Description	Unit	Quantity
	Providing, detailing, fabricating and fixing at desired location using hot rolled sections and MS Plates of grade Fe 250 as per specifications and approved fabrication drawings (which are to be prepared by Contractor and got approved from Engineer), transporting to site and erecting structural steel members for all heights & at all levels including provision of necessary erection bolts, fixing bolts, nuts, washers, cleats, stiffeners, gussets, base plate, and all necessary fixtures and operations like preheating as per specifications, straightening, bending, cutting, drilling, grinding, machining if specified, welding, grinding and removing the welding burr and preparing surface for painting with wire brush cleaning and applying two coats of epoxy red oxide zinc phosphate primer of 30 microns each and two coats of Epoxy Corrosion Resistant Enamel paint of 30 microns after fabrication including touching up with spray painting after erection etc.. complete as directed by Engineer In Charge. (The qty. for this item shall be measured for gusset plates, base plates, bolts in M.T.)	M-T	2.0
8	Precast cover		
	Providing, hoisting and fixing at all level precast reinforced cement concrete work in cable trench drain covers, including the cost of required centering, shuttering and reinforcement, of Nominal Mix 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate 20mm nominal size).	Cu.m	13.8

Section 18 - Tree Cutting & Plantation			
Sr. No.	Description	Unit	Quantity
1	Tree Cutting		
a	Excavation for Transplanting Trees on Soft surface: Excavating the ground in the earth / Murum / sand for transplanting the tree to the desired location, with required machinery. Tree to be lifted with roots & replaced in fresh soil. Making trench at suitable distance away from the stem based on age of the plant in a circular fashion to a sufficient depth to remove the ball of earth & applying fungicide on cut portion. -Tree Girth upto 0.3 M	Nos	40
b	Excavation for Transplanting Trees on Soft surface: Excavating the ground in the earth / Murum / sand for transplanting the tree to the desired location, with required machinery. Tree to be lifted with roots & replaced in fresh soil. Making trench at suitable distance away from the stem based on age of the plant in a circular fashion to a sufficient depth to remove the ball of earth & applying fungicide on cut portion- Tree Girth upto 0.6 M or more	Nos	10
2	Excavation for planting Transplanted Trees: Excavating the ground for planting individual Tree (Transplanted tree) in the area demarcated making trench based on age of the plant.	Nos	50
3	Planting Trees on Soft/Hard surface (Individual): Filling of Red Hill Earth, Cow Dung Manure & good earth from excavated pit in the excavated pits mixing in 2:1:1 proportion, watering & providing well grown trees with minimum average girth of 2" and minimum height of 10' above finished level after plantation of specified variety , at desired location & at specified distances. Achieving finished grade level. Planting the tree with appropriate anchoring, leveling the top soil surface as specified after plantation, staking to balance the tree. Including transport to the site & planting, preparation of tree basin, watering & maintaining for 1 month after completion of plantation and replacement of casualties till 1 month.	Nos	50

Section 18 - Tree Cutting & Plantation			
Sr. No.	Description	Unit	Quantity
4	Transplantation		
	Transplanting of Trees: Planting the tree in the pit filled with good soil, pressed down layer by layer, insecticide to be sprayed before planting, broken limbs to be removed. tree to be supported by three strong stakes driven into the ground meter away from the stem, transport to the site & planting, preparation of tree basin, watering & maintaining for 1 month after completion of plantation and replacement of casualties till 1 month. filling good garden soil mixed with manure (fine dressing)	Nos.	50
5	Felling, logging, fashioning of timber and billeting of trunks and branches, stacking the material neatly nearby as directed, including removal of roots, etc.. complete: Trees with girth above 30 cm Upto 100 cm	Nos.	10

Section 19 - Refurbishment of Parking shed			
Sr. No.	Description	Unit	Quantity
1	Dismantling roofing including ridges, hips, valleys and gutters etc., and stacking the material within 50 meters lead of : Asbestos sheet	Sqm	368.00
2	Providing and fixing non-asbestos fiber cement high impact polypropylene reinforced roofing accessories in all colours with polymer coated J or L hooks, bolts and nuts and or G.I. seam bolts and nuts, G.I. plain and bitumen washers or with self-drilling fastener and EPDM washer etc.. complete as directed. Corrugated serrated adjustable ridges	Rmt	34.00
3	Providing and applying first single coat of approved primer and two coats of synthetic enamel paint/flat oil paint of an approved make and colour as per manufacturers specifications to surfaces specified below, at all height and locations as directed including scaffolding, cleaning and preparing surfaces for painting by any approved means etc.. complete as directed by Engineer-in-charge. for steel work	sqm	250
4	Providing and applying first single coat of approved primer and two coats of synthetic enamel paint/flat oil paint of an approved make and colour as per manufacturers specifications to the metal purlins not more the 150mm in height, at all height and locations as directed including removing the existing paint by burning, cleaning, preparing the surface for painting etc.. complete as directed by Engineer-in-charge.	rmt	500

