

CIVIL WORK COST ESTIMATE FOR 400 MLD

Executive Engineer (Dnsl)
Chennai Metropolitan Water Supply &
Sewerage Board
Chennai - 600 002.

Intake and Off Shore works

1,27,42,88,732


Executive Engineer (Desai)
Chennai Metropolitan Water Supply &
Sewerage Board
Chennai - 600 002.

Intake Pumps and On shore Screens

Executive Engineer (Desai)
Chennai Metropolitan Water Supply &
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Chennai - 600 002.

Lamella Clarifier					
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S.N.	Description	Unit	Qty.	Rate INR	Cost INR	Packing, Forwarding, Transport and Transit Insurance	Total Cost INR	Reference
1	Flash Mixers along with Motors MOC Super Duplex	Nos.	4	7,75,000	31,00,000	93,000	31,93,000	RA
2	Flocculators along with Motors MOC Supler Duplex	Nos.	96	5,75,000	5,52,00,000	16,56,000	5,68,56,000	RA
3	Lamella Plates FRP/GRP 2.1 x 1.3 m (with 6 mm thk)	Nos.	12236	18,570	22,72,22,520	68,16,676	23,40,39,196	MR Page 78
4	Scraper Mechanism MS Rubber Lined	MT	4,323	82,600	35,70,79,800		35,70,79,800	Item No. 10,6 Pg. No. 182 CPWD + MR
5	Chain, Sprocket sets	Nos.	24	14,50,000	3,48,00,000		3,48,00,000	MR
6	FRP/GRP launders 250 x 250 10mm thk. 7.5m Long. 2 pcs	Nos.	300	41,600	1,24,80,000	3,74,400	1,28,54,400	MR Page 78
7	Bolts, plates, I- Bolt and angles in SS-316 L with cathodic protection for Launders	Kg	6,515	472	30,77,686		30,77,686	Item No. 10,28 Pg. No. 185 CPWD
8	Flash Mixer Drain Valve - (Butterfly, 250NB Manual) with Disc in Super Duplex and shaft in Cr	Nos.	4	23,232	92,928	2,788	95,716	Page 6 MR
9	Flocculator Mixer Drain Valve - (Butterfly, 250NB Manual) with Disc in Super Duplex and shaft in Cr	Nos.	96	23,232	22,30,272	66,908	22,97,180	Page 6 MR
10	Lamella Sludge Outlet Valve - (Butterfly, 450NB Motorized)	Nos.	24	2,42,285	58,14,840	1,74,445	59,89,285	Page 7 MR
11	Lamella Sludge Outlet Flushing Line Isolation Valve - (Ball Valve, 80NB Manual) SS-316 L	Nos.	24	4,900	1,17,600	3,528	1,21,128	pg 163 MR
12	2400 mm GRP piping from lamella to DAF	RM	85	1,15,200	97,92,000	2,93,760	1,00,85,760	MR page 79
13	Lamella Sludge Outlet Flushing Line Check Valve - 80NB	Nos.	24	7,800	1,87,200	5,616	1,92,816	pg 163 MR
14	Flash Mixer Drain Piping - (250NB, GRP)	RM	100	1,760	1,76,000	5,280	1,81,280	MR page 79
15	Flocculator Drain Piping - (250NB, GRP)	RM	100	1,760	1,76,000	5,280	1,81,280	MR page 79
16	Eot ST	Nos.	1	14,50,000	14,50,000	43,500	14,93,500	MR 2.87
17	Lamella Sludge Piping - (400NB, GRP) individual	RM	80	3,840	3,07,200	9,216	3,16,416	MR page 79
18	Sludge Pumps to Outlet Chamber inc. Motor and Valves	Nos.	3	5,45,000	16,35,000	49,050	16,84,050	RA
19	Piping for sludge disposal 1200 mm - HDPE PE 100 PN 10	RM	50	16,157	8,07,850		8,07,850	TWAD page no 30
TOTAL-Lamella Clarifier							72,53,46,343	

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S.N.	Description	Unit	Qty.	Total	Cost INR	Packing, Forwarding, Transport and Transit Insurance	Total Cost INR	Reference
1	Complete Daf with Recycle pumps, Compressor, Nozzles , Pressurized Vessel	Nos.	32	3,80,63,890	1,21,80,44,480	6,39,47,335	1,28,19,91,815	MR Page no 41
TOTAL-DAF							1,28,19,91,815	



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Dual Media Filters

S.N.	Description	Unit	Qty.	Unit Rate INR	Cost INR	Packing, Forwarding, Transport and Transit Insurance	Total Cost INR	Reference
1	Pneumatically operated gate/ valves for Filter Inlet- 600 mm dia PN-10	Nos.	40	8,12,495	3,24,99,796	9,74,994	3,34,74,790	MR Page 163
2	Pneumatically operated gate/ valves for Filter Outlet-450 mm dia PN-10	Nos.	40	6,45,039	2,58,01,550	7,74,046	2,65,75,596	MR Page 163
3	Pneumatically operated gate/ valves for Filter B/W Inlet-300 mm dia PN-10	Nos.	80	5,26,280	4,21,02,400	12,63,072	4,33,65,472	MR Page 163
4	Pneumatically operated gate/ valves for Filter B/W Outlet-700 mm dia PN-10	Nos.	40	8,47,062	3,38,82,473	10,16,474	3,48,98,947	MR Page 163
5	Pneumatically operated gate/ valves for Air Inlet- 450 mm dia PN-10	Nos.	80	6,45,039	5,16,03,099	15,48,093	5,31,51,192	MR Page 163
6	Air piping DI 900 mm K9	RM	370	21,526	79,64,620	2,38,939	82,03,559	TWAD page no
7	Media Gravel	t	3375	3,540	1,19,47,500	3,58,425	1,23,05,925	MR Page 170
8	Media Sand	t	9520	3,540	3,37,00,800	10,11,024	3,47,11,824	MR Page 170
9	Media Anthracite	t	8100	57,000	46,17,00,000	1,38,51,000	47,55,51,000	MR Page 170
10	PP/PVC Nozzles for underdrainage	Nos.	295845	65	1,92,29,925	5,76,898	1,98,06,823	MR page 171
11	Filter Back wash Pumps @ 5500 m3/hr @ 15 mWC	Nos.	2	1,75,00,000	3,50,00,000	10,50,000	3,60,50,000	MR Pg 297
12	Suction valves 1100 mm dia PN-10	Nos.	2	62,63,000	1,25,26,000	3,75,780	1,29,01,780	MR Pg 326
13	NRV 1000 mm dia	Nos.	2	4,98,420	9,96,840	29,905	10,26,745	<i>(Signature)</i>
14	Delivery Valves 1000 mm	Nos.	2	7,48,420	14,96,840	44,905	15,41,745	" (Signature)
15	Filter B/w Piping for GRP 1000 mm	RM	965	21,120	2,03,80,800	6,11,424	2,09,92,224	Engineer MR Page 79 & Executive Engineer Board
16	EOT 5t	Nos.	2	14,50,000	29,00,000	87,000	29,87,000	Chennai - 600 002. MRE Page 79 & Executive Engineer Board

Engineer &
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 Chennai - 600 002.
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17	Rotary twin blower including Motor with accessories such as NRV, PRV, filter , Pads inc. Air Valves for backwashing Filters, Air piping SSetc. 4000 m ³ /hr@ 0.4 bar	Nos.	3	7,43,000	22,29,000	66,870	22,95,870	MR
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18	Delivery valves Blower 900 mm dia Acutated	Nos.	3	11,38,386	34,15,158	34,15,158	MR Page 163
19	Common Header 1100 mm dia Valve Acuated	Nos.	1	16,06,165	16,06,165	16,06,165	MR Page 163
20	GRP Piping upto Filter Gallery from DAF 2400 mm	RM	45	1,15,200	51,84,000	1,55,520	53,39,520
21	GRP Piping from Filter Gallery upto RO feed Tank 1800 mm	RM	65	65,664	42,68,160	1,28,045	43,96,205
22	Pumps from RO Feed Tank to Inlet of Cartridge Filters 5750 m3/hr@ 18 m head Casing, Impeller and shaft Super Duplex	No	8	2,49,96,970	19,99,75,760	59,99,273	20,59,75,033
23	1200 dia Cartridge filter piping GRP PN 12	RM	268	27,232	72,98,176	2,18,945	75,17,121
24	1500 dia Cartridge filter piping GRP PN 12	RM	124	46,080	57,13,920	1,71,418	58,85,338
25	Dirty Wash Water Pumps- VT Super Duplex 2500 m3/hr @ 15 m head	No.	2	1,04,05,570	2,08,11,140	6,24,334	2,14,35,474
26	Suction 800 mm	No	2	6,98,420	13,96,840	41,905	14,38,745
27	Delivery Valve 600 mm	No.	2	6,88,555	13,77,110	41,313	14,18,423
28	NRV 600 mm	No.	2	7,57,939	15,15,878	45,476	15,61,354
29	Filter B/W Piping for Discharge GRP 1500 mm	RM	50	46,080	23,04,000	69,120	23,73,120
TOTAL Filters							<u>1,08,22,02,148</u>

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Reverse Osmosis (RO)

S.N.	Description	Unit	Qty.	Unit Cost in INR	Cost INR	Packing, Forwarding, Transport and Transit Insurance	Total Cost INR	Reference
1	Membranes	Nos.	32640	36,725	1,19,87,04,000	5,99,35,200	1,25,86,39,200	MR page no. 312
2	Pressure Vessel	Nos.	4080	86,000	35,08,80,000	1,75,44,000	36,84,24,000	MR PAGE NO 73
3	RO Boster Pumps 1063 m3/hr @ 14.5 bar Pumps with Impeller, casing, shaft Super Duplex with PERN>41 inc. Motor	Nos.	17	52,06,165	8,85,04,805	66,37,860	9,51,42,665	Page no 38/39
4	HPP Pumps 1063 m3/hr @ 55.3 bar Pumps with Impeller, casing, shaft Super Duplex with PERN>41 inc. Motor	Nos.	17	2,70,00,000	45,90,00,000	3,44,25,000	49,34,25,000	Page no 38/39
5	ERD boster pump Pumps 1263m3/hr @ 6 bar Pumps with Impeller, casing, shaft Super Duplex with PERN>41 inc. motor	Nos.	17	67,50,000	11,47,50,000	86,06,250	12,33,56,250	Page no 38/39
6	ERD feed pump Pumps 1263m3/hr @ 5.7 bar Pumps with Impeller, casing, shaft Super Duplex with PERN>41, inc. Motor	Nos.	1	42,66,00,000	42,66,00,000	1,27,98,000	43,93,98,000	Page no 180
7	ERD	No.	1	18,88,555	3,21,05,435	9,63,163	3,30,68,598	MR 326
8	Suction Valve500 mm dia for RO Booster Pump (class #300)	Nos.	17	19,65,200	3,34,08,400	10,02,252	3,44,10,652	MR 326
9	NRV 450 mm dia for RO booster pump (Class#300)	Nos.	17	14,66,645	2,49,32,965	7,47,989	2,56,80,954	MR 326
10	Delivery Valve 450 mm dia for RO Booster Pump (class #300)	Nos.	2	29,90,000	59,80,000	1,79,400	61,59,400	MR 292
11	Eot 20 ton	No.	1	17,95,36,320			17,95,36,320	286
12	Flexible Pressure Coupling SS (super Duplex PREN>41) for Pressure tubes inc. gaskets 6"	Nos.	8160	22,002				
13	Pressure Coupling SS (super Duplex PREN>41) for Pressure tubes inc. gaskets 4"	Nos.	16320	10,664	17,40,36,480		17,40,36,480	286
14	Suction Valve 500 mm dia class 600# for RO HPP	Nos.	17	54,50,100	9,26,51,700	27,79,551	9,54,31,251	MR 326
15	NRV 400 mm dia class 600# for RO HPP	Nos.	17	22,16,504	3,76,80,562	11,30,417	3,88,10,979	MR 326
16	Plug Valve 450 mm dia class 600# for RO HPP - Control Valve	Nos.	17	49,54,650	8,42,29,050	25,26,872	8,67,55,922	MR 326
17	500 mm dia class 600# for Control Valve during low TDS	Nos.	17	54,50,100	9,26,51,700	27,79,551	9,54,31,251	MR 326

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18	Inlet valves for ERD, DI body Ebonite lining, SS shaft- 600 mm PN 16	Nos.	17	12,88,555	2,19,05,435	6,57,163	2,25,62,598	MR 326
19	Suction Valve 600 mm dia for ERD Booster Pump PN- 16	Nos.	17	12,88,555	2,19,05,435	6,57,163	2,25,62,598	MR 4
20	NRV 500 mm dia for ERD booster pump complete Super Duplex (Class#150)	Nos.	17	18,64,963	3,17,04,363	9,51,131	3,26,55,494	MR 4



21	Delivery Valve 500 mm dia for ERD Booster Pump PN16	Nos.	17	10,46,643	1,77,92,931	5,33,788	1,83,26,719	MR 316
22	Suction Valve 600 mm dia for ERD Recirculation Pump	Nos.	17	12,88,555	2,19,05,435	6,57,163	2,25,62,598	MR 316
23	NRV 500 mm dia for ERD recirculation pump complete Super Duplex (Class#150)	Nos.	17	18,64,963	3,17,04,363	9,51,131	3,26,55,494	MR 316
24	Delivery Valve 500 mm dia for ERD recirculation Pump PN16	Nos.	17	10,46,643	1,77,92,931	5,33,788	1,83,26,719	MR 316
25	Sampling Valve 15 NB SS-Superduplex	Nos.	17	23,500	3,99,500	11,985	4,11,485	MR 316
26	Super Duplex piping 450 mm	RM	183	74,727	1,36,75,041	4,10,251	1,40,85,292	MR PAGE 158
27	Super Duplex piping 400 mm	RM	187	66,296	1,23,97,399	3,71,922	1,27,69,321	MR PAGE 158
28	Super Duplex piping 600 mm	RM	128	99,707	1,27,62,528	3,82,876	1,31,45,404	MR PAGE 158
29	Super Duplex piping 500 mm for ERD	RM	328	83,288	2,73,18,546	8,19,556	2,81,38,102	MR PAGE 158
30	Super Duplex piping 500 mm for ERD Booster pump	RM	127	83,288	1,05,77,608	3,17,328	1,08,94,936	MR PAGE 158
30	Control Valve at outlet of ERD for Brine control 600 mm dia	Nos.	17	12,88,555	2,19,05,435	6,57,163	2,25,62,598	MR 316
31	Super Duplex piping 100-150 mm for all skids interconnecting rows and columns	kg	967	88,841	8,59,09,054	25,77,272	8,84,86,325	MR PAGE 158
32	Jointing, Welding , specials for Super Duplex Piping	Job	1	3,09,50,012	3,09,50,012	3,09,50,012	3,09,50,012	MR 316
33	Cartidge Housing CSRubber lined for 15 bar of pressure	t	1990	86,000	17,11,40,000		17,11,40,000	Item No. 10.6 Pg. No.182 CPWD + MR
34	Cartidge Filters (1l/sec for 1016 mm length)	No.	11025	600	66,15,000	1,98,450	68,13,450	MR page no 79
35	GRP piping for permeate-1500 mm dia	RM	168	46,080	77,41,440		77,41,440	MR page no 79
36	GRP piping for permeate- 2200 mm	RM	135	1,15,200	1,55,52,000		1,55,52,000	MR page no 79
37	Glass Fused Steel Bolled Tanks	M	7.6	57,50,000	4,37,00,000	13,11,000	4,50,11,000	TWAD
38	Skids MS with Polytherene paint for correction protection	MT	2119	76,000	16,10,44,000		16,10,44,000	Item No. 10.6 Pg. No.182 CPWD + MR
39	CIP pumps 1100 m3/hr @ 10 bar super duplex	Nos.	3	44,42,401	1,33,27,203	3,99,816	1,37,27,019	14297
40	Suction Valve 500 mm PN-16	Nos.	3	12,55,565	37,66,695	1,13,001	38,79,696	316
41	NRV 450 mm class #300	Nos.	3	19,65,200	58,95,600	1,76,868	60,72,468	316
42	Delivery Valve is 450 mm PN 16	Nos.	3	10,46,643	31,39,929	94,198	32,34,127	Executive Engineer (Water Supply & Sewerage) (Diesel)
43	CIP tanks FRP/GRP 2 nos each of 150 KL	KL	300	6,000	18,00,000	54,000	18,54,000	Chennai Metropolitan Board Chennai Sewerage -600 002

44	Cartridge Vessels FRP for CIP at 5 Kg/cm ² design	Nos.	3	17,84,000	53,52,000	1,60,560	55,12,560	MR
45	Cartridges 5 microm 40 inch long	Nos.	1400	600	8,40,000	25,200	8,65,200	MR - 303
46	CIP pump 1250 m3/hr @ 6 bar inc. motor	Nos.	6	72,00,000	4,32,00,000	12,96,000	4,44,96,000	MR, 297
47	Suction Valve 600 mm	Nos.	6	11,88,555	71,31,330	2,13,940	73,45,270	MR 3
48	NRV 450 mm	Nos.	6	18,30,120	1,09,80,720	3,29,422	1,13,10,142	MR PAGE 6
49	Delivery Valve is 450 mm	Nos.	6	9,66,643	57,99,858	1,73,996	59,73,854	MR PAGE 6
50	CIP piping 400 mm HDPE PN 6	RM	234	4045	9,46,530		9,46,530	TWAD page 30
Total for Reverse Osmosis								
								4,57,46,77,623

Lime-Potabalization

S.N.	Description	Unit Cost INR	Unit	Qty.	Unit Cost INR	Total Cost INR	Reference
1	Lime Stone Filter Feed Pump	41,00,000	Nos.	6	2,46,00,000	2,46,00,000	MR
2	Lime Stone Filter inc. lime stones for a depth of 3 m	1,52,74,450	Nos.	10	15,27,44,500	15,27,44,500	RA
3	Degassing Air Blower	12,54,545	Nos.	4	50,18,182	50,18,182	MR
4	Degassing Tower	20,90,909	Nos.	4	83,63,636	83,63,636	MR
5	Air scouring Blower	95,00,000	Nos.	6	5,70,00,000	5,70,00,000	MR
7	Lime Stone Recharging system	40,00,000	nos.	2	80,00,000	80,00,000	
8	Waste Disposal Pump	25,00,000	Nos.	2	50,00,000	50,00,000	
TOTAL- Lime Potabalization						26,07,26,318	


 Engineer (Desai)
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CO₂ system

S.N.	Description	Unit	Qty.	Cost INR	Total in INR	Packing, Forwarding, Transport and Transit Insurance	Total Cost INR	Reference
1	CO ₂ Storage Vessel in CS with Vacuum lining 3m dia with 16 m ht	Nos.	4	87,59,905.00	3,50,39,620		10,51,189	3,60,90,809 MR Pg no 148
2	Dosing System comprising of: -CO2 filter -Flow regulating valve -Automatic shut off valve -Manual shut off valve -Pressure reducing valve -Safety valves -Discharge valve -Limit switches -all mounted on a stainless steel base frame	Nos.	2	12,47,389.00	24,94,778			MR Pg no 148
3	CO ₂ Flowmeter M2 for Dosing System Mass flow sensor type M2 (fully calibrated) assembled to process pipe DI 25, PN 40 with flange connection DIN 2635. Measuring range 0-3500kg.	Nos.	2	6,48,857.00	12,97,714		38,931	13,36,645 MR Pg no 148
4	CO ₂ Gas Sensor and Detector	Nos.	1	1,00,382.00	1,00,382	3,011	1,03,393 MR Pg no 148	
5	Automatic change over system,incl. valve equipment, pipework, transmitter, etc	Nos.	1	7,51,520.00	7,51,520	22,546	7,74,066 MR Pg no 148	
6	Controls The set value for the CO ₂ quantity (of the max. dosing quantity) can be either entered manually on the regulator or by a superior system with a 4-20 mA signal. Faults will be displayed on the control cabinet by a signal lamp. cables included between: - control cabinet and tank - control cabinet and vaporiser - control cabinet and dosing system	Nos.	1	42,117,235.00	42,117,235	1,26,517	43,43,752 MR Pg no 148	
7								

TOTAL

4,52,18,286


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 Chennai - 600 002

Dosing equipments

S.N.	Description	Unit	Qty.	Rate INR	Cost INR	Packing, Forwarding, Transport and Transit Insurance	Total Cost INR	Reference
1	Tank - (FRP/HDPE, tanks)-Storage	L	1,92,000	6	11,52,000		11,52,000	pg 85 TWAD
2	Stainless Steel Tank for Acid Storage	MT	65	4,25,000	2,76,25,000		2,76,25,000	Q4
3	Dosing Tanks	L	96,000	9.45	9,07,200		9,07,200	pg 85 TWAD
4	Bulk storage	m3	2,500	4,090	1,02,25,000		1,02,25,000	CMWSSB TOR
5	Dosing Pumps 4500 LPH Inc. Pulsation Damper, PRV, and all ass. Inc Motor	Nos.	12	5,85,750	70,29,000	2,10,870	72,39,870	MR Pg 76
6	Dosing Pumps 5800 LPH inc. Pulsation Damper, PRV, and all ass. Inc Motor	Nos.	12	5,69,750	68,37,000	2,05,110	70,42,110	MR Pg 76
7	Dosing Pumps 250/300 LPH inc. Pulsation Damper, PRV, and all ass. Inc Motor-Alloy20	Nos.	8	1,76,250	14,10,000	42,300	14,52,300	MR Pg 76
8	Dosing Pumps 300 LPH inc. Pulsation Damper, PRV, and all ass. Inc Motor-PP	Nos.	12	1,76,250	21,15,000	63,450	21,78,450	MR Pg 76
9	Dosing Pumps 100 LPH inc. Pulsation Damper, PRV, and all ass. Inc Motor-PP	Nos.	6	1,29,750	7,78,500	23,355	8,01,855	MR Pg 76
10	Dosing Pumps 50 LPH inc. Pulsation Damper, PRV, and all ass. Inc Motor-PP	Nos.	8	1,10,000	8,80,000	26,400	9,06,400	MR Pg 76
11	Dosing Pumps 2600 LPH inc. Pulsation Damper, PRV, and all ass. Inc Motor-	Nos.	12	7,08,750	85,05,000	2,55,150	87,60,150	MR Pg 76
12	Piping for Dosing HDPE 90 OD	RM	345	320	1,10,400		1,10,400	TWAD Pg 30
13	Jointing of pipe, tank fixation, bolts etc.	Job	1	45,00,000	45,00,000		45,00,000	RA
14	Strainer (Y - type, PVC)	Nos.	58	3,000	1,74,000		1,74,000	MR
15	Piping - (50NB, Alloy20)	RM	100	5,700	5,70,000		5,70,000	MR
16	Mixers and Agitators with Motors for Chemical Preparation SS	Nos.	48	3,00,000	1,44,00,000	4,32,000	1,48,32,000	RA
17	EOT at various locations 5 T	Nos.	5	14,50,000	72,50,000	2,17,500	74,67,500	MR 28'1
18	EOT at various locations 10 T	Nos.	4	19,30,000	77,20,000	2,31,600	79,51,600	MR 28'1
19	Sump Drainage pumps inc Piping, Valves and all accessories	Nos.	20	3,50,000	70,00,000		70,00,000	
20	PP Ball Valves	Nos.	65	1,500	97,500		97,500	
21	GRP Platforms	Sqm	5,000	5,500	27,50,000		27,50,000	MR Pg 78

TOTAL-

13,84,93,335

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Product water Pumps and Chlorination

S.N.	Description	Rate INR	Unit	Qty.	Cost INR	Packing, Forwarding, Transport and Flight Insurance	Total Cost INR	Reference
1	Product water Transfer Pump 4164 m3/hr @ 78 m head excluding Motor	40,75,000	Nos.	6	2,44,50,000	7,33,500	2,51,83,500	MR Page no 166
2	Suction Valve 1000 mm	13,44,503	Nos.	6	80,67,018		80,67,018	Pg 74 TWAD
3	NRV 900 mm	5,06,367	Nos.	6	30,38,202		30,38,202	Pg 83 TWAD
4	Delivery Valve is 900 mm	10,88,386	Nos.	6	65,30,316		65,30,316	Pg 74 TWAD
5	Delivery piping DI 900 mm	21,526	RM	65	13,99,190		13,99,190	6.1 pag 48 TWAD
6	Suction piping DI 1000 mm	25,379	RM	45	11,42,055		11,42,055	6.1 pag 48 TWAD
7	Delivery and common header and specials and flanges	101	Kg	35879	36,23,779		36,23,779	10.2_pg 64 TWAD
8	Chlorination system including Safety, Storage Handling, Testing and Monitoring Devices (25 kg/hr 2 W + 2S)	73,08,020	No.	1	73,08,020	2,19,241	75,27,261	MR Page no 167
9	Motive Water Pumps @ 13 m3/hr @ 4 m head	65,000	No.	4	2,60,000	7,800	2,67,800	MR Page no 167
10	Eot 10 t	19,30,000	no.	1	19,30,000	57,900	19,87,900	MR Page no 168
11	Tonners	85,500	No	90	76,95,000		76,95,000	
12	Automatic Chlorine Tonner Leak , Absorption system	24,58,300	No.	1	24,58,300	73,749	25,32,049	MR Page no 167

6,89,94,070

Total of Product Water Pumps and CL System

**Executive Engineer (Desal)
 Executive Engineer Water Supply &
 Chennai Metropolitan Water Board
 Chennai Sewerage Board
 Chennai - 600 002.**

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
A Electrical Equipment								
Scope includes:								
Note:	The configuration, rating and quantity of items indicated in the Schedule of Quantities given below are a All the statutory fee will be paid by the Purchaser. b Unit Rate of all the items in scope of erection shall be furnished. c Bidder shall visit site & assess the exact volume of Work.							
1.00 110 / 11.5 KV SWITCH YARD EQUIPMENT								MR 182
1.01	110KV, 1250A, 40KA SF6 Circuit breaker	Sets	6.00					
1.02	110 KV, 1250A, double break isolator with earth switch	Sets	8.00					
1.03	110 KV, 1250A, double break isolators without earth switch.	Sets	3.00					
1.04	98kV, 10kA lightning arrester complete with insulating base and surge counter.	Nos.	18.00					
1.05	110 KV Single phase outdoor Current Transformer of ratio 800-100/1-1-1-Amps	Nos.	6.00					
1.06	110 KV Single phase outdoor Current Transformer of ratio 300-100/1-1-1-Amps	Nos.	12.00					
1.07	40/50 MVA, ONAN/ONAF, 110/11.5 KV, 3 phase Power Transformers	Sets	4.00					
1.08	100A, 63.5 ohm Outdoor Neutral Grounding Resistor (NGR).	Sets	4.00					
1.09	110KV Control and Relay Panel (2 Line, 1 Bus Coupler and 4 Transformer bays)	Set	1.00					
1.10	110KV Potential Transformers 110KV/V3/110V/V3/110V/V3.	Sets	6.00					
1.11	Valve Regulated Lead Acid (VRLA) battery bank along with accessories.	Set	1.00					
1.12	Battery charger cum DC distribution board	Set	1.00					
1.13	GI lattice support structures for switchyard equipment supports and gantries	Lot	1.00					
1.14	Busbar material consisting of : i) 80mm dia Tubular aluminium bus; ii) ACSR 54/3.18 mm" twin Zebra conductor; iii) Anti fog type suspension/strain insulators (silicon rubber); iv) Post insulators (silicon rubber); v) Terminal connectors & clamps suitable for ACSR conductors; and vi) Terminal connectors and clamps suitable for IPS tube.	Lot	1.00					
1.15	Marshalling box for control cabling.	Sets	4.00					
1.16	Power & Control cables	Lot	1.00					

Chennai Metro Water Supply and Sewerage Board
400 MLD SWROD Plant for Chennai City

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
1.17	Illumination system to provide minimum 30 lux.	Set	1.00					
1.18	Emergency Lighting	Set	2.00					
1.19	Earthing Material	Lot	1.00					
1.20	415V AC Distribution Board fabricated from 14/16 SWG Non-magnetic stainless steel sheet / GRP material / Engineering plastic etc.	Sets	1.00					
1.21	2.5mtr high, fencing made up of 12 SWG Galvanised chain linkage	Lot	1.00					
1.22	3 phase, 4 wire, 100Amp weather proof power plugs with sockets	Sets	6.00					
1.23	Fire Fighting System	Lot	1.00					
1.24	Piping, valves, bends, pipe supports, pre-fabricated ladder design GI cable racks / trays	Lot	1.00					
1.25	MS Rails, gaskets, etc.	Lot	1.00					
1.26	11kV Busduct 3000A, 40kA /1 sec - Aluminium busbar (15 Mtr. Each)	Sets	4.00					
1.27	Substation Automation System (SAS)	Set	1.00					
1.28	Erection, Testing & Commissioning Charges	Lot	1.00					
1.29	Charges for Coordination / Liaisoning with Strautory Authorities	Lot	1.00					
1.30	Cost of On-Site training (if any)	Lot	1.00					
					25,65,27,000.00		25,65,27,000.00	
2.00	MV SWITCH BOARDS (with vacuum 11kV circuit breaker panels)							MR PG 109
	11 KV Switch Board at Main Receiving Sub Station as per Drawing No. SWROD-E1-02 comprising of:							
2.10	a. Incomer from 110kV Switchyard (3000 A) - 4 nos. b. Bus Division VCBs - 4 nos. b. Bus Coupler (3000 A) - 3 nos. c. PT at incomer - 4 nos. d. Outgoing (2000 A) - 24 nos.	Set	1.00	56,60,000.00	56,60,000.00	1,78,290.00	58,38,290.00	
	11 KV Switch Board at Intake Water Building as per Drawing No. SWROD-E1-03 comprising of:							
2.20	a. Incomer from MRSS (2000 A) - 1 no. b. PT at incomer - 1 no. c. Outgoing (1250 A) - 20 nos.	Set	1.00	1,01,50,000.00	1,01,50,000.00	3,19,725.00	1,04,69,725.00	
	11 KV Single Bus Switch Boards comprising of:							
2.30	a. Incomer from MRSS (2000 A) - 1 no. b. PT at incomer - 1 no. c. Outgoing (1250 A) - 12 nos.							



Chennai Metro Water Supply and Sewerage Board
400 MLD SWROD Plant for Chennai City

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
2.31	Switch Board - 1 at RO Plant Electrical Building as per Drawing No. SWROD-E1-04	Set	1.00	58,20,000.00	58,20,000.00	1,83,330.00	60,03,330.00	
2.32	Switch Board - 2 at RO Plant Electrical Building as per Drawing No. SWROD-E1-05	Set	1.00	58,20,000.00	58,20,000.00	1,83,330.00	60,03,330.00	
2.33	Switch Board - 3 at RO Plant Electrical Building as per Drawing No. SWROD-E1-06	Set	1.00	58,20,000.00	58,20,000.00	1,83,330.00	60,03,330.00	
2.34	Switch Board - 4 at RO Plant Electrical Building as per Drawing No. SWROD-E1-07	Set	1.00	58,20,000.00	58,20,000.00	1,83,330.00	60,03,330.00	
2.35	Switch Board - 5 at RO Plant Electrical Building as per Drawing No. SWROD-E1-08	Set	1.00	58,20,000.00	58,20,000.00	1,83,330.00	60,03,330.00	
2.36	Switch Board - 6 at RO Plant Electrical Building as per Drawing No. SWROD-E1-09	Set	1.00	58,20,000.00	58,20,000.00	1,83,330.00	60,03,330.00	
2.37	Switch Board - 7 at RO Plant Electrical Building as per Drawing No. SWROD-E1-10	Set	1.00	58,20,000.00	58,20,000.00	1,83,330.00	60,03,330.00	
2.38	Switch Board - 8 at RO Plant Electrical Building as per Drawing No. SWROD-E1-11	Set	1.00	58,20,000.00	58,20,000.00	1,83,330.00	60,03,330.00	
2.40	11 KV Switch Board at CIP Building as per Drawing No. SWROD-E1-12 comprising of: a. Incomer from MRSS (2000 A) - 1 no. b. PT at incomer - 1 no. c. Outgoing (1250 A) - 8 nos.	Set	1.00	38,95,000.00	38,95,000.00	1,22,692.50	40,17,692.50	
2.50	11 KV Switch Board at Product Water Building as per Drawing No. SWROD-E1-13 comprising of: a. Incomer from MRSS (2000 A) - 1 no. b. PT at incomer - 1 no. c. Outgoing (1250 A) - 16 nos.	Set	1.00	77,35,000.00	77,35,000.00	2,43,652.50	79,78,652.50	
2.60	Earthing trucks	Nos.	5.00	60,000.00	3,00,000.00	9,450.00	3,09,450.00	
2.70	Circuit breaker handling trolleys	Nos.	5.00	55,000.00	2,75,000.00	8,662.50	2,83,662.50	
3.00	VRLA BATTERY, BATTERY CHARGER AND DC DISTRIBUTION BOARDS							MR PG 114
3.10	150AH, 110VDC Output, 3P 415V, 50 Hz Input	No	RO					
3.20	200AH, 110VDC Output, 3P 415V, 50 Hz Input with DCDB	No	10.00	4,30,850.00	43,08,500.00	1,35,717.75	44,44,217.75	
3.30	240AH, 110VDC Output, 3P 415V, 50 Hz Input with DCDB	No	2.00	4,80,600.00	9,61,200.00	30,277.80	9,91,477.80	



Chennai Metro Water Supply and Sewerage Board
400 MLD SWROD Plant for Chennai City

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

Chennai Metro Water Supply and Sewerage Board
400 MLD SWROD Plant for Chennai City

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
PCC-4 at DMGF Building as per Drawing No. SWROD-E1-17 comprising of:								
5.14	Incomer (4000 A) - 2 nos. Bus coupler (4000 A) - 1 no. Outgoing (2500 A) - 1 nos. Outgoing (1600 A) - 4 nos. Outgoing (1250 A) - 5 nos.	Set	1.00	48,02,704.00	48,02,704.00	1,51,285.18	49,53,989.18	
PCC-5 at CIP Building as per Drawing No. SWROD-E1-18 comprising of:								
5.15	Incomer (4000 A) - 2 no. Bus coupler (4000 A) - 1 no. Outgoing (2500 A) - 1 no. Outgoing (1600 A) - 3 nos. Outgoing (1250 A) - 6 nos.	Set	1.00	47,68,320.00	47,68,320.00	1,50,202.08	49,18,522.08	
PCC-6 at Post Chlorine Building as per Drawing No. SWROD-E1-19 comprising of:								
5.16	Incomer (3200 A) - 2 no. Bus coupler (3200 A) - 1 no. Outgoing (1600 A) - 3 nos. Outgoing (1250 A) - 7 nos.	Set	1.00	42,39,045.00	42,39,045.00	1,33,529.92	43,72,574.92	
5.17	ACB Handling Maintenance Trolleys for each MCC location	Set	6.00	55,000.00	3,30,000.00	10,395.00	3,40,395.00	
5.20	ANNEXURE-E Motor Control Centre (MCCs) - For Feeder Details of individual MCCs refer							
5.20	MCC 1.01 at Intake Pump Station with 1 no. i/c from PCC-1 Approx. no. of feeders - 47 Approx. Length - 5.5 Mtr	Set	1.00	35,72,000.00	35,72,000.00	1,12,518.00	36,84,518.00	
5.20	MCC 1.02 at Filter B/W Holding Tank with 1 no. i/c from PCC-1 Approx. no. of feeders - 17 Approx. Length - 4.5 Mtr	Set	1.00	25,31,000.00	25,31,000.00	79,726.50	26,10,725.50	
5.20	MCC 2.01, 2.02, 2.03, 2.04 at Lamella System each with 1 no. i/c from PCC-1 Approx. no. of feeders - 43 Approx. Length - 5.5 Mtr each	Set	4.00	30,58,000.00	1,22,32,000.00	3,85,308.00	1,26,17,308.00	
5.20	MCC 3.01, 3.02, 3.03, 3.04 at DAF Building each with 1 no. i/c from PCC-2 & PCC-3 Approx. no. of feeders - 99 Approx. Length - 10.5 Mtr each	Set	4.00	69,02,000.00	2,76,08,000.00	8,69,652.00	2,84,77,652.00	