Section 20- Demolition work			
Sl. No	Item	Unit	Quantity
1	Demolishing beams, joists, R.C.C. columns, piles, pile caps etc., in any thickness and size manually/ by mechanical means including stacking of steel bars and disposal of unserviceable material within 50 meters lead as per direction of Engineer - in- charge.	cum	839
2	Demolishing brick work in lime or cement mortar including plaster, paint, etc.. manually/ by mechanical means including stacking of serviceable material and disposal of unserviceable material within 50 meters lead as per direction of Engineer-in-charge.	cum	596
3a	Dismantling doors, windows, fanlight and clerestory windows (steel or wood) shutter including chowkhats, architrave, holdfasts etc.. complete and stacking within 50 meters lead:- of area 3 sq. meters and below-Doors	each	12
3b	Dismantling doors, windows, fanlight and clerestory windows (steel or wood) shutter including chowkhats, architrave, holdfasts etc.. complete and stacking within 50 meters lead:- Of area 3 sq. meters and below-Windows	each	81
4	Dismantling steel work in built up sections in angles, tees, flats and channels of rolling shutters, grills, gates, fencing, hoardings, including all gusset plates, bolts, nuts, cutting rivets, welding etc.. including dismembering and stacking within 50metres lead.	kg	3240

Section 20- Demolition work			
Sl. No	Item	Unit	Quantity
5	Excavation in all types of soils (for sewerage works), such as Earth, Marine clay, Marshy land, Running sand, Garbage, Slush, Murum, Rock boulders etc.. as directed by the engineer. The rate includes dewatering, backfilling, removing the rank vegetation and removing the excavated materials within a lead of 150M as directed including levelling, ramming, etc.. complete, and measured from the edge of cutting including all lifts and stacking in layers and removing the surplus excavated materials as directed for lift upto 2M{Records to be maintained properly}.The rate also includes supporting public utilities such as cables, drains, pipe water mains, but shall not include the cost of shoring etc.. as specified and directed.1) The rate includes the handling/supporting the existing utilities such as cables, drains, pipes, water mains etc.. 2) It also includes the royalty and other taxes if any.- Lift from 0 m to2m	cum	768
6	Disposal of building rubbish / malba / similar unserviceable, dismantled or waste materials by mechanical means including loading, transporting, unloading to contractor identified dumping ground for all loads including all lifts involved	cum	1640.00
7	Dismantling roofing including ridges, hips, valleys and gutters etc., and stacking the material within 50 meters lead of : Asbestos sheet	sqm	628.0
8	Dismantling steel work in built up sections in angles, tees, flats and channels of rolling shutters, grills, gates, fencing, hoardings, including all gusset plates, bolts, nuts, cutting rivets, welding etc.. including dismembering and stacking within 50metres lead. Including dismantling trusses members, rafters, purlins etc.. of steel work for every additional span of one meter or part thereof beyond 10 meters & dismantling trusses members, rafters, purlins etc.. of steel work for every additional height of one meter or part thereof beyond 5 meters.	kg	31375.0

Section 21 - Toilet Blocks - Plumbing items in IPS building			
Sl. No	Description	Unit	Quantity
A	Supply, Installation, Testing and Commissioning of the following for Toilet Block:		
I	Sanitary and C.P Fittings		
a	P/F in position Western WC, 'Hindware' make, starwhite, Studio EWC Cat. No.: 20041 , with 10 lit. cap. DUAL Flush Tank with C.P. Bolts, nut's. Fixing at toilet floor , fixing Solid plastic seat cover, C.I. Flush pipe with clamps rubble joints including cutting and making good the walls, floors where required. The item also includes providing and fixing health faucet (hindware make) with necessary plumbing arrangements etc.. complete.	Nos.	1
b	P/F Wash Basin counter in Jet Black Granite platform clear 600 mm. wide for fixing oval shape under-counter wash basin, with necessary kadappa supports, with granite fascia of 75 mm. ht., 50 mm. skirting on three sides, necessary granite verticals at least 300 mm above counter on one side as per drawings & details , incl. edge chamfer & edge polishing etc., fixing in cm (1:4), curing etc.. complete.	Nos.	2
c	Providing and fixing white vitreous china flat back or wall corner type lipped front urinal basin of 430x260x350mm or 340x410x265mm sizes respectively.	Nos.	2
d	Granite Urinal partition with concealed CI bracket, cutting and making good.	Nos.	2
e	C.P. brass Urinal flush valve/flush cock (Flowrate as 3.8 Lit per Flush) for urinal with all accessories complete.	Nos.	2
f	Providing and fixing PTMT pillar cock of approved quality and colour, 15 mm nominal bore, 107 mm long, weighing not less than 110 gms	Nos.	3
g	6 mm thick mirror of approved quality with all accessories complete.	Each	1
h	Providing and fixing PTMT soap Dish Holder having length of 138 mm, breadth 102 mm, height of 75 mm with concealed fitting arrangements,	Nos.	3
i	Recessed type S.S. soap dish with PVC rawl plug & C.P. brass screw with all accessories complete.	Nos.	1
II	Piping (Plumbing)		