Chennai Metro Water Supply and Sewerage Board
400 MLD SWROD Plant for Chennai City

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
5.21	MCC 4.01 for DMGF System at Pre-Treatment Storage with 1 no. i/c from PCC-4 Approx. no. of feeders - 116 Approx. Length - 14.5 Mtr	Set	1.00	1,27,24,000.00	1,27,24,000.00	4,00,806.00	1,31,24,806.00	
5.21	MCC 4.02 for DMF System - DMGF Building with 1 no. i/c from PCC-4 Approx. no. of feeders - 25 Approx. Length - 5 Mtr	Set	1.00	42,72,000.00	42,72,000.00	1,34,568.00	44,06,568.00	
5.21	MCC 4.03 For DMF System - RO Feed Tank (PMCC-1) with 2 no. i/c & 1 b/c Approx. no. of feeders - 41 Approx. Length - 9 Mtr	Set	1.00	88,87,000.00	88,87,000.00	2,79,940.50	91,66,940.50	
5.21	MCC 5.01 for ClP Building with 1 no. i/c from PC-5 Approx. no. of feeders - 36 Approx. Length - 7.5 Mtr	Set	1.00	62,48,000.00	62,48,000.00	1,96,812.00	64,44,812.00	
5.21	MCC 5.02 for Chemical Storage for RO with 1 no. i/c from PC-5 Approx. no. of feeders - 40 Approx. Length - 6.5 Mtr	Set	1.00	50,01,000.00	50,01,000.00	1,57,531.50	51,58,531.50	
5.21	MCC 5.03 for RO Plant Electrical Building (PMCC-2) with 2 no. i/c & 1 b/c Approx. no. of feeders - 84 Approx. Length - 9 Mtr	Set	1.00	80,20,000.00	80,20,000.00	2,52,630.00	82,72,630.00	
5.21	MCC 6.01 for Potabilization - Lime Plant with 1 no. i/c from PCC-6 Approx. no. of feeders - 124 Approx. Length - 14.5 Mtr	Set	1.00	1,31,49,000.00	1,31,49,000.00	4,14,193.50	1,35,63,193.50	
5.21	MCC 6.02 for Potabilization - Chlorination with 1 no. i/c from PCC-6 Approx. no. of feeders - 72 Approx. Length - 11.5 Mtr	Set	1.00	91,18,000.00	91,18,000.00	2,87,217.00	94,05,217.00	
5.21	MCC 7.01 for Product Water Building (PMCC-5) with 2 no. i/c & 1 b/c Approx. no. of feeders - 76 Approx. Length - 10 Mtr	Set	1.00	1,08,30,000.00	1,08,30,000.00	3,41,145.00	1,11,71,145.00	
5.21	MCC 8.01 & 8.02 for Sludge Treatment (PMCC-3 & PMCC-4) each with 2 no. i/c & 1 b/c Approx. no. of feeders - 60 Approx. Length - 8.5 Mtr each	Set	2.00	96,53,000.00	1,93,06,000.00	6,08,139.00	1,99,14,139.00	
5.22	ACB Handling Maintenance Trolleys for each MCC location	Set	21.00	55,000.00	11,55,000.00	0.00	36,382.50	11,91,382.50
5.30	415V LV Bus Ducts				0.00	0.00	0.00	0.00



BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
5.31	2500A (approx. Length - 15 Mtr each)	Sets	4.00	7,49,000.00	29,96,000.00	94,374.00	30,90,374.00	
5.32	3200A (approx. Length - 15 Mtr each)	Sets	6.00	10,50,000.00	63,00,000.00	1,98,450.00	64,98,450.00	
5.33	4000A (approx. Length - 15 Mtr each)	Sets	12.00	12,72,000.00	1,52,64,000.00	4,80,816.00	1,57,44,816.00	
5.40	Local Push Button Stations (FRP / GRP Enclosure)				0.00	0.00	0.00	
5.41	Local Push Button Station DOL for MCCS	Nos	104.00	2,700.00	2,80,800.00	8,845.20	2,89,645.20	
5.42	Local Push Button Station RDOL for MCCS	Nos	292.00	4,100.00	11,97,200.00	37,711.80	12,34,911.80	
5.50	LV Capacitor Banks							C
5.51	LV APFCP & Capacitor (415 V, 600 KVAR)	Nos	2.00	7,30,100.00	14,60,200.00	45,996.30	15,06,196.30	
5.52	LV APFCP & Capacitor (415 V, 700 KVAR)	Nos	3.00	8,27,400.00	24,82,200.00	78,189.30	25,60,389.30	
5.53	LV APFCP & Capacitor (415 V, 800 KVAR)	Nos	6.00	9,33,100.00	55,98,600.00	1,76,355.90	57,74,955.90	
6.00	MOTORS (11kV, 690V & 415V), MV CAPACITORS (11 kV) & LRS							
6.10	11 kV Slip Ring Motors for inc. in Mechanical							
6.11	RO High Pressure Pumps (2500kW, 2900 rpm)	Nos	17.00	60,43,000.00	10,27,31,000.00	32,36,026.50	10,59,67,026.50	MR PG 133
6.20	690 V Squirrel Cage Motors for							
6.21	ERD Re-Circulation Pump (280kW, 1000-1500 rpm)	Nos	17.00	11,50,000.00	1,95,50,000.00	6,15,825.00	2,01,65,825.00	MR PG 133
6.22	ERD Feed Booster Pump (315kW, 1000-1500 rpm)	Nos	17.00	12,25,000.00	2,08,25,000.00	6,55,987.50	2,14,80,987.50	
6.23	RO CIP Pump (500kW, 1000-1500 rpm)	Nos	3.00	16,40,000.00	49,20,000.00	1,54,980.00	50,74,980.00	
6.24	RO Feed Booster Pump (630kW, 1000-1500 rpm)	Nos	17.00	20,25,000.00	3,44,25,000.00	10,84,387.50	3,55,09,387.50	
6.21	Product Water Pumps (630kW, 750-1000 rpm)	Nos	9.00	20,25,000.00	1,82,25,000.00	5,74,087.50	1,87,99,087.50	
6.30	415 V LV Slip Ring & Squirrel Cage Motors							
6.31	415 V LV Slip Ring & Squirrel Cage Motors for							MR PG 137
a	DMF Scour Air Blower, 250 kW, 1000-1500 rpm	Nos	6.00	5,05,719.00	30,34,314.00	95,580.89	31,29,894.89	
b	RO CIP - Heater/Coolant Allowance, 200 kW, 1000-1500 rpm	Nos	3.00	5,05,719.00	15,17,157.00	47,790.45	15,64,947.45	
c	B/W Disposal Pump, 180 kW, 1000-1500 rpm	Nos	3.00	5,05,719.00	15,17,157.00	47,790.45	15,64,947.45	
d	RO Flushing, 150 kW, 1000-1500 rpm	Nos	3.00	5,05,719.00	15,17,157.00	47,790.45	15,64,947.45	

Chennai Metro Water Supply and Sewerage Board
400 MLD SWROD Plant for Chennai City

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit	Total Amount (INR)	Reference
e	DMF Filter Backwash Pump-Low, 90 kW, 1000-1500 rpm	Nos	20.00	3,31,226.00	66,24,520.00	2,08,672.38	68,33,192.38	
f	Chlorine Crane, 75 kW, 1000-1500 rpm	Nos	4.00	2,63,409.00	10,53,636.00	33,189.53	10,86,825.53	
g	RO CIP Neutralization Pump / Mix, 55 kW, 1000-1500 rpm	Nos	2.00	1,87,249.00	3,74,498.00	11,796.69	3,86,294.69	
h	Recirculation PMP, 45 kW, 1000-1500 rpm	Nos	68.00	1,87,249.00	1,27,32,932.00	4,01,087.36	1,31,34,019.36	
i	Coagulation/Rapid Mixing, 37 kW, 1000-1500 rpm	Nos	8.00	1,87,249.00	14,97,992.00	47,186.75	15,45,178.75	
j	Process Water Pumps, 30 kW, 1000-1500 rpm	Nos	18.00	1,09,004.00	19,62,072.00	61,805.27	20,23,877.27	
k	Chlorine Evaporator, 22 kW, 1000-1500 rpm	Nos	7.00	1,09,004.00	7,63,028.00	24,035.38	7,87,063.38	
l	Lime Sludge Pump, 15 kW, 1000-1500 rpm	Nos	6.00	64,421.00	3,86,526.00	12,175.57	3,98,701.57	
m	Screen Backwash System, 1.1 kW, 1000-1500 rpm	Nos	6.00	36,212.00	2,17,272.00	6,844.07	2,24,116.07	
n	Filter Press, 7.5 kW, 1000-1500 rpm	Nos	6.00	29,106.00	1,74,636.00	5,501.03	1,80,137.03	
o	Lime Slurry Mixer, 5.5 kW, 1000-1500 rpm	Nos	18.00	18,027.00	3,24,486.00	10,221.31	3,34,707.31	
p	Lime Saturator Mixer, 2.2 kW, 1000-1500 rpm	Nos	30.00	10,603.00	3,18,090.00	10,019.84	3,28,109.84	
q	RO Chemical Dosing -SBS Dosing Pump, 0.75 kW, 1000-1500 rpm	Nos	328.00	6,329.00	20,75,912.00	65,391.23	21,41,303.23	
6.32 415 V LV Slip Ring & Squirrel Cage Motors for								
a	Centrifuge Motors, 110 kW, 750-1000 rpm	Nos	12.00	4,02,633.00	48,31,596.00	1,52,195.27	49,83,791.27	
b	Potabilization CO2 Plant, 75 kW, 750-1000 rpm	Nos	2.00	3,37,145.00	6,74,290.00	21,240.14	6,95,530.14	
c	Screw Pumps, 55 kW, 750-1000 rpm	Nos	24.00	2,70,155.00	64,83,720.00	2,04,237.18	66,87,957.18	
d	HVAC Switch Room, 30 kW, 750-1000 rpm	Nos	16.00	1,49,508.00	23,92,128.00	75,352.03	24,67,480.03	
e	Compressed Air System, 22 kW, 750-1000 rpm	Nos	6.00	1,11,185.00	6,67,110.00	21,013.97	6,88,123.97	
f	Sludge Mixers, 15 kW, 750-1000 rpm	Nos	4.00	92,169.00	3,68,676.00	11,613.29	3,80,289.29	
g	Mixer and Poly Dosing system, 11 kW, 750-1000 rpm	Nos	64.00	50,548.00	32,35,072.00	1,01,904.77	33,36,976.77	
h	Thickener, 7.5 kW, 750-1000 rpm	Nos	4.00	36,914.00	1,47,656.00	4,651.16	1,52,307.16	
6.40 MV Capacitors & Series Reactor for 11kV Slip Ring Motors for								
RO High Pressure Pumps (11 KV, 2500 kW, 2900 rpm)								
6.41	Capacitor Rating at 12.1 KV -1000 kVAR and Reactor Rating at 12.1 KV is 1% of the capacitor rating	No	17.00	3,54,000.00	60,18,000.00	1,89,567.00	62,07,567.00	
6.50 Liquid Resistance Starters for 11kV Slip Ring Motors for								
6.51	RO Pressure Pump (2500 kW / 2900 rpm)	Set	17.00	10,00,000.00	1,70,00,000.00	5,35,500.00	1,75,35,500.00	
7.00 VARIABLE FREQUENCY DRIVES / CONVERTER TRANSFORMERS / FIELD MOUNTED CONTROL UNITS								
								MR PG 142

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
7.10	690 V Variable Frequency Drives for Squirrel Cage MV motors for							
7.11	ERD Re-Circulation Pump (280 kW, 1000-1500 rpm)	No	17.00	9,21,000.00	1,56,57,000.00	4,93,195.50	1,61,50,195.50	
7.12	ERD Feed Booster Pump (315 kW, 1000-1500 rpm)	No	17.00	9,21,000.00	1,56,57,000.00	4,93,195.50	1,61,50,195.50	
7.13	RO CIP Pump (500 kW, 1000-1500 rpm)	No	3.00	25,37,000.00	76,11,000.00	2,39,746.50	78,50,746.50	
7.14	RO Feed Booster Pump (630 kW, 1000-1500 rpm)	No	17.00	26,19,000.00	4,45,23,000.00	14,02,474.50	4,59,25,474.50	
7.15	Product Water Pump (630 kW, 750-1000 rpm)	No	9.00	26,19,000.00	2,35,71,000.00	7,42,486.50	2,43,13,486.50	
7.16	Intake Water Pump (700 kW, 500-1000 rpm)	No	9.00	43,90,000.00	3,95,10,000.00	12,44,565.00	4,07,54,565.00	
					0.00	0.00	0.00	
7.20	11/0.690/0.690 kV, Three Winding Convertor Transformers for 690V VFDs - of following ratings	Nos	34.00	7,50,000.00	2,55,00,000.00	8,03,250.00	2,63,03,250.00	
7.21	630kVA	Nos	3.00	12,84,000.00	38,52,000.00	1,21,338.00	39,73,338.00	
7.22	1000kVA	Nos	26.00	15,39,000.00	4,00,14,000.00	12,60,441.00	4,12,74,441.00	
7.23	1250kVA	Nos	9.00	19,71,222.00	1,77,40,998.00	5,58,841.44	1,82,99,839.44	
7.30	415 V Variable Frequency Drives for							
7.31	1000 - 1500 rpm, 415 V LV Squirrel Cage Motors for							
a	DMF Scour Air Blower (250 kW, 1000-1500 rpm)	Nos	6.00	13,66,000.00	81,96,000.00	2,58,174.00	84,54,174.00	
b	RO CIP - Heater/Coolant Allowance (200 kW, 1000-1500 rpm)	Nos	3.00	10,68,000.00	32,04,000.00	1,00,926.00	33,04,926.00	
c	B/W Disposal Pump (180 kW, 1000-1500 rpm)	Nos	3.00	10,68,000.00	32,04,000.00	1,00,926.00	33,04,926.00	
d	RO Flushing (150 kW, 1000-1500 rpm)	Nos	3.00	9,15,000.00	27,45,000.00	86,467.50	28,31,467.50	
e	DMF Filter Backwash Pump-Low (90 kW, 1000-1500 rpm)	Nos	20.00	6,76,000.00	1,35,20,000.00	4,25,880.00	1,39,45,880.00	
f	Chlorine Crane (75 kW, 1000-1500 rpm)	Nos	4.00	5,53,000.00	22,12,000.00	69,678.00	22,81,678.00	
g	RO CIP Neutralisation Pump / Mix (55 kW, 1000-1500 rpm)	Nos	2.00	4,95,000.00	9,90,000.00	31,185.00	10,21,185.00	
h	Recirculation PMP (45 kW, 1000-1500 rpm)	Nos	68.00	4,29,000.00	2,91,72,000.00	9,18,918.00	3,00,90,918.00	
i	Coagulation/Rapid Mixing (37 kW, 1000-1500 rpm)	Nos	8.00	3,38,000.00	27,04,000.00	85,176.00	27,89,176.00	
j	Process Water Pumps (30 kW, 1000-1500 rpm)	Nos	18.00	3,05,000.00	54,90,000.00	1,72,935.00	56,62,935.00	
k	Chlorine Evaporator (22 kW, 1000-1500 rpm)	Nos	7.00	2,72,000.00	19,04,000.00	59,976.00	19,63,976.00	
l	Lime Sludge Pump (15 kW, 1000-1500 rpm)	Nos	6.00	2,42,000.00	14,52,000.00	45,738.00	14,97,738.00	
m	Screen Backwash System (11 kW, 1000-1500 rpm)	Nos	6.00	2,28,000.00	13,68,000.00	43,092.00	14,11,092.00	
n	Filter Press (7.5 kW, 1000-1500 rpm)	Nos	6.00	2,28,000.00	13,68,000.00	43,092.00	14,11,092.00	
o	Lime Slurry Mixer (5.5 kW, 1000-1500 rpm)	Nos	18.00	2,10,000.00	37,80,000.00	1,19,070.00	38,99,070.00	
p	Lime Saturator Mixer (2.2 kW, 1000-1500 rpm)	Nos	30.00	1,81,000.00	54,30,000.00	1,71,045.00	56,01,045.00	
q	RO Chemical Dosing - SBS Dosing Pump (0.75 kW, 1000-1500 rpm)	Nos	328.00	1,74,415.00	5,72,08,120.00	18,02,055.78	5,90,10,175.78	