Section 21 - Toilet Blocks - Plumbing items in IPS building			
Sl. No	Description	Unit	Quantity
a	CPVC (Chlorinated Poly Vinyl Chloride) water supply pipes with pipe as per CTS SDR 11 including all fittings and accessories complete.		
	i) 15 mm	Rmt	15
	ii) 20 mm	Rmt	15
	iii) 25 mm	Rmt	15
b	Male/ female screwed end full way lever operated forged brass ball valve with all accessories complete.		
	i) 20 mm	Nos.	1
	ii) 25 mm	Nos.	1
c	UPVC pipe Type-B for Soil, Waste pipe conforming to IS 13592 including fittings and accessories complete.		
	i) 75 mm	Rmt	15
	ii) 110 mm	Rmt	15
d	UPVC pipe Wash basin, and Urinal waste pipe conforming to IS : 4985 (Pipe Class III - 6 kg / sq.cm) including fittings and accessories complete.		
	i) 32 mm	Rmt	15
	ii) 40 mm	Rmt	15
e	Providing & Fixing 100mm diameter Nahani trap Jali in steel finish with necessary fixing required to make the item well functional.	Nos.	2
III	Dado AND FLOORING Removal for toilet		
	Removing mosaic, cement marble, granites non-slippery, tandur, kotah, shahabad stone or Indian Pattern stone, glazed tiles in flooring and dado including bedding brick bat coba etc., and delivering materials in Ward Office and carting away unserviceable materials	Sqm	28
IV	Dado		

Section 21 - Toilet Blocks - Plumbing items in IPS building			
Sl. No	Description	Unit	Quantity
	Providing and fixing 8mm thk. ceramic tiles as specified below conforming to I.S. 15622-2006 of approved quality, pattern and colour for dado in the wet area including preparing the surface and levelling in the desired line, backing of 20 thk. cement mortar in proportion 1:3 with approved waterproofing compound, square cut top edge or chamfered top edge in cement mortar 1:3, cement float, machine cutting, leveling, jointing, filling the joints with neat cement slurry or approved colour grout, finishing, curing etc.. complete as directed by Engineer In Charge.(Light coloured antiskid / matt ceramic tiles)	Sqm	24
	Flooring		
	Providing and laying 8mm thk. ceramic tiles as specified below conforming to I.S.15622-2006 for flooring of an approved, quality, make, size and pattern /design, for flooring including cement mortar bedding of 25 mm thick in 1:4 proportion, neat cement float, cutting, leveling, jointing, filling the joints by neat cement slurry or approved colour grout, curing, finishing etc.. complete as directed by Engineer In Charge.	Sqm	24
V	Disposal		
	Disposal of building rubbish / malba / similar unserviceable, dismantled or waste materials by mechanical means including loading, transporting, unloading to approved municipal dumping ground or as approved by Engineer-in-charge, beyond 50 m initial lead, for all loads including all lifts involved.	Cum	2.8

Section 21 - Toilet Blocks - Plumbing items in IPS building			
Sl. No	Description	Unit	Quantity
	Dismantling C.I. pipes including excavation and refilling trenches after taking out the pipes, manually/ by mechanical means breaking lead caulked joints, melting of lead and making into blocks including stacking of pipes & lead at site within 50 meter lead as per direction of Engineer-in-charge:		
	Up to 150 mm diameter	Rmt	10

Section 22- Miscellaneous Items			
Sr No.	Description	Unit	Quantity
1	Total Station Survey of the plot		
	To carry out total station survey of open plot with reference to existing co-ordinate system by establishing control stations by establishing temporary bench mark from permanent bench mark, marking the traverse on open plot by nails, carrying out detailed levelling at a longitudinal and lateral interval of 10m(i.e. forming grid of 10mx10m), plotting cross sections, cross distance, preparing drawings on Auto cad to the scale of 1:500, mentioning all the dimensions on the plan, super imposing CTS plan/DP remarks/demarcation plan and supplying 3 hard copies and 1 soft copy in C.D. form.. etc.. -upto 1000sqm	upto 1000 Sqm	1
2	To carry out total station survey of open plot with reference to existing co-ordinate system by establishing control stations by establishing temporary bench mark from permanent bench mark, marking the traverse on open plot by nails, carrying out detailed levelling at a longitudinal and lateral interval of 10m(i.e. forming grid of 10mx10m), plotting cross sections, cross distance, preparing drawings on Auto cad to the scale of 1:500, mentioning all the dimensions on the plan, super imposing CTS plan/DP remarks/demarcation plan and supplying 3 hard copies and 1 soft copy in C.D. form.. etc.. - for every additional 1000sqm area or part thereof	each 1000 Sqm	27.0
3	Clearing the land of all vegetation, stumps, removal of roots, cutting and disposal of the trees upto 30 cms. in girth.	Sqm	7000.0
4	Site office Temporary Storage Shed for Equipments, Testing Laboratory, etc..	Lumpsum	
5	Liasoning and documentation charges for various permissions and licenses to be obtained (as applicable) from statutory authorities	Lumpsum	
6	Geotechnical Investigation	Lumpsum	

Section 22- Miscellaneous Items			
Sr No.	Description	Unit	Quantity
7	Dismantling steel work in built up sections in angles, tees, flats and channels of rolling shutters, grills, gates, fencing, hoardings, including all gusset plates, bolts, nuts, cutting rivets, welding etc.. including dismembering and stacking within 50metres lead.	Kg	5250.0
8	Providing, detailing, and fabricating as per specifications, transporting to site and erecting ladder / railing using stainless steel hollow pipes of grade 304 including, S.S. fixtures and fastenings, cleats, stiffeners, gussets etc.. and all necessary operations straightening, bending, like cutting, drilling, welding, grinding and removing the welding burr, machining if specified, finishing, cleaning etc.. complete as directed by Engineer In Charge.	Kg	5250.0
	For Handrail Pedestal		
9	Providing and laying in position M-15 grade plain cement concrete (cement content considered @ 240 kg/cum as per IS 456 table, with cement content as per approved design mix by and manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, manufactured as per mix design of specified grade for plain cement concrete work, including pumping of R.M.C. from transit mixer to site of laying and curing, including the cost of centering, shuttering and finishing, including cost of curing, admixtures in recommended proportions as per IS : 9103 to accelerate/ retard setting of concrete, improve workability without impairing strength and durability as per direction of the Engineer.	Cum	9.000

Section 22- Miscellaneous Items			
Sr No.	Description	Unit	Quantity
10	Providing and laying in position ready mixed design mix M-20 grade cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying and the cost of centering, shuttering, finishing and excluding reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer-in-charge. The Mix design as per particular specifications shall be got approved by Engineer-in-Charge before execution of the item. The rate shall include cost of all specified materials and operations at all levels and heights, including the cost of centering, shuttering and and excluding reinforcement which shall be paid under relevant item.(Note :- Cement content considered in this item is @ 300 kg/cum as per IS 456 table showing minimum cement content. No extra will be paid, nor any amount will recovered on account of variation of cement in mix design as per specifications for controlled concrete). All works (including Centering & Shuttering)		
	Foundations, footings, bases of columns, rafts, pile cap	Cum	32.0
11	Providing and fixing in position steel bars reinforcement of various diameters for R.C.C. pile, pile caps, footings, raft, retaining wall, shear wall, lift wall, foundations, slabs, beams, columns, canopies, staircases, newels, chajjas, lintels, pardies, coping, fins, arches, etc.. as per detailed designs, drawings and bar bending schedules, including straightening, cutting, bending, hooking the bars, binding with wires or tack welding, supporting as required etc.. all complete at all levels.		
	for pedestal	MT	1.6

Section 22- Miscellaneous Items			
Sr No.	Description	Unit	Quantity
12	Providing and applying first single coat of approved primer and two coats of anti-algal, anti-fungal, exterior paint as specified below of an approved make and colour as per manufacturers specifications to any surface, upto 10m height from ground level and at all locations as directed including preparing surfaces for painting by any approved means, scaffolding, cleaning and curing etc.. complete as directed by Engineer-in-charge. By using acrylic based exterior paint for plastered wall surface	Sqm	75.00
13	General Cost (Site office accessories including PCs, Laptops, Printer, Scanner, camera, etc..), transportation, fire safety and inspection) as per clause 11.3 Volume II	Lumpsum	

Note:

The Item Description and Quantities mentioned above sections are for understanding the Civil scope of work in various areas of plant, however Contractor to fill rate against quantities mentioned in **consolidated Civil BOQ in Volume VI Price Packet C** only.