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
7.32	750 - 1000 rpm, 415 V LV Squirrel Cage Motors for							
a	Centrifuge Motors (110 kW, 750-1000 rpm)	No	12.00	6,76,000.00	81,12,000.00	2,55,528.00	83,67,528.00	
b	Potabilization CO2 Plant (75 kW, 750-1000 rpm)	No	2.00	5,53,000.00	11,06,000.00	34,839.00	11,40,839.00	
c	Screw Pumps (55 kW, 750-1000 rpm)	No	24.00	4,95,000.00	1,18,80,000.00	3,74,220.00	1,22,54,220.00	
d	HVAC Switch Room (30 kW, 750-1000 rpm)	No	16.00	3,05,000.00	48,80,000.00	1,53,720.00	50,33,720.00	
e	Compressed Air System (22 kW, 750-1000 rpm)	No	6.00	2,72,000.00	16,32,000.00	51,408.00	16,83,408.00	
f	Sludge Mixers (15 kW, 750-1000 rpm)	No	4.00	2,41,970.00	9,67,880.00	30,488.22	9,98,368.22	
g	Mixer and Poly Dosing system (11 kW, 750-1000 rpm)	No	64.00	2,28,000.00	1,45,92,000.00	4,59,648.00	1,50,51,648.00	
h	Thickener (7.5 kW, 750-1000 rpm)	No	4.00	2,28,000.00	9,12,000.00	28,728.00	9,40,728.00	
7.40	Field mounted Control Units (FRP / GRP Enclosure) for							
7.4.1	690 V MV Inverter Drives	Nos	72.00	5,600.00	4,03,200.00	12,700.80	4,15,900.80	
7.4.2	415 V LV Drives	Nos	668.00	4,000.00	26,72,000.00	84,168.00	27,56,168.00	
8.00	LIGHTING / ILLUMINATION							MR PG 115
8.10	415/415V Energy Saver Lighting Transformer							
8.1.1	63 kVA	Nos	1.00	2,09,000.00	2,09,000.00	6,583.50	2,15,583.50	
8.1.2	100 kVA	Nos	2.00	2,90,000.00	5,80,000.00	18,270.00	5,98,270.00	
8.1.3	125 kVA	Nos	8.00	3,34,000.00	26,72,000.00	84,168.00	27,56,168.00	
8.1.4	160 kVA	Nos	3.00	4,16,000.00	12,48,000.00	39,312.00	12,87,312.00	
8.1.5	250 kVA	Nos	2.00	5,60,000.00	11,20,000.00	35,280.00	11,55,280.00	
8.20	Distribution Boards							
	Main Lighting and Power Distribution Board (MLPDB-01) at Intake Water Building: The Board (50 KA Fault Level) shall be fabricated from Engineering Plastic / GRP / Polycarbonate material and provided with 2x1250A 4P EDO ACB as incomer (one from normal supply & other from DG set - Both the incomers are wired with auto/manual AMF change-over mode) and 1x400, 2x250, 4x200A TPN MCCB as outgoings as per Drg. No SWROD-E4-01	Nos.	1.00	7,61,400.00	7,61,400.00	23,984.10	23,984.10	7,85,384.10

Chennai Metro Water Supply and Sewerage Board

400 MLD SWROD Plant for Chennai City

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
8.20	Main Lighting and Power Distribution Board (MLPDB-02) at RO Plant Electrical Building. The Board (50 KA fault Level) shall be fabricated from Engineering Plastic / Polycarbonate / GRP material and provided with 2x800A 4P EDO ACB as incomer (one from normal supply & other from DG set - Both the incomers are wired with auto/manual AMF change-over mode) and 1x400, 2x200, 1x160 & 1x125 TPN MCCB as outgoings as per Drg. No SWROD-E4-02	Nos.	1.00	6,08,720.00	6,08,720.00	19,174.68	6,27,894.68	
8.20	Main Lighting and Power Distribution Board (MLPDB-03) at Product Water Building. The Board (50 KA fault Level) shall be fabricated from Engineering Plastic / Polycarbonate / GRP material and provided with 2x630A 4P EDO ACB as incomer (one from normal supply & other from DG set - Both the incomers are wired with auto/manual AMF change-over mode) and 1x250, 2x200, 1x160 TPN MCCB as outgoings as per Drg. No SWROD-E4-03	Nos.	1.00	5,72,930.00	5,72,930.00	18,047.30	5,90,977.30	
8.20	Auxiliary Lighting and Power Distribution Board (ALPDB-015 & 023) at DAF Building and RO Plant Building. The Board (50 KA fault Level) shall be fabricated from Engineering Plastic / Polycarbonate / GRP material and provided with following:	Nos.	2.00	4,34,470.00	8,68,940.00	27,371.61	8,96,311.61	
	Incomer:					0.00	0.00	0.00
	1No. 400A, 4P, MCCB Microprocessor Type with adjustable O/I, SC & E/F (40-100%)					0.00	0.00	0.00
	1 Nos. [0-500V] Voltmeter (96mm x 96mm) with S/S					0.00	0.00	0.00
	1 Nos. [0-400A] Ammeter (96mm x 96mm) with CT's and S/S					0.00	0.00	0.00
	1 Set of ON/OFF/ Trip and Phase Indicating Lights with HRC fuses					0.00	0.00	0.00
	Busbars:					0.00	0.00	0.00
	4 x 600A, Electrolytic Aluminium Bus-Bars of equal cross section.					0.00	0.00	0.00
	Outgoings:					0.00	0.00	0.00
	All MCCB to be of adjustable O/I & S/C protection. 100A / 63A / 40A TPN MCCBs as outgoings as per Drg. No SWROD-E4-01 & SWROD-E4-02					0.00	0.00	0.00
8.21	Auxiliary Lighting and Power Distribution Board (ALPDB-012, 013 & 031) at Lamella Building (2 nos.) and Administration Building. The Board (50 KA fault Level) shall be fabricated from Engineering Plastic / Polycarbonate / GRP material and provided with following:	Nos.	3.00	3,47,010.00	10,41,030.00	32,792.45	10,73,822.45	
	Incomer:							
	1 Nos. 250A, 4P, MCCB Microprocessor Type with adjustable O/I, SC & E/F (40-100%)							
	1 Nos. [0-500V] Voltmeter (96mm x 96mm) with S/S							

**Chennai Metro Water Supply and Sewerage Board
400 MLD SWROD Plant for Chennai City**

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
	1 Nos. [0-250A] Ammeter (96mm x 96mm) with CT's and S/S							
	1 Set of ON/OFF / Trip and Phase Indicating Lights with HRC fuses							
	Busbars:							
	4 x 400A, Electrolytic Aluminium Bus-Bars of equal cross section.							
	Outgoings:							
	All MCCB to be of adjustable O/L & S/C protection. 100A / 63A / 40A TPN MCCBs as outgoings as per Drg. No SWROD-E4-01 & SWROD-E4-03							
	Auxiliary Lighting and Power Distribution Board (ALPDB-011, 014, 016, 017, 021, 022, 032 & 033) at Intake, Dirty Water, DMGF (2 nos.), MRSS, Electrical Building for RO Plant, Workshop & Chlorine Buildings. The Board (50 KA Fault Level) shall be fabricated from Engineering Plastic / Polycarbonate / GRP material and provided with following:	Nos.	8.00	3,16,620.00	25,32,960.00	79,788.24	26,12,748.24	
	Incomer:							
	1 Nos. 200A, 4P, MCCB Microprocessor Type with adjustable O/L, SC & E/F (40-100%)							
	1 Nos. [0-500V] Voltmeter (96mm x 96mm) with S/S							
	1 Nos. [0-200A] Ammeter (96mm x 96mm) with CT's and S/S							
	1 Set of ON/OFF / Trip and Phase Indicating Lights with HRC fuses							
	Busbars:							
	4 x 300A, Electrolytic Aluminium Bus-Bars of equal cross section.							
	Outgoings:							
	All MCCB to be of adjustable O/L & S/C protection. 100A / 63A / 40A TPN MCCBs as outgoings as per Drg. No SWROD-E4-01, SWROD-E4-02 & SWROD-E4-03							
	Auxiliary Lighting and Power Distribution Board (ALPDB-024 & 034) at Chemical Storage & Potabilization Buildings. The Board (50 KA Fault Level) shall be fabricated from Engineering Plastic / Polycarbonate / GRP material and provided with following:	Nos.	2.00	1,86,670.00	3,73,340.00	11,760.21	3,85,100.21	
	Incomer:							
	1 Nos. 160A, 4P, MCCB Microprocessor Type with adjustable O/L, SC & E/F (40-100%)					0.00	0.00	0.00
	1 Nos. [0-500V] Voltmeter (96mm x 96mm) with S/S							
	1 Nos. [0-160A] Ammeter (96mm x 96mm) with CT's and S/S							
	1 Set of ON/OFF / Trip and Phase Indicating Lights with HRC fuses							
	Busbars:							
	4 x 300A, Electrolytic Aluminium Bus-Bars of equal cross section							

**Chennai Metro Water Supply and Sewerage Board
400 MLD SWROD Plant for Chennai City**

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
	Outgoings:							
	All MCCB to be of adjustable O/L & S/C protection. 63A / 40A TPN MCCBs as outgoings as per Drg. No SWROD-E4-02 & SWROD-E4-03							
8.21	Auxiliary Lighting and Power Distribution Board (ALPDB-025) at STP Building. The Board (50 KA fault Level) shall be fabricated from Engineering Plastic / GRP/ Polycarbonate material and provided with following: Incomer: 1 Nos. 125A, 4P, MCCB Microprocessor Type with adjustable O/L, SC & E/F (40-100%) 1 Nos. [0-500V] Voltmeter (96mm x 96mm) with S/S 1 Nos. [0-120A] Ammeter (96mm x 96mm) with CT's and S/S 1 Set of ON/OFF/ Trip and Phase Indicating Lights with HRC fuses Busbars: 4 x 300A, Electrolytic Aluminium Bus-Bars of equal cross section Outgoings: All MCCB to be of adjustable O/L & S/C protection. 63A / 40A TPN MCCBs as outgoings as per Drg. No SWROD-E4-02	Nos.	1.00	1,79,900.00	1,79,900.00	5,666.85	1,85,566.85	
8.21	Street Lighting Feeder Pillar (Master). The Board (35 kA fault Level) shall be fabricated from 14/16 SWG non-magnetic stainless steel sheet / Engineering Plastic / Polycarbonate / GRP material and provided with 2 nos. 100 A 4-P MCCB each in series with 100A 4-P Contactor. The Contactors shall be wired in auto-change-over Mode, with timer / photo-electric & 100A 4-P bye pass Contactor as incomer and 2-Nos. 40A/63A TPN MCCB Outgoings & 12 nos 10/16/32A SP MCB as outgoings. The Board shall incorporate suitable Changeover section for shift of power from Electrical to Solar source.	Nos.	7.00	1,58,579.00	11,10,053.00	34,966.67	11,45,019.67	
8.21	Street Lighting Feeder Pillar (Slave). The Board (35 kA fault Level) shall be fabricated from Engineering Plastic / Polycarbonate / GRP material and provided with 1 no. 40A/63A 4-P MCCB as incomer and 12 nos 10/16/20/25/32A SP MCB as outgoings.	Nos.	4.00	43,624.00	1,74,496.00	5,496.62	1,79,992.62	
8.21	Street Lighting Feeder Pillar (Normal). The Board (35 kA fault Level) shall be fabricated from Engineering Plastic / Polycarbonate / GRP material and provided with 1 no 100A 4-P MCCB as incomer and 12 nos 10/16/32A SP MCB + 2Nos. 32/63 A 3-phase MCBs as outgoings.	Nos.	2.00	32,516.00	65,032.00	2,048.51	67,080.51	

**Chennai Metro Water Supply and Sewerage Board
400 MLD SWROD Plant for Chennai City**

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
8.21	Flame Proof, weather proof MCCB conforming to Group-IIA 7B as per IS 2148/1981 and degree of protection IP 55 as per IS : 2147/1962 and enclosure with cast alum alloy LM 6 as required 100/75 A 4P MCCB (35 KA) for Cranes	Each	14.00	35,520.00	4,97,280.00	15,664.32	5,12,944.32	
8.30	Indoor LDBs & PDBs				0.00	0.00	0.00	
	LDBs and PDBs shall be of cubicle type dust and vermin proof 10 kA fault level TPN MCB DB made of 16 SWG CRCA sheet steel / GRP material. The DB should be suitable for wall mounting with lockable double hinged door construction and painted with stove enamel paint of desired shade. The DBs shall conform to latest IS Code and provided with incoming and outgoing connections and bus bars of solid electrolytic copper and 10 kA current limiting type MCB's. The DB's shall be provided with solid copper neutral & earthing links and fabricated in a manner as approved by engineer-in-charge. All the RCCB's shall have 100 mA sensitivity.							
8.31	Lighting and Power DB'S (Vertical Bus Bars)							
	8-Way TPN MCB DB (vertical type) as above and provided with following: a. 63/80A, 4P, MCCB (25 KA fault level) as Incomer - 1 No. b. 100A Copper Bus Bars of equal ratings - 3 Nos. c. 6/10/16/20/32A MCB as outgoing in each phase - 6 Nos. d. 10 Way copper earth/neutral links - 4 Nos.	Nos.	27.00	13,737.00	3,70,899.00	11,683.32	3,82,582.32	
8.32	Lighting DB'S (Segregated Bus Bars)							
	8-Way TPN MCB DB (segregated phase type) as above and provided with following: a. 63A, 4P, MCCB (25 KA fault level) as Incomer - 1 No. b. 40A, DP RCBO in series with 40A DP Contactor with 2-NO/NC contacts as Incomer in each phase - 1 No. c. 100A Copper Bus Bars of equal ratings - 3 Nos. d. 6/10/16/20/32A MCB as outgoing in each phase - 8Nos. e. 10 Way copper earth/neutral links - 4 Nos.	Nos.	35.00	26,044.00	9,11,540.00	28,713.51	9,40,253.51	

**Chennai Metro Water Supply and Sewerage Board
400 MLD SWROD Plant for Chennai City**

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
8.32	<p>6-Way TPN MCB DB (segregated phase type) as above and provided with following:</p> <ul style="list-style-type: none"> a. 63A, 4P, MCCB (25 KA fault level) as Incomer - 1 No. b. 40A, DP RCBO in series with 40A DP Contactor with 2-NO/NC contacts as Incomer in each phase - 1 No. These phase contactors shall be utilised as auto switching unit. c. 100A Copper Bus Bars of equal ratings - 3 Nos. d. 6/10/16/20/32A MCB as outgoing in each phase - 6Nos. e. 10 Way copper earth/neutral links - 4 Nos. 	Nos.	6.00	25,077.00	1,50,462.00	4,739.55	1,55,201.55	
8.32	<p>4-Way TPN MCB DB (segregated phase type) as above and provided with following:</p> <ul style="list-style-type: none"> a. 63A, 4P, MCCB (25 KA fault level) as Incomer - 1 No. b. 40A, DP RCBO in series with 40A DP Contactor with 2-NO/NC contacts as Incomer in each phase - 1 No. These phase contactors shall be utilised as auto switching unit. c. 100A Copper Bus Bars of equal ratings - 3 Nos. d. 6/10/16/20/32A MCB as outgoing in each phase - 4Nos. e. 10 Way copper earth/neutral links - 4 Nos. 	Nos.	5.00	23,214.00	1,16,070.00	3,656.21	1,19,726.21	
8.32	<p>8-Way SPN MCB DB as above and provided with following:</p> <ul style="list-style-type: none"> a. 2-Nos. 100 A Copper Bus Bars of equal ratings b. 1-No. 40A, DP MCB as Incomer c. 1-No. 32A, DP RCBO in series with above MCB Incomer d. 8-Nos. 6/10/16/20/32A MCB as outgoing e. 2-Nos. 12 Way copper earth/neutral links f. 1 Set of ON/OFF/ Trip and Phase indicating Lights in each incomer. 	Nos.	2.00	13,678.00	27,356.00	861.71	28,217.71	
8.40	Solar Panels (For 8-hrs Solar Energy Back UP)				0.00	0.00	0.00	
8.41	Micro Solar Farms consisting of 10 nos. of Photo Voltaic Sheets or as required to capture around 10 kW of Solar Energy	Nos.	7.00	1,45,000.00	10,15,000.00	31,972.50	10,46,972.50	
8.42	Power Conditioning Unit (PCU) / Inverter of suitable rating and capacity to handle 10 kW of power.	Nos.	7.00	1,50,000.00	10,50,000.00	33,075.00	10,83,075.00	
8.43	Solar PCU Units with Battery Banks, each consisting of 2V or 12V batteries in adequate quantities to store 2x5, 10 kW of Solar Energy	Nos.	7.00	9,60,300.00	67,22,100.00	2,11,746.15	69,33,846.15	
8.50	Socket Outlets							

**Chennai Metro Water Supply and Sewerage Board
400 MLD SWROD Plant for Chennai City**

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
8.51	Commercial Type - Polycarbonate Material							
8.51	230V, 6A Universal Domestic Plug Socket Output	Nos.	196.00	487.00	95,452.00	3,006.74	98,458.74	
8.51	16A MCB box (1 phase, Metal Clad Socket with MCB)	Nos.	132.00	2,238.00	2,95,416.00	9,305.60	3,04,721.60	
8.51	20A MCB box (1 phase, Metal Clad Socket with MCB)	Nos.	30.00	2,238.00	67,140.00	2,114.91	69,254.91	
8.51	32A MCB box (1 phase, Metal Clad Socket with MCB)	Nos.	2.00	2,828.00	5,656.00	178.16	5,834.16	
8.52	32A MCB box (3 phase, Metal Clad Socket with MCB)	Nos.	8.00	3,908.00	31,264.00	984.82	32,248.82	
8.52	63A, 3 phase Welding Socket (Male Female type with Interlocking)	Nos.	2.00	7,544.00	15,088.00	475.27	15,563.27	
					0.00	0.00	0.00	
8.52	Industrial Type - Moulded IP-65 Plug & Socket Units							
8.52	16A MCB box (1 phase, Industrial Metal Clad Socket with MCB)	Nos.	104.00	2,238.00	2,32,752.00	7,331.69	2,40,083.69	
8.52	20A MCB box (1 phase, Industrial Metal Clad Socket with MCB)	Nos.	85.00	2,238.00	1,90,230.00	5,992.25	1,96,222.25	
8.52	32A MCB box (1 phase, Industrial Metal Clad Socket with MCB)	Nos.	63.00	2,828.00	1,78,164.00	5,612.17	1,83,776.17	
8.52	32A, 3 phase Welding Socket (Male Female type with Interlocking)	Nos.	31.00	3,908.00	1,21,148.00	3,816.16	1,24,964.16	
8.53	63A MCB box (3 phase, Industrial Metal Clad Socket with MCB)	Nos.	6.00	7,544.00	45,264.00	1,425.82	46,689.82	
8.60	Lighting Fixtures							
8.61	Indoor Commercial							
8.61	Fancy Surface Mounted Light Fitting suitable for 2x18W CFL complete with brass holder, lamps, Ballast etc. Crompton Cat. No. DDSH218EB/G CFL Lamp or Equivalent.	Nos.	47.00	1,100.00	51,700.00	1,628.55	53,328.55	
8.61	Bulkhead Light Fitting suitable for 1x5W LED complete with brass holder, lamp etc. Crompton Cat. No. F.OVEA # LLWLSU-5-WW or Equivalent.	Nos.	22.00	1,300.00	28,600.00	900.90	29,500.90	
8.61	Fluorescent Light Fixtures complete with brass holders, HF Ballast power improvement capacitor, tube light etc. i/c internal wiring:							
a	Philips TMC 50L/236 HF (EBW) or Equivalent	Nos.	291.00	780.00	2,26,980.00	7,149.87	2,34,129.87	
b	Philips FBS 470 2xPL-36W EBT D6 Df-WH or Equivalent	Nos.	46.00	3,660.00	1,68,360.00	5,303.34	1,73,663.34	
c	Philips TPH 824 2xTL5-28W EBP D/I D8) or Equivalent	Nos.	35.00	4,500.00	1,57,500.00	4,961.25	1,62,461.25	
d	Philips ADREN0 V2 28W TWG207 HF Lamp, or Equivalent	Nos.	81.00	670.00	54,270.00	1,709.51	55,979.51	
e	Philips ADREN0 V2 14W TWG207 HF Lamp (for Mirror) or Equivalent	Nos.	26.00	510.00	13,260.00	417.69	13,677.69	
f	Philips TCW450 P 2xTL5-34W HF P2953 or Equivalent	Nos.	34.00	3,200.00	1,08,800.00	3,427.20	1,12,227.20	
g	Philips TMX095 2xTL-40W IC or Equivalent	Nos.	286.00	3,200.00	9,15,200.00	28,828.80	9,44,028.80	
8.62	Indoor/Outdoor Industrial							
8.62	Indoor							

**Chennai Metro Water Supply and Sewerage Board
400 MLD SWROD Plant for Chennai City**

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
	SON Type High Bay Light Fitting with external reflector and SON Lamp including built in control gear box and lamps as required							
a	Integral High Bay 400W, SON Light fitting Philips Cat # OPTIBAY HPK205.1xSON400W WB GL or Equivalent	Nos.	723.00	5,100.00	36,87,300.00	1,16,149.95	38,03,449.95	
b	Integral Medium Bay 250 W, SON Light Fitting similar to Philips Cat # OPTIBAY HPK205.1x250WSON WB GL.	Nos.	205.00	4,300.00	8,81,500.00	27,767.25	9,09,267.25	
c	Non Integral Well Glass 150 W, SON Light Fitting similar to Philips Cat # NDC-021 & 1x150W SONWB GL.	Nos.	351.00	4,520.00	15,86,520.00	49,975.38	16,36,495.38	
					0.00	0.00	0.00	
8.62	Flood Lights				0.00	0.00	0.00	
a	150W Asymmetrical Flood Light & Gear Tray MACH-3	Nos.	167.00	4,000.00	6,68,000.00	21,042.00	6,89,042.00	
b	Integral Asymmetrical Flood Light 250W, Metal Halide Fitting Crompton Cat # CG MACH 5-30608 WITH 250W HPSV/MH-T LAMP and GT25S Mach Gear Tray or Equivalent	Nos.	68.00	5,350.00	3,63,800.00	11,459.70	3,75,259.70	
c	1000W, Halogen Flood Light Fitting suitable for 2x500W or 1x1000W Halogen Lamp.	Nos.	6.00	22,400.00	1,34,400.00	4,233.60	1,38,633.60	
					0.00	0.00	0.00	
8.63	Street Lighting				0.00	0.00	0.00	
					0.00	0.00	0.00	
8.63	Pole Lights				0.00	0.00	0.00	
a	60W LED pole light fitting similar to Crompton NEXUS+ Cat # LST030/CDL for 5 mtrs Poles complete with reducer and adaptors connected on a top of pole for attaching the light fitting.	Nos.	39.00	9,900.00	3,86,100.00	12,162.15	3,98,262.15	
b	DESIGNER DECORATIVE flood light fitting with suitable Raised Base Mount with 250W post top Lanterns side mounting as per Bajaj Cat No. BRSGL 250 SV TM Complete or equivalent.	Nos.	68.00	45,000.00	30,60,000.00	96,390.00	31,56,390.00	
c	Supplying and Storing of pole light fitting with SON Lamp and as per Crompton Cat No. STRALET, LED FIXTURE LSTA2-115-CDL (COMPLETE) and external Ignitor Post Top Luminaire similar to PHILIPS Cat# HCS370 1XCDMTT Light, Ballast & 70W Lamp GR.	Nos.	5.00	8,000.00	40,000.00	1,260.00	41,260.00	
d	Post Top Luminaire similar to PHILIPS Cat# HCS370 1XCDMTT Light, Ballast & 70W Lamp GR.	Nos.	60.00	5,460.00	3,27,600.00	10,319.40	3,37,919.40	
8.63	Boundary Wall Lights				0.00	0.00	0.00	
a	Post Top Luminaire similar to Philips Cat# HPS 370 1XCDMTT-150 GR, 150W Ballast and 1-150W CDMT Lamp.	Nos.	174.00	6,840.00	11,90,160.00	37,490.04	12,27,650.04	



BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
8.63	Gate Light							
a	Post Top Luminaire similar to Philips Cat# CDS 570 CDMT-150W C 240V 50Hz E.	Nos.	4.00	9,000.00	36,000.00	1,134.00	37,134.00	
8.64	EMERGENCY EXIT LIGHTS							
	Maintenance Free 24V, 60 minutes Battery back up Exit Signs constructed from 18 Gauge stove enamelled MS ventilated box of suitable size with MS grooved channels for sliding of acrylic sheet. Signage frontal facias shall be of white acrylic sheet with figure and arrow in green complete with accessories as per Agni Suraksha / MK Cat. No. or Equivalent							
a	Maintenance Free Battery back up emergency light of 1 hours duration complete with maintenance free 24V battery and lamp as per MK/Agni Suraksha	Nos.	32.00	1,600.00	51,200.00	1,612.80	52,812.80	
b	Self illuminating Exit Signs made from Self charging illuminating tapes of 25mm / 32mm wide strips as per Agni Suraksha or Equivalent.	Nos.	48.00	600.00	28,800.00	907.20	29,707.20	
c	Safety Lamp 2 x 40 W with Battery Back up for surface type mounting	Nos.	5.00	2,000.00	10,000.00	315.00	10,315.00	
d	Safety Lamp 2 x 40 W with Battery Back up for recessed type mounting	Nos.	5.00	2,200.00	11,000.00	346.50	11,346.50	
e	Portable 220V / 24V, 1 phase transformer with 3 nos. 3 pin socket and cable	Nos.	10.00	16,000.00	160,000.00	5,040.00	165,040.00	
f	24 V 100W hand lamp	Nos.	10.00	6,800.00	68,000.00	2,142.00	70,142.00	
8.70	Flood Lighting Poles							
8.71	13M GRP mast shaft in tapered section suitable for 50m/sec wind speed, with 1000W Halogen, 250-400 MHF or SON Luminaries (2, 3 or 4 will be used) luminaries in symmetrical arrangement, junction box, lightening finial, wiring material, power cable between panel and mast, DP MCB in JB compartment, stainless steel mounting clamp and bolts, luminary mounting bolt are not included.	Nos.	14.00	57,590.00	8,06,260.00	25,397.19	8,31,657.19	
8.72	Material for Highmast Foundation	Nos.	14.00	7,925.00	1,10,950.00	3,494.93	1,14,444.93	
8.73	Asymmetrical floodlight luminaries type CG MACH 5-30608 (Crompton Greave) or equivalent with 1x250W SV T lamp and its control gear box including CG mounting clamp and bolts.	Nos.	40.00	5,350.00	2,14,000.00	6,741.00	2,20,741.00	
8.74	Twin dome aviation obstruction lights of type BIAOL 2 or equivalent with 2 Nos. no. Neon/LED lamps.	Nos.	14.00	3,800.00	53,200.00	1,675.80	54,875.80	
8.80	Street Light Poles							
	Glass Re-inforced Polymer Poles (68-72 glass) confirming to IEC/BIS/VDE							

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
8.81	5 mtr high Street Lighting Pole	Nos.	39.00	7,775.00	3,03,225.00	9,551.59	3,12,776.59	
8.82	7 mtr high Street Lighting Pole	Nos.	5.00	10,400.00	52,000.00	1,638.00	53,638.00	
8.83	9 mtr high Street Lighting Pole	Nos.	48.00	13,400.00	64,320.00	20,260.80	6,63,460.80	
8.84	10 mtr high Street Lighting Pole	Nos.	20.00	14,500.00	2,90,000.00	9,135.00	2,99,135.00	
8.85	GRP Lighting Brackets 1000mm length.	Nos.	162.00	2,200.00	3,56,400.00	11,226.60	3,67,626.60	
8.86	Die Cast Aluminium / FRP Junction Boxes with Hardwares	Nos.	126.00	3,000.00	3,78,000.00	11,907.00	3,89,907.00	
8.90	Fans / Coolers							
8.91	Ceiling Fans							
	Ceiling Fans complete with motor, a set of blades, down rod but with electronic regulator i/c wiring the down rod with 2x1.5 sq.mm. PVC insulated copper conductor wire as reqd:							
8.91	1200 mm Sweep	Nos.	77.00	2,205.00	1,69,785.00	5,348.23	1,75,133.23	
8.91	1400 mm Sweep	Nos.	11.00	2,425.00	26,675.00	840.26	27,515.26	
8.92	Exhaust Fans							
	900 rpm, Exhaust Fans complete with motor, a set of blades, cowl, adjustable type louvres, grouting bolts, power improvement capacitors including making holes in the wall to suit the size of fan and as per Havells Heavy Duty Metal Exhaust Fans or Equivalent							
8.92	300 mm dia.	Nos.	16.00	3,255.00	52,080.00	1,640.52	53,720.52	
8.92	380 mm dia.	Nos.	32.00	3,865.00	1,23,680.00	3,895.92	1,27,575.92	
8.92	450 mm Dia.	Nos.	109.00	5,140.00	5,60,260.00	17,648.19	5,77,908.19	
8.93	Man Coolers							
8.93	450mm Wall Mounted Air Circulators	Nos.	32.00	7,375.00	2,36,000.00	7,434.00	2,43,434.00	
9.00	DIESEL GENERATOR (DG) SETS							MR PG 120
9.01	Auto-Main Failure 0.8 p.f., 3 phase, 50Hz Diesel Generating Sets with heavy duty air cooled engine mounted Radiator System all in an acoustic enclosure to restrict noise level to 75dBA at 1 mtr. distance complete with following:							

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
	The unit shall be complete with AMF Logic Control Panel (630, 800, 1250A 4P ACB) along with Generator Protection Relay for DG Set, ON/ OFF indicating lamps (LED), 3 Nos. Ammeter and Electronic Energy Meter with viewing toughened glass window and Emergency Trip Push Buttons. The Engine Panel (Preferably Digital Type - Control circuitry shall be suitable for interfacing with plant PLC / DCS for remote monitoring, switching and control) shall be housed inside the Enclosure.							
	990 Ltrs. fuel storage Tank at the base duly provided with fuel gauge. The unit shall be provided with fully charged 24V Lead Acid Battery Bank, and trickle boost Automatic Battery Charging set. Residential type Silencer and heat insulated exhaust manifold with rock wool insulation (150kg/meter cube density) and aluminium cladding etc. A suitable Heat Exchanger System with Stainless Steel flexible belows for connection to Heat Exchanger. The secondary water to be cooled in FRP cooling Tower located remotely at Terrace etc., if required.							
	Acoustic enclosure shall be made out of 14 SWG CRCA sheet steel. Sound proofing shall be done with high quality fire proof rock wool of suitable thickness and density (150kg) confirming to IS 8183. It shall be desired to place silencer outside the acoustic enclosure.							
a	380 kVA for Product Water Area connected to MLPDB-03	Nos.	1.00	25,45,793.00	25,45,793.00		80,192.48	26,25,985.48
b	625 kVA for RO Plant Area connected to MLPDB-02	Nos.	1.00	35,54,700.00	35,54,700.00		1,11,973.05	36,66,673.05
c	800 kVA for Intake Water Area connected to MLPDB-01	Nos.	1.00	44,53,830.00	44,53,830.00		1,40,295.65	45,94,125.65
9.02	Initial Supply as well as first replacement of Lube Oil. Fuel for 8-Hours for Full Load test run before handing over of the sets to the Owners.				0.00	0.00	0.00	0.00
a	380 kVA for Product Water Area connected to MLPDB-03	Nos.	1.00	62,761.00	62,761.00		1,976.97	64,737.97
b	625 kVA for RO Plant Area connected to MLPDB-02	Nos.	1.00	71,178.00	71,178.00		2,242.11	73,420.11
c	800 kVA for Intake Water Area connected to MLPDB-01	Nos.	1.00	99,072.00	99,072.00		3,120.77	1,02,192.77
9.03	EXHAUST SYSTEM: 50 mm thick layer of LRB rock wool having 96kg/m ³ density, cladding with 26 gauge aluminium sheet all-round the exhaust pipe complete as required at site for following pipes inclusive of bends, elbows etc.				0.00	0.00	0.00	0.00
a	125 mm dia NB "B" class from each 380 & 625kVA DG Sets	Mtrs	150.00	1,984.00	2,97,600.00		9,374.40	3,06,974.40
b	200 mm dia. NB 4.85 mm thick 2x200mm from 800kVA DG to outside atmosphere	Mtrs	100.00	3,174.00	3,17,400.00		9,998.10	3,27,398.10
c	300mm dia. NB 5.2 mm thick 2x200mm from 800kVA DG to outside atmosphere	Mtrs	100.00	4,761.00	4,76,100.00		14,997.15	4,91,097.15
9.04	Thermal Insulation of Residential Silencer with 50 mm thick LRB / Rock Wool with wire mesh & covered with 24 Gauge Al. Sheet	Nos.	3.00	9,619.00	28,857.00		909.00	29,766.00

Chennai Metro Water Supply and Sewerage Board
400 MLD SWROD Plant for Chennai City

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
9.05	SUPPORTING STRUCTURE: MS Support structure with angle / channel etc. for exhaust pipe, Cooling Water pipes etc.	Tonne	8.00	84,163.00	6,73,304.00	21,209.08	6,94,513.08	
9.06	Supply and fixing of Aviation Light with Battery Charger and Maintenance Free lead acid storage Batteries of suitable rating.			0.00	0.00	0.00	0.00	
a	Aviation Lights	Nos.	10.00	24,047.00	2,40,470.00	7,574.81	2,48,044.81	
b	100AH Battery Charger	Nos.	5.00	60,116.00	3,00,580.00	9,468.27	3,10,048.27	
c	100AH Battery Bank	Nos.	5.00	36,070.00	1,80,350.00	5,681.03	1,86,031.03	
d	3x4 Sq.mm Cu Armoured Cable i/c laying and Termination at both ends.	Mtrs	250.00	248.00	62,000.00	1,953.00	63,953.00	
9.07	CONTROL PANEL FOR 380KVA DG SET: Supply, erection, testing and commissioning of DG Set Electric AMF Control Panel in IP-65 Enclosure as follows:	Sets	1.00	3,90,756.00	3,90,756.00	12,308.81	4,03,064.81	
(a)	4 Nos. 600A Electrolytic Aluminium PVC Sleeved Aluminium Bus Bars of equal cross-section							
(b)	1 No. 630A, 50Hz, 3 phase, neutral, 4P EDO ACB for 380kVA DG Set with							
(i)	1 No. CT Operated, 4 Wire Digital Energy Meter							
(ii)	1 No. Kilowatt Meter							
(iii)	3 Nos. Ammeters (0-300-600) complete with CT's one in each phase							
(iv)	1 No. (0-500V) Voltmeter with Selector switch							
(v)	1 Set of ON/OFF & Phase indicating lights with fuses							
(vi)	1 No. Generator Protection Relay (Similar to MC-12A relay of I&T)							
(vii)	1 No. Reverse Power Relay							
(c)	The AMF Logic of above DG Sets to be interlinked with Transformer Incoming to accomplish the desired Manual / Auto Change-Over etc.							
(d)	The Panel shall be suitable for 3-4x185 sq.mm. XLPEAA Incoming and Outgoing Cable Connections							
9.08	CONTROL PANEL FOR 625KVA DG SET: Supply, erection, testing and commissioning of DG Set Electric AMF Control Panel in IP-65 Enclosure as follows:	Sets	1.00	4,50,872.00	4,50,872.00	14,202.47	4,65,074.47	
(a)	4 Nos. 1000A Electrolytic Aluminium PVC Sleeved Aluminium Bus Bars of equal cross-section							
(b)	1 No. 1000A, 50Hz, 3 phase, neutral, 4P EDO ACB for 625kVA DG Set with							
(i)	1 No. CT Operated, 4 Wire Digital Energy Meter							
(ii)	1 No. Kilowatt Meter							
(iii)	3 Nos. Ammeters (0-500-1000) complete with CT's one in each phase							
(iv)	1 No. (0-500V) Voltmeter with selector switch							
(v)	1 Set of ON/OFF & Phase indicating lights with fuses							



BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
(vi)	1 No. Generator Protection Relay (Similar to MC-12A relay of L&T)							
(vii)	1 No. Reverse Power Relay							
(c)	The AMF Logic of above DG Sets to be interlinked with Transformer Incomer to accomplish the desired Manual / Auto Change-Over etc.							
(d)	The Panel shall be suitable for 3x4300 sq.mm. XLPEAA Incoming and Outgoing Cable Connections							
9.09	CONTROL PANEL FOR 800KVA DG SET: Supply, erection, testing and commissioning of DG Set Electric AMF Control Panel in IP-65 Enclosure as follows:	Sets	1.00	4,80,930.00	4,80,930.00	15,149.30	4,96,079.30	
(a)	4 Nos. 1200A Electrolytic Aluminium PVC Sleeved Aluminium Bus Bars of equal cross-section							
(b)	1 No. 1200A, 50Hz, 3 phase, neutral, 4P EDO ACB for 800kVA DG Set with							
(i)	1 No. CT Operated, 4 Wire Digital Energy Meter							
(ii)	1 No. Kilowatt Meter							
(iii)	3 Nos. Ammeters (0-600-1200) complete with CT's one in each phase							
(iv)	1 No. (0-500V) Voltmeter with selector switch							
(v)	1 Set of ON/OFF & Phase indicating lights with fuses							
(vi)	1 No. Generator Protection Relay (Similar to MC-12A relay of L&T)							
(vii)	1 No. Reverse Power Relay							
(c)	The AMF Logic of above DG Sets to be interlinked with Transformer Incomer to accomplish the desired Manual / Auto Change-Over etc.							
(d)	The Panel shall be suitable for 4x4300 sq.mm. XLPEAA Incoming and Outgoing Cable Connections							
9.10	Supplying, laying, connecting and testing of Class C Black MS fuel pipe work including bends, flanges, nuts bolts, packing etc from Bulk Storage Tanks to Day Tanks and from Day Tanks to Engines and back in an approved manner as per follows:							
a	25 mm dia.	Mtrs.	60.00	361.00	21,660.00	682.29	22,342.29	
b	25 mm dia S/S Ball Valve.	Nos.	6.00	3,607.00	21,642.00	681.72	22,323.72	
c	990 Litres Fuel Tank(for Overflow)	No.	3.00	36,070.00	1,08,210.00	3,408.62	1,11,618.62	
9.11	Supply and erection of canopy type MS structure made out of 40 mm medium class MS pipe (class B), 25x25x3 mm angle iron from work and 14 SWG GI sheet structure shall be grouted in 1:2:4 CC foundation for handling 4 nos 9 lit each fire fighting buckets including providing buckets with two coats of anticorrosive paints etc. complete as required.	Sets	3.00	1,803.00	5,409.00	170.38	5,579.38	

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
10.00 CABLES								MR PG 121
10.10	11kV (UE), Aluminium Conductor, XLPE Insulated, Screened, PVC extruded, Armoured Cables	Mtrs	50,000.00	1,111.00	55,50,000.00	17,49,825.00	5,72,99,825.00	
10.11	3C x 300	Mtrs	2,500.00	965.00	24,12,500.00	75,993.75	24,88,493.75	
10.12	3C x 240							
10.20	1.1kV, Stranded Copper Conductor, PVC Insulated, PVC Sheathed, Unarmoured Cables	Mtrs	2,000.00	105.00	2,10,000.00	6,615.00	2,16,615.00	
10.21	2C x 6	Mtrs	6,000.00	166.00	9,96,000.00	31,374.00	10,27,374.00	
10.22	2C x 10	Mtrs	6,000.00	166.00	9,96,000.00	31,374.00	10,27,374.00	
10.23	2C x 16	Mtrs	6,000.00	238.00	14,28,000.00	44,982.00	14,72,982.00	
10.24	2C x 25	Mtrs	500.00	374.00	1,87,000.00	5,890.50	1,92,890.50	
10.30	1.1kV grade, Stranded Copper Conductor, PVC Insulated, PVC Sheathed, armoured Cables	Mtrs	1,000.00	16.00	16,000.00	504.00	16,504.00	
10.30	1C x 2.5	Mtrs	1,000.00	65.80	65,800.00	2,072.70	67,872.70	
10.30	2C x 2.5	Mtrs	50,000.00	82.60	49,56,000.00	1,56,114.00	51,12,114.00	
10.30	3C x 2.5	Mtrs	1,000.00	103.60	1,03,600.00	3,263.40	1,06,863.40	
10.30	4C x 2.5	Mtrs	400.00	143.50	57,400.00	1,808.10	59,208.10	
10.31	6C x 2.5	Mtrs	500.00	182.70	91,350.00	2,877.53	94,227.53	
10.31	8C x 2.5	Mtrs	5,500.00	110.60	6,08,300.00	19,161.45	6,27,461.45	
10.31	3C x 4	Mtrs	6,000.00	152.60	9,15,600.00	28,841.40	9,44,441.40	
10.31	3C x 6	Mtrs	100.00	233.10	23,310.00	734.27	24,044.27	
10.31	3C x 10	Mtrs	200.00	140.70	28,140.00	886.41	29,026.41	
10.31	4C x 4	Mtrs	2,000.00	196.70	3,93,400.00	12,392.10	4,05,792.10	
10.31	4C x 6	Mtrs	800.00	300.30	2,40,240.00	7,567.56	2,47,807.56	
10.40	1.1kV grade, Stranded Aluminium Conductor, XLPE Insulated, PVC Sheathed, armoured Power Cables							
10.40	3C x 10	Mtrs	16,000.00	74.90	11,98,400.00	37,749.60	12,36,149.60	
10.40	3C x 16	Mtrs	4,000.00	79.80	3,19,200.00	10,054.80	3,29,254.80	
10.40	3C x 25	Mtrs	1,500.00	100.80	1,51,200.00	4,762.80	1,55,962.80	

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

B Control & Instrumentation Equipment

Scope includes:

- | | |
|---|--|
| a | Design, Engineering, Testing at Works and Supply of items |
| b | Receiving and Storing at site |
| c | Issue for installation |
| d | Unpacking at site |
| e | Fabrication and Erection of base frames / mounting accessories |
| f | Supply of accessories required for installation of equipment |
| g | Erection / Installation |

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Total Amount (INR)	Reference
h	Checking / testing / no load trials of installed equipment						
i	Load trials and commissioning						
j	Training of Plant Personnel						
k	Documentation and As-Built Drawings						
l	Handing Over of the Equipments						
Note:							
a	The configuration, rating and quantity of items indicated in the Schedule of Quantities given below are						
b	All the statutory fee will be paid by the Purchaser.						
c	Unit Rate of all the items in scope of erection shall be furnished.						
d	Bidder shall visit site & assess the exact volume of Work.						
1.00 DISTRIBUTED CONTROL SYSTEM (DCS)							
1.10	One Set - Control desks; servers and redundant servers; computers for operator stations, plant overview, process optimization, information management system, peripherals; programmable controllers (PCs); quantity of I/O; power supplies; ethernet switches; distributed / remote I/O panels as per details shown in enclosed drawings no. SWROD-12-01. Monitor for plant overview shall be min. 56" Plasma Type.			Lot	1.00	0.00	
1.20	One Lot - Special cables like OFC, screened & unscreened cables, co-axial cables, STP, UTP cables etc. as per the requirement of the application for data communication between I/Os and PCs, for communication between different programmable controllers & High speed ethernet network; Field bus cables for field instruments, variable speed drives, numeric relays on electrical panels and sub-control systems; Data cables to I/Os integrated to Motor Control Centers (MCC); and Data cables required for plant optimization system and MIS computers.			Lot	1.00	0.00	
1.30	One number PC based Engineering Station with keyboard, mouse and colour monitor with necessary licensed software loaded which shall be able to work as operating station as well.			Set	1.00	0.00	
1.40	One number Laptop computer of latest configuration with necessary licensed software loaded as Portable Programming Unit for the programmable controller and other field instruments / devices / drives.			Set	1.00	0.00	

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

**Chennai Metro Water Supply and Sewerage Board
400 MLD SWROD Plant for Chennai City**

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
1.00	Online Chlorine measurement consists of sensor element, transmitter and flow assembly for range: 0-5 PPM. It shall be microprocessor based with 4-20mA isolated/ field bus output, 2 electrode design, cathode electrode of Platinum & Anode electrode of silver, accuracy of + 0.2% of FS with local display facility, compatible for 230V AC power supply, automatic temperature compensation, sampling unit, flow assembly, inbuilt temp. sensor, calibration facility with its equipments, mounting arrangement, measuring cable between the sensor and transmitter, isolation valve, etc. Location: Common outlet of Dual Media Gravity Filter.	Nos.	1	2,76,096.00	2,76,096.00	8,697.02	2,84,793.02	
2.00	Online Conductivity measurement consists of sensor element, transmitter and flow assembly for range: 0-100000 mS/cm, accuracy of $\pm 0.5\%$ of measuring range. It shall be microprocessor based with 4-20mA (24V DC loop powered)/ profibus output. It shall have local display facility, automatic temperature compensation, flow/ immersion fittings as applicable, inbuilt temp. sensor, calibration facility with its equipments, mounting arrangements, measuring cable between the sensor and transmitter, isolation valve, etc.			0.00	0.00	0.00	0.00	
2.10	Location: Cartridge filter common outlet	Nos.	17	97,197.00	16,52,349.00	52,048.99	17,04,397.99	
2.20	Location: RO permeate outlet	Nos.	17	97,197.00	16,52,349.00	52,048.99	17,04,397.99	
3.00	Online ORP measurement consists of sensor element, transmitter and flow assembly for range: -1500 to +1500mV with accuracy of $\pm 20\text{mV}$. It shall be microprocessor based with 4-20mA (24V DC loop powered)/ profibus output, sensor element of platinum electrode with suitable reference electrode with local display facility, automatic temperature compensation, sampling unit, calibration facility with its equipments, measuring cable between the sensor and transmitter, mounting arrangements, isolation valve, etc. Location: Cartridge filter common outlet	Nos.	17	90,177.00	15,33,009.00	48,289.78	15,81,298.78	
4.00	Online pH measurement consists of sensor element, transmitter and flow assembly for range: 0-14pH with accuracy of better than 0.1pH. It shall be microprocessor based with 4-20mA (24V DC loop powered)/ profibus output, automatic temperature compensation, measuring electrode shall be glass with silver reference electrode preferably. It shall have local display facility, inbuilt temp. sensor, and shall be complete with sampling unit, auto cleaning, auto calibration facility with its equipments, measuring cable between the sensor and transmitter, mounting arrangements, isolation valve, etc. Location: Cartridge filter common outlet	Nos.	17	90,177.00	15,33,009.00	48,289.78	15,81,298.78	

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
4.20	Location: RO permeate outlet	Nos.	17	90,177.00	15,33,009.00	48,289.78	15,81,298.78	
4.30	Location: Lime clarification unit	Nos.	1	90,177.00	90,177.00	2,840.58	93,017.58	
4.40	Location: CIP pump discharge unit	Nos.	1	90,177.00	90,177.00	2,840.58	93,017.58	
5.00	Online TOC/DOC measurement shall consists of sensor element, transmitter and flow assembly for range: 0-100 ppm. It shall be microprocessor based with (24V DC loop powered)/ profibus output, automatic temperature compensation, autocleaning with suitable sensor element. It shall have local display facility, built in temperature sensor, sampling unit, flow assembly, calibration facility with its equipments, measuring cable between the sensor and transmitter, mounting arrangements, Isolation valve, etc.							
5.10	Location: Intake pump discharge header (TOC)	Nos.	1	24,53,645.00	24,53,645.00	77,289.82	25,30,934.82	
5.20	Location: Intake pump discharge header (DOC)	Nos.	1	24,53,645.00	24,53,645.00	77,289.82	25,30,934.82	
5.30	Location: Common outlet of gravity dual media filter (TOC)	Nos.	1	24,53,645.00	24,53,645.00	77,289.82	25,30,934.82	
5.40	Location: Common outlet of gravity dual media filter (DOC)	Nos.	1	24,53,645.00	24,53,645.00	77,289.82	25,30,934.82	
6.00	Online Turbidity measurement consists of light source, transmitter and flow assembly (if applicable) for range: 0- 5, 100 & 200 NTU, accuracy of min ± 2% of reading / + 0.02 below 40NTU and + 5% of rdg above 40NTU, automatic temperature compensation, autocleaning. It shall be microprocessor based with 4-20mA isolated/ profibus bus output. It shall have local display facility, built in temperature sensor, sampling unit, flow assembly, calibration facility with its equipments, measuring cable between the sensor and transmitter, isolation valve, necessary accessories etc.							
6.10	0 to 5 NTU - Location: Common outlet of gravity dual media filter	Nos.	1	1,91,446.00	1,91,446.00	6,030.55	1,97,476.55	
6.20	0 to 100 NTU - Location: Lamella clarifier outlet header.	Nos.	1	2,39,139.00	2,39,139.00	7,532.88	2,46,671.88	
6.30	0 to 100 NTU - Location: Common DAF outlet	Nos.	1	2,39,139.00	2,39,139.00	7,532.88	2,46,671.88	
6.40	0 to 200 NTU - Location: Intake pump discharge headers.	Nos.	1	2,39,139.00	2,39,139.00	7,532.88	2,46,671.88	
7.00	Full bore Electromagnetic Flow meter with sensor & transmitter of programmable type for the following with local digital display, 230 V AC power supply, 4-20mA / profibus output, accuracy of + 0.3% or better. Platinum/ Iridium electrode, enclosure protection IP-67 with necessary calibration unit and other accessories including followings, 1) Reducer & expander (wherever line size is greater than flow meter bore), 2) Straight length pipe of min. 5 D in the upstream and 3 D in the downstream, 3) Fasteners & gaskets, 4) Spool piece with flange on both side for replacement of meter: 1 No. for each size wherever qty <10 & 2 Nos. for each size wherever qty >10.							

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
7.10	0 to 6000 m3/hr - Location: Back wash pumps	Nos.	1	23,07,692.00	23,07,692.00	72,692.30	23,80,384.30	
7.20	0 to 21500 m3/hr - Location: RO flushing pump discharge header	Nos.	1	32,76,923.00	32,76,923.00	1,03,223.07	33,80,146.07	
7.30	0 to 21500 m3/hr - Location: High pressure pump suction	Nos.	17	32,76,923.00	5,57,07,691.00	17,54,792.27	5,74,62,483.27	
7.40	0 to 21500 m3/hr - Location: RO permeate outlet	Nos.	17	32,76,923.00	5,57,07,691.00	17,54,792.27	5,74,62,483.27	
8.00	Online Metal Tube Rota meter with accuracy of + 2% of full scale and repeatability of +1% with inlet, outlet & Isolation valves, flanges, etc.							
8.10	0 to 20 m3/hr - Location: Acid unloading pump discharge header	Nos.	1	40,985.00	40,985.00	1,291.03	42,276.03	
8.20	0 to 20 m3/hr - Location: FeCl3 unloading pump discharge header	Nos.	1	40,985.00	40,985.00	1,291.03	42,276.03	
8.30	150 to 900 LPH - Location: Acid dosing pump common discharge	Nos.	1	40,985.00	40,985.00	1,291.03	42,276.03	
8.40	150 to 900 LPH - Location: FeCl3 dosing pump common discharge	Nos.	1	40,985.00	40,985.00	1,291.03	42,276.03	
8.50	150 to 900 LPH - Location: Anti-scalant dosing pump common discharge	Nos.	1	40,985.00	40,985.00	1,291.03	42,276.03	
8.60	150 to 900 LPH - Location: SMBS dosing pump common discharge	Nos.	1	40,985.00	40,985.00	1,291.03	42,276.03	
8.70	150 to 900 LPH - Location: Poly dosing pump common discharge	Nos.	1	40,985.00	40,985.00	1,291.03	42,276.03	
9.00	Level sensor (Ultrasonic) and transmitter with 4-20 mA (24V DC loop powered) / profibus output, accuracy of + 0.25% or better with digital local display facility, necessary accessories, noise suppression software (if applicable), etc.							
9.01	0-930 mm - Location: Gravity dual media filter	Nos.	40	69,231.00	27,69,240.00	87,231.06	28,56,471.06	
9.02	0-1120 mm - Location: Intake pump discharge header	Nos.	1	69,231.00	69,231.00	2,180.78	71,411.78	
9.03	0-1540 mm - Location: Anti-scalant dosing tank	Nos.	1	69,231.00	69,231.00	2,180.78	71,411.78	
9.04	0-1540 mm - Location: Anti-scalant dosing tank	Nos.	1	69,231.00	69,231.00	2,180.78	71,411.78	
9.05	0-1540 mm - Location: SMBS dosing tank	Nos.	1	69,231.00	69,231.00	2,180.78	71,411.78	
9.06	0-1540 mm - Location: SMBS dosing tank	Nos.	1	69,231.00	69,231.00	2,180.78	71,411.78	
9.07	0-1540 mm - Location: Poly Dosing Tank	Nos.	1	69,231.00	69,231.00	2,180.78	71,411.78	
9.08	0-1540 mm - Location: Poly Dosing Tank	Nos.	1	69,231.00	69,231.00	2,180.78	71,411.78	
9.09	0-2940 mm - Location: Acid Dosing Tank	Nos.	1	69,231.00	69,231.00	2,180.78	71,411.78	
9.10	0-2940 mm - Location: Acid Dosing Tank	Nos.	1	69,231.00	69,231.00	2,180.78	71,411.78	
9.11	0-2940 mm - Location: FeCl3 Dosing Tank	Nos.	1	69,231.00	69,231.00	2,180.78	71,411.78	
9.12	0-2940 mm - Location: FeCl3 Dosing Tank	Nos.	1	69,231.00	69,231.00	2,180.78	71,411.78	
9.13	0-3100 mm - Location: Dual Media Gravity Filter	Nos.	40	69,231.00	27,69,240.00	87,231.06	28,56,471.06	
9.14	0-5683 mm - Location: Bulk FeCl3 storage tank	Nos.	2	69,231.00	1,38,462.00	4,361.55	1,42,823.55	
9.15	0-5683 mm - Location: Bulk acid storage tanks	Nos.	2	69,231.00	1,38,462.00	4,361.55	1,42,823.55	
9.16	0-5683 mm - Location: CIP tank	Nos.	1	69,231.00	69,231.00	2,180.78	71,411.78	
9.17	0-5683 mm - Location: Carbon dioxide storage tanks	Nos.	2	69,231.00	1,38,462.00	4,361.55	1,42,823.55	
9.18	0-5683 mm - Location: Lime clarification unit	Nos.	1	69,231.00	69,231.00	2,180.78	71,411.78	
9.19	0-5683 mm - Location: Back wash holding tank	Nos.	2	69,231.00	1,38,462.00	4,361.55	1,42,823.55	

**Chennai Metro Water Supply and Sewerage Board
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BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
9.20	0.5683 mm - Location: RO permeate tank Temperature Gauge bi-metallic of range: 0-60 Deg C, accuracy of + 1% with thermowell & other accessories.	Nos.	2	69,231.00	1,38,462.00	4,361.55	1,42,823.55	
10.00	Location: On instrument air system	Nos.	1	10,258.00	10,258.00	323.13	10,581.13	
11.00	Single point Pt-100 RTD of range: 0-40 Deg C, class A accuracy, (-) 100 deg C to (+) 300 Deg C, SS 316L sheath with thermowell, flanges, mounting accessories, etc.	Nos.	17	17,468.00	2,96,956.00	9,354.11	3,06,310.11	
12.00	Location: Cartridge filter common outlet							
	Temperature transmitter of range: 0-60 Deg C, for 3 wire RTD, pt-100 shall be with 4-20 mA (24V DC loop powered)/ profibus output, accuracy of + 0.1% of calibrated or better, digital local display, etc.	Nos.	17	12,308.00	2,09,236.00	6,590.93	2,15,826.93	
13.00	Location: Cartridge filter common outlet							
13.10	Pressure Gauge (bourdon type), accuracy of + 1% of FSD, with snubber, pulsation dampener, gauge cock, valve manifold, etc	Nos.	1	14,843.00	14,843.00	467.55	15,310.55	
13.20	0-10 kg/cm ² - Location: On instrument air system	Nos.	1	14,843.00	14,843.00	467.55	15,310.55	
13.30	0-10 kg/cm ² - Location: On instrument air system	Nos.	1	21,766.00	21,766.00	685.63	22,451.63	
13.40	0-10 kg/cm ² - Location: Anti-scalant dosing pump	Nos.	1	21,766.00	21,766.00	685.63	22,451.63	
13.50	0-10 kg/cm ² - Location: SMBDS dosing pump	Nos.	1	21,766.00	21,766.00	685.63	22,451.63	
13.60	0-10 kg/cm ² - Location: SMBDS dosing pump	Nos.	1	21,766.00	21,766.00	685.63	22,451.63	
13.70	0-10 kg/cm ² - Location: Poly dosing pump	Nos.	1	21,766.00	21,766.00	685.63	22,451.63	
13.80	0-10 kg/cm ² - Location: Poly dosing pump	Nos.	1	21,766.00	21,766.00	685.63	22,451.63	
14.00	Pressure Gauge (diaphragm seal type), accuracy of +/- 1% of FSD with snubber, pulsation dampener, gauge cock, etc for the high pressure line of Max. 100 Bar.							
14.01	0 to 2.5 kg/cm ² - Location: CIP pump discharge	Nos.	2	21,766.00	43,532.00	1,371.26	44,903.26	
14.02	0 to 2.5 kg/cm ² - Location: RO flushing pump discharge	Nos.	2	21,766.00	43,532.00	1,371.26	44,903.26	
14.03	0 to 2.5 kg/cm ² - Location: Acid unloading pump	Nos.	2	21,766.00	43,532.00	1,371.26	44,903.26	
14.04	0 to 2.5 kg/cm ² - Location: FeCl3 unloading pump	Nos.	2	21,766.00	43,532.00	1,371.26	44,903.26	
14.05	0 to 6 kg/cm ² - Location: Air blowers	Nos.	3	21,766.00	65,298.00	2,056.89	67,354.89	
14.06	0 to 6 kg/cm ² - Location: Back wash pumps	Nos.	2	21,766.00	43,532.00	1,371.26	44,903.26	
14.07	0 to 6 kg/cm ² - Location: Cartridge filter inlet	Nos.	1	21,766.00	21,766.00	685.63	22,451.63	
14.08	0 to 6 kg/cm ² - Location: Cartridge filter outlet	Nos.	1	21,766.00	21,766.00	685.63	22,451.63	
14.09	0 to 10 kg/cm ² - Location: FeCl3 dosing pump	Nos.	1	21,766.00	21,766.00	685.63	22,451.63	
14.10	0 to 10 kg/cm ² - Location: FeCl3 dosing pump	Nos.	1	21,766.00	21,766.00	685.63	22,451.63	
14.11	0 to 10 kg/cm ² - Location: Acid dosing pump	Nos.	1	21,766.00	21,766.00	685.63	22,451.63	



BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit	Total Amount (INR)	Reference
14.12	0 to 10 kg/cm ² - Location: Acid dosing pump	Nos.	1	21,766.00	21,766.00	685.63	22,451.63	
14.13	0 to 15 kg/cm ² - Location: FRD booster pump	Nos.	17	21,766.00	3,70,022.00	11,655.69	3,81,677.69	
14.14	0 to 18 kg/cm ² - Location: Cartridge filter inlet	Nos.	17	21,766.00	3,70,022.00	11,655.69	3,81,677.69	
14.15	0 to 18 kg/cm ² - Location: Cartridge filter outlet	Nos.	17	21,766.00	3,70,022.00	11,655.69	3,81,677.69	
14.16	0 to 18 kg/cm ² - Location: High pressure pump suction	Nos.	17	21,766.00	3,70,022.00	11,655.69	3,81,677.69	
14.17	0 to 18 kg/cm ² - Location: High pressure pump discharge	Nos.	17	21,766.00	3,70,022.00	11,655.69	3,81,677.69	
14.18	0 to 18 kg/cm ² - Location: Dirty water transfer pump discharge	Nos.	3	21,766.00	65,298.00	2,056.89	67,354.89	
14.19	0 to 50 kg/cm ² - Location: RO booster pump	Nos.	17	21,766.00	3,70,022.00	11,655.69	3,81,677.69	
15.00	Pressure transmitter (diaphragm seal) with 4-20 mA (24V DC loop powered)/ profibus output, accuracy of + 0.075% or better with local digital display, etc for high pressure line of 100 Bar Max.							
15.10	0-4 kg/cm ² - Location: Lime clarification unit	Nos.	1	69,231.00	69,231.00	2,180.78	71,411.78	
15.20	0-4 kg/cm ² - Location: CIP pump discharge header	Nos.	1	69,231.00	69,231.00	2,180.78	71,411.78	
15.30	0-4 kg/cm ² - Location: RO flushing pump discharge	Nos.	1	69,231.00	69,231.00	2,180.78	71,411.78	
15.40	0-55 kg/cm ² - Location: High pressure pump suction	Nos.	17	69,231.00	11,76,927.00	37,073.20	12,14,000.20	
15.50	0-55 kg/cm ² - Location: High pressure pump discharge	Nos.	17	69,231.00	11,76,927.00	37,073.20	12,14,000.20	
15.60	0-55 kg/cm ² - Location: RO brine reject	Nos.	17	69,231.00	11,76,927.00	37,073.20	12,14,000.20	
15.70	0-75 kg/cm ² - Location: RO feed	Nos.	17	69,231.00	11,76,927.00	37,073.20	12,14,000.20	
16.00	Differential Pressure transmitter (diaphragm seal) with 4-20 mA (24V DC loop powered)/ profibus output, accuracy of + 0.075% or better with local digital display, etc for high pressure line of 90 Bar Max.							
16.10	0-1 kg/cm ² - Location: Across cartridge filter (sea water)	Nos.	17	84,615.00	14,38,455.00	45,311.33	14,83,766.33	
16.20	0-1 kg/cm ² - Location: Across cartridge filter (acid/ caustic)	Nos.	1	84,615.00	84,615.00	2,665.37	87,280.37	
17.00	Pressure Switch with diaphragm seal shall have pot free contact type micro switches of minimum rating of 5A, 230V AC, valves, etc.							
17.10	-1 to +1 Bar - Location: RO feed	Nos.	17	43,077.00	7,32,309.00	23,067.73	7,55,376.73	
17.20	-1 to +1 Bar - Location: RO brine reject	Nos.	17	43,077.00	7,32,309.00	23,067.73	7,55,376.73	
17.30	0-7.5 kg/cm ² - Location: On instrument air system	Nos.	1	33,846.00	33,846.00	1,066.15	34,912.15	
17.40	0-7.5 kg/cm ² - Location: On instrument air system	Nos.	1	33,846.00	33,846.00	1,066.15	34,912.15	
17.50	0-7.5 kg/cm ² - Location: Acid unloading pump discharge header	Nos.	1	33,846.00	33,846.00	1,066.15	34,912.15	
17.60	0-7.5 kg/cm ² - Location: FeCl ₃ unloading pump discharge header	Nos.	1	33,846.00	33,846.00	1,066.15	34,912.15	

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
18.00	Online Automatic Silt Density Index monitoring system shall be microprocessor based with 4-20 mA (24V DC loop powered)/ profibus output with filters, local panels, battery with charger, facility for auto flushing, auto replacement of filters for each cycle, fault detection, contacts for alarms, etc. Range -0 to 200 SDI Location: Common outlet of gravity dual media filter	Nos.	17	20,01,645.00	3,40,27,965.00	10,71,880.90	3,50,99,845.90	
19.00	Level Gauge (diaphragm seal type), accuracy of +/- 1% of FSD with snubber, pulsation dampener, gauge cock, etc for the high pressure line of Max. 100 Bar.							
19.10	0 to 6, 0 to 100 M, % - Location: ClP tank	Nos.	1	1,19,331.00	1,19,331.00	3,758.93	1,23,089.93	
19.20	0 to 6, 0 to 100 M, % - Location: Bulk acid storage tanks	Nos.	2	1,19,331.00	2,38,662.00	7,517.85	2,46,179.85	
19.30	0 to 6, 0 to 100 M, % - Location: Bulk FeCl3 storage tanks	Nos.	2	1,19,331.00	2,38,662.00	7,517.85	2,46,179.85	
20.00	Online oil analyzer consists of sensor element, transmitter and mounting assembly for range: 0-10 & 50 PPM. It shall be microprocessor based with 4-20mA isolated/ field bus output. It shall have local display facility, flow/ immersion fittings as applicable, calibration facility with its equipments, mounting arrangements, measuring cable between the sensor and transmitter, isolation valve, etc.							
20.10	0 to 10 PPM - Location: Common DAF header	Nos.	1	18,46,154.00	18,46,154.00	58,153.85	19,04,307.85	
20.20	0 to 50 PPM - Location: Intake pump discharge header	Nos.	1	18,46,154.00	18,46,154.00	58,153.85	19,04,307.85	
21.00	Level Gauge (magnetic type) shall be with rustproof finish, vent & drain connection with all necessary accessories like safety ball check offset type gauge cocks, vent and drain connection (with 1/2" vent & drain valves), nipples, caps, etc				0.00	0.00	0.00	
21.01	0 to 1200 mm - Location: Acid dosing tank	Nos.	1	53,846.00	53,846.00	1,696.15	55,542.15	
21.02	0 to 1200 mm - Location: Acid dosing tank	Nos.	1	53,846.00	53,846.00	1,696.15	55,542.15	
21.03	0 to 1200 mm - Location: FeCl3 dosing tank	Nos.	1	53,846.00	53,846.00	1,696.15	55,542.15	
21.04	0 to 1200 mm - Location: FeCl3 dosing tank	Nos.	1	53,846.00	53,846.00	1,696.15	55,542.15	
21.05	0 to 1200 mm - Location: Anti-saciant dosing tank	Nos.	1	53,846.00	53,846.00	1,696.15	55,542.15	
21.06	0 to 1200 mm - Location: Anti-saciant dosing tank	Nos.	1	53,846.00	53,846.00	1,696.15	55,542.15	
21.07	0 to 1200 mm - Location: SMBS dosing tank	Nos.	1	53,846.00	53,846.00	1,696.15	55,542.15	
21.08	0 to 1200 mm - Location: SMBS dosing tank	Nos.	1	53,846.00	53,846.00	1,696.15	55,542.15	
21.09	0 to 1200 mm - Location: Poly dosing tank	Nos.	1	53,846.00	53,846.00	1,696.15	55,542.15	
21.10	0 to 1200 mm - Location: Poly dosing tank	Nos.	1	53,846.00	53,846.00	1,696.15	55,542.15	

**Chennai Metro Water Supply and Sewerage Board
400 MLD SWROD Plant for Chennai City**

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
7.00 CONTROL & INSTRUMENTATION CABLES								
7.10 1.1KV Grade Unscreened Armoured PVC Copper Cables								
7.10 2 x 1.5 sq.mm. (flexible)	Mtrs	40,000.00	162.00	64,80,000.00	2,04,120.00		66,84,120.00	
7.10 3 x 1.5 sq.mm.	Mtrs	30,000.00	200.00	60,00,000.00	1,89,000.00		61,89,000.00	
7.10 4 x 1.5 sq.mm.	Mtrs	50,000.00	242.00	1,21,00,000.00	3,81,150.00		1,24,81,150.00	
7.10 5 x 1.5 sq.mm.	Mtrs	2,500.00	284.00	7,10,000.00	22,365.00		7,32,365.00	
7.11 6 x 1.5 sq.mm.	Mtrs	1,85,000.00	325.00	6,01,25,000.00	18,93,937.50		6,20,18,937.50	
7.11 8 x 1.5 sq.mm.	Mtrs	8,000.00	389.00	31,12,000.00	98,028.00		32,10,028.00	
7.11 10 x 1.5 sq.mm.	Mtrs	2,500.00	517.00	12,92,500.00	40,713.75		13,33,213.75	
7.11 12 x 1.5 sq.mm.	Mtrs	7,000.00	596.00	41,72,000.00	1,31,418.00		43,03,418.00	
7.11 14 x 1.5 sq.mm.	Mtrs	7,000.00	678.00	47,46,000.00	1,49,499.00		48,95,499.00	
7.11 24 x 1.5 sq.mm.	Mtrs	8,500.00	1,018.00	86,53,000.00	2,72,569.50		89,25,569.50	
7.11 2 x 2.5 sq.mm.	Mtrs	6,500.00	212.00	13,78,000.00	43,407.00		14,21,407.00	
7.11 4 x 2.5 sq.mm.	Mtrs	2,000.00	340.00	6,80,000.00	21,420.00		7,01,420.00	
7.11 4 x 4.0 sq.mm.	Mtrs	2,000.00	463.00	9,26,000.00	29,169.00		9,55,169.00	
7.20 1.1KV Grade Screened Armoured PVC Copper Cables								
7.21 1 x 2 x 1.0 sq.mm.	Mtrs	2,500.00	33.00	82,500.00	2,598.75		85,098.75	
7.22 2 x 2 x 1.0 sq.mm.	Mtrs	23,000.00	64.00	14,72,000.00	46,368.00		15,18,368.00	
7.23 1 x 3 x 1.0 sq.mm.	Mtrs	500.00	39.00	19,500.00	614.25		20,114.25	
7.24 2 x 3 x 1.0 sq.mm.	Mtrs	35,000.00	70.00	24,50,000.00	77,175.00		25,27,175.00	
7.25 6 x 3 x 1.0 sq.mm.	Mtrs	35,000.00	169.00	59,15,000.00	1,86,322.50		61,01,322.50	
C GENERAL (FOR BOTH ELECTRICAL & C&I EQUIPMENTS)								
1.00 FRP CABLE TRAYS								
1.10 Ladder type Pre-fabricated trays (standard length 3 mtrs)	Mtrs	3,000.00	397.00	11,91,000.00	37,516.50		12,28,516.50	
1.11 150mm wide ("C" Channel Size:75x25x3 mm Th.)	Mtrs	7,000.00	539.00	37,73,000.00	1,18,849.50		38,91,849.50	
1.12 300mm wide ("C" Channel Size:75x25x4 mm Th.)	Mtrs	6,000.00	614.00	36,84,000.00	1,16,046.00		38,00,046.00	
MR PG 243								
MR PG 123								

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Total Amount (INR)	Reference
1.14	600mm wide ("C" Channel Size:100x35x4 mm Th.)	Mtrs	8,500.00	796.00	67,66,000.00	2,13,129.00	69,79,129.00
1.15	750mm wide ("C" Channel Size:100x35x4 mm Th.)	Mtrs	1,500.00	860.00	12,90,000.00	40,635.00	13,30,635.00
1.16	FRP Joining Coupler Plate Size: 200x50x3mm thick with 4 Sets of SS304 hardware Size: M 6x25mm.	Nos.	10,500.00	52.00	5,46,000.00	17,199.00	5,63,199.00
1.17	FRP Joining Coupler Plate Size: 200x70x3mm thick with 8 Sets of SS304 hardware Size: M 6x25mm.	Nos.	6,500.00	77.00	5,00,500.00	15,765.75	5,16,265.75
1.20	Perforated type Pre-fabricated trays (standard length 3 mtrs)				0.00	0.00	0.00
1.21	50mm wide x 30mm height x 3mm thickness	Mtrs	1,000.00	122.00	1,22,000.00	3,843.00	1,25,843.00
1.22	100mm wide x 50mm height x 3mm thickness	Mtrs	1,500.00	212.00	3,18,000.00	10,017.00	3,28,017.00
1.23	150mm wide x 50mm height x 3mm thickness	Mtrs	12,500.00	263.00	32,87,500.00	1,03,556.25	33,91,056.25
1.24	300mm wide x 50mm height x 4mm thickness	Mtrs	2,500.00	546.00	13,65,000.00	42,997.50	14,07,997.50
1.25	FRP Joining Coupler Plate Size: 200x50x3mm thick with 4 Sets of SS304 hardware Size: M 6x25mm.	Nos.	10,000.00	52.00	5,20,000.00	16,380.00	5,36,380.00
2.00	EARTHING, GROUNDING AND LIGHTNING PROTECTION						MR page 126
2.10	Earthing & Grounding						
2.10	75 x 8 mm GI Flat	Mtrs	400.00	650.00	2,60,000.00	8,190.00	2,68,190.00
2.10	75 x 6 mm GI Flat	Mtrs	20,000.00	500.00	1,00,00,000.00	3,15,000.00	1,03,15,000.00
2.10	50 x 8 mm GI Flat	Mtrs	400.00	450.00	1,80,000.00	5,670.00	1,85,670.00
2.10	50 x 6 mm GI Flat	Mtrs	9,600.00	400.00	38,40,000.00	1,20,960.00	39,60,960.00
2.11	50 x 6 mm Cu Flat	Mtrs	4,700.00	1,250.00	58,75,000.00	1,85,062.50	60,60,062.50
2.11	40 x 5 mm GI Flat	Mtrs	100.00	250.00	25,00,000.00	787.50	25,787.50
2.11	25 x 6 mm GI Flat	Mtrs	100.00	150.00	15,00,000.00	472.50	15,472.50
2.11	25 x 3 mm Aluminium Strip along with cable tray	Mtrs	25,000.00	135.00	33,75,000.00	1,06,312.50	34,81,312.50
2.11	25 x 3 mm GI Flat	Mtrs	15,500.00	135.00	20,92,500.00	65,913.75	21,58,413.75
2.11	4 SWG GI wire	Mtrs	1,000.00	30.00	30,000.00	945.00	30,945.00
2.11	6 SWG GI wire	Mtrs	500.00	35.00	17,500.00	551.25	18,051.25
2.11	8 SWG GI wire	Mtrs	4,000.00	45.00	1,80,000.00	5,670.00	1,85,670.00
2.11	10 SWG GI wire Providing & fixing of state of the art Earth Testing Station at 1200 mm above Finished Floor Level	Mtrs	100.00	60.00	6,000.00	189.00	6,189.00
2.11		Nos.	76.00	4,200.00	3,19,200.00	10,054.80	3,29,254.80

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
2.12	Earth Pits							
a	Treated earth pit with 1200 x 1200 x 12 mm Cu plate and 16 mm dia copper electrode	Nos.	100.00	28,000.00	28,00,000.00	88,200.00	28,88,200.00	
b	Transformer & DG Set Neutral: 600x600x6mm Cu Plate Earth	Nos.	86.00	22,000.00	18,92,000.00	59,598.00	19,51,598.00	
c	Transformer, DG Set and MV Panels / VFD / Motors Body: 600x600x6mm GI Plate Earth	Nos.	234.00	16,500.00	38,61,000.00	1,21,621.50	39,82,621.50	
d	3500 mm x 38 mm dia GI pipe Earth Pits for 1V VFD / Motors / MLPDB / ALPDB / Feeder Pillars & Isolation Transformers	Nos.	58.00	9,500.00	5,51,000.00	17,356.50	5,68,356.50	
e	Earth Pits for Electronic Equipment etc. 3000 mm length x 16 mm dia Cu Coated 300 X 6000 mm dia. earth pits duly filled with black cotton soil & ground enhancement materials with 15 ohm-cms resistivity value.	Nos.	96.00	14,500.00	13,92,000.00	43,848.00	14,35,848.00	
f	Supply and Installation of Advance Maintenance Free JMV 1730 environment friendly Chemical Earthing system consisting of 3 no. of 3 mtr length, 17 mm dia. earth electrode made of high tensile low carbon steel circular rods, molecularly bonded copper on outer surface (minimum copper bonding thickness-250 microns) with terminals to connect incoming strips with 6 bags (25 Kgs each) of environment friendly JAM FILL compound and it must be tested from Spectro Lab. FRP earth pit chamber (300mm x 300mm) for DCS / PCS / UPS / Instruments	Set	34.00	28,000.00	9,52,000.00	29,988.00	9,81,988.00	
2.12	Common Earth Bus Bar for electrical equipment earthing 200x10 Cu flat, 1500 mm long with tapped holes or studs at 80 mm staggered pitch and 4 nos. 1.1 kV insulator blocks. The Grid Earth Plate shall be placed near Panels.	Nos.	16.00	8,500.00	1,36,000.00	4,284.00	1,40,284.00	
2.12	Common earth bus bar for electronic earthing 100x6 Cu flat 300 mm long with 2 nos. 1.1 kV insulator blocks	Nos.	16.00	6,500.00	1,04,000.00	3,276.00	1,07,276.00	
2.12	30 x 5mm Cu strips from Cu earth pits to the Earthing Grid. Each Earthing Grid plate shall have 4-earth pit connections.	Mtrs	650.00	950.00	6,17,500.00	19,451.25	6,36,951.25	
2.12	1C x 185 sq mm Insulated Armoured Copper cables from earth stations to Earthing Grid Plates in HDPE Pipes.	Mtrs	800.00	1,125.00	9,00,000.00	28,350.00	9,28,350.00	
2.12	1C x 70 sq mm Insulated Unarmoured Copper Cables	Mtrs	11,000.00	450.00	49,50,000.00	1,55,925.00	51,05,925.00	
2.12	1C x 50 sq mm Insulated Unarmoured Copper Cables	Mtrs	500.00	390.00	1,95,000.00	6,142.50	2,01,142.50	
2.12	1C x 35 sq mm Insulated Unarmoured Copper Cables	Mtrs	200.00	320.00	64,000.00	2,016.00	66,016.00	
				0.00				

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
2.20	Lightning Protection							
2.20	Level-3 early streamers for protection level 62 mtr dia & 99 mtr dia protection complete with fixing clamp for the roof 1X70 sqmm Cu cable in pipe to earth testing station & chemical earth pits.							
	ESE Lightning Arrestor							
2.20	Supply of LPS from Type-III Ion Streamer 1.0 Early Streamer Emission type Lightning Protection complete with the Lightning Air Terminal made of lead coated copper based on pro-active Early Streamer Emission (ESE) Technology. Device shall emit electromagnetic impulse in the form of a controlled emission of streamers into the air microseconds earlier than naturally formed streamers. Device shall confirm to NFC17-102 standards and must be CPR1 tested. Appropriate mounting arrangement like insulator at top of Mast should be there. The device mounted at 5 meter clear to the highest point on the roof top.							
a	3 mtr tall Mast with Insulator suitable for LA and appropriate for 3 meter mast to insulate the LA and mast.	Set	29.00	1,10,000.00	31,90,000.00	1,00,485.00	32,90,485.00	
b	5 mtr tall Mast with Insulator suitable for LA and appropriate for 3 meter mast to insulate the LA and mast.	Set	9.00	1,45,000.00	13,05,000.00	41,107.50	13,46,107.50	
2.20	Lightning Strike Recorder - (6 digits display) BDL-6D of not resettable type in an IP 67 enclosure with the minimum sensitivity of 1500A & maximum capacity of 220 kA (8/20 micro second waveform)	Set	76.00	30,000.00	22,80,000.00	71,820.00	23,51,820.00	
2.20	One Side Down conductor of 70 sq.mm single core insulated flexible Copper cable with necessary accessories, etc	Mtrs	5,700.00	890.00	50,73,000.00	1,59,799.50	52,32,799.50	
2.21	Porcelain Insulators	Nos.	145.00	281.00	40,745.00	1,283.47	42,028.47	
2.21	25 x 3 Cu Flat	Mtrs	4,750.00	850.00	40,37,500.00	1,27,181.25	41,64,681.25	
2.21	50 x 6 Cu flat	Mtrs	200.00	1,150.00	2,30,000.00	7,245.00	2,37,245.00	
2.21	Treated earth pit with 1200 x 1200 x 12 mm Cu plate and 16 mm dia copper electrode - Electronic Type	Nos.	145.00	28,000.00	40,60,000.00	1,27,890.00	41,87,890.00	

**Chennai Metro Water Supply and Sewerage Board
400 MLD SWROD Plant for Chennai City**

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	0.03 Reference
A Electrical Equipment								
Scope includes:								
Note:								
a	The configuration, rating and quantity of items indicated in the Schedule of Quantities given below are							
b	All the statutory fee will be paid by the Purchaser.							
c	Unit Rate of all the items in scope of erection shall be furnished.							
d	Bidder shall visit site & assess the exact volume of Work.							
1.00 110 / 11.5 KV SWITCH YARD EQUIPMENT								MR 182
1.01	110kV, 1250A, 40kA SF6 Circuit breaker	Sets	6.00					
1.02	110 kV, 1250A, double break isolator with earth switch	Sets	8.00					
1.03	110 kV, 1250A, double break isolators without earth switch.	Sets	3.00					
1.04	98kV, 10kA lightning arrester complete with insulating base and surge counter.	Nos.	18.00					
1.05	110 kV Single phase outdoor Current Transformer of ratio 800-100/1-1-1-1Amps	Nos.	6.00					
1.06	110 kV Single phase outdoor Current Transformer of ratio 300-100/1-1-1-1Amps	Nos.	12.00					
1.07	40/50 MVA, ONAN/ONAF, 110/11.5 kV, 3 phase Power Transformers	Sets	4.00					
1.08	100A, 63.5 ohm Outdoor Neutral Grounding Resistor (NGR).	Sets	4.00					
1.09	110kV Control and Relay Panel (2 Line, 1 Bus Coupler and 4 Transformer bays)	Set	1.00					
1.10	110kV Potential Transformers 110kV/y3/110V/y3/110V/y3.	Sets	6.00					
1.11	Valve Regulated Lead Acid (VRLA) battery bank along with accessories.	Set	1.00					
1.12	Battery charger cum DC distribution board	Set	1.00					
1.13	GI lattice support structures for switchyard equipment supports and gantries	Lot	1.00					
1.14	Busbar material consisting of : i) 80mm dia Tubular aluminium bus; ii) ACSR 54/3.18 mm" twin Zebra conductor; iii) Anti fog type suspension/strain insulators (silicon rubber); iv) Post insulators (silicon rubber); v) Terminal connectors & clamps suitable for ACSR conductors; and vi) Terminal connectors and clamps suitable for IPS tube.	Lot	1.00					
1.15	Marshalling box for control cabling.	Sets	4.00					
1.16	Power & Control cables	lot	1.00					

Chennai Metro Water Supply and Sewerage Board
400 MLD SWROD Plant for Chennai City

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

Chennai Metro Water Supply and Sewerage Board

400 MLD SWROD Plant for Chennai City

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
2.31	Switch Board - 1 at RO Plant Electrical Building as per Drawing No. SWROD-E1-04	Set	1.00	58,20,000.00	58,20,000.00	1,83,330.00	60,03,330.00	
2.32	Switch Board - 2 at RO Plant Electrical Building as per Drawing No. SWROD-E1-05	Set	1.00	58,20,000.00	58,20,000.00	1,83,330.00	60,03,330.00	
2.33	Switch Board - 3 at RO Plant Electrical Building as per Drawing No. SWROD-E1-06	Set	1.00	58,20,000.00	58,20,000.00	1,83,330.00	60,03,330.00	
2.34	Switch Board - 4 at RO Plant Electrical Building as per Drawing No. SWROD-E1-07	Set	1.00	58,20,000.00	58,20,000.00	1,83,330.00	60,03,330.00	
2.35	Switch Board - 5 at RO Plant Electrical Building as per Drawing No. SWROD-E1-08	Set	1.00	58,20,000.00	58,20,000.00	1,83,330.00	60,03,330.00	
2.36	Switch Board - 6 at RO Plant Electrical Building as per Drawing No. SWROD-E1-09	Set	1.00	58,20,000.00	58,20,000.00	1,83,330.00	60,03,330.00	
2.37	Switch Board - 7 at RO Plant Electrical Building as per Drawing No. SWROD-E1-10	Set	1.00	58,20,000.00	58,20,000.00	1,83,330.00	60,03,330.00	
2.38	Switch Board - 8 at RO Plant Electrical Building as per Drawing No. SWROD-E1-11	Set	1.00	58,20,000.00	58,20,000.00	1,83,330.00	60,03,330.00	
11 KV Switch Board at CIP Building as per Drawing No. SWROD-E1-12 comprising of:								
2.40	a. Incomer from MRSS (2000 A) - 1 no. b. PT at incomer - 1 no. c. Outgoing (1250 A) - 8 nos.	Set	1.00	38,95,000.00	38,95,000.00	1,22,692.50	40,17,692.50	
11 KV Switch Board at Product Water Building as per Drawing No. SWROD-E1-13 comprising of:								
2.50	a. Incomer from MRSS (2000 A) - 1 no. b. PT at incomer - 1 no. c. Outgoing (1250 A) - 16 nos.	Set	1.00	77,35,000.00	77,35,000.00	2,43,652.50	79,78,652.50	
2.60 Earthing trucks								
2.70	Circuit breaker handling trolleys	Nos.	5.00	60,000.00	3,00,000.00	9,450.00	3,09,450.00	
		Nos.	5.00	55,000.00	2,75,000.00	8,662.50	2,83,662.50	
3.00 VRLA BATTERY, BATTERY CHARGER AND DC DISTRIBUTION BOARDS								
3.10	150AH, 110V/DC Output, 3P 415V, 50 Hz Input	No	RO					MR PG 114
3.20	200AH, 110V/DC Output, 3P 415V, 50 Hz Input with DCDB	No	10.00	4,30,850.00	43,08,500.00	1,35,717.75	44,44,217.75	
3.30	240AH, 110V/DC Output, 3P 415V, 50 Hz Input with DCDB	No	2.00	4,80,600.00	9,61,200.00	30,277.80	9,91,477.80	

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
3.40	DC Distribution Boards - Comprising of Incomer - 1 no. 32A DP MCB & Outgoing - 8 Nos. 6A DP MCBs	No	RO					
4.00	11 / 0.433 KV, OIL FILLED DISTRIBUTION TRANSFORMERS							MR PG 110
4.1.0	1600 kVA (2 nos. each for PMCC-3 & PMCC-4)	No	4.00	26,70,000.00	1,06,80,000.00		3,36,420.00	1,10,16,420.00
4.2.0	2000 kVA (2 nos. each for PCC-6, PMCC-2 & PMCC-5)	Nos	6.00	30,11,800.00	1,80,70,800.00		5,69,230.20	1,86,40,030.20
4.3.0	2500 kVA (2 nos. each for PCC-1, PCC-2, PCC-3, PCC-4, PCC-5 & PMCC-1)	Nos	12.00	36,54,000.00	4,38,48,000.00		13,81,212.00	4,52,29,212.00
5.00	5.00 LV (415V) SWITCH BOARDS - PCCs, MCCCs, LV BUS DUCTS & APFCR							MR PG 110
5.10	Power Control Centers (PCCs)							
5.1.1	PCC-1 at Intake Pump Station as per Drawing No. SWROD-E1-14 comprising of: Incomer (4000 A) - 2 no. Bus coupler (4000 A) - 1 no. Outgoing (1600 A) - 2 nos. Outgoing (1250 A) - 8 nos.	Set	1.00	45,60,000.00	45,60,000.00		1,43,640.00	47,03,640.00
5.1.2	PCC-2 at DAF Building as per Drawing No. SWROD-E1-15 comprising of: Incomer (4000 A) - 2 no. Bus coupler (4000 A) - 1 no. Outgoing (1600 A) - 7 nos. Outgoing (1250 A) - 3 nos.	Set	1.00	47,33,000.00	47,33,000.00		1,49,089.50	48,82,089.50
5.1.3	PCC-3 at DAF Building as per Drawing No. SWROD-E1-16 comprising of: Incomer (4000 A) - 2 no. Bus coupler (4000 A) - 1 no. Outgoing (1600 A) - 7 nos. Outgoing (1250 A) - 3 nos.	Set	1.00	47,33,000.00	47,33,000.00		1,49,089.50	48,82,089.50

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
5.14	PCC-4 at DMGF Building as per Drawing No. SWROD-E1-17 comprising of: Incomer (4000 A) - 2 no. Bus coupler (4000 A) - 1 no. Outgoing (2500 A) - 1 nos. Outgoing (1600 A) - 4 nos. Outgoing (1250 A) - 5 nos.	Set	1.00	48,02,704.00	48,02,704.00	1,51,285.18	49,53,989.18	
5.15	PCC-5 at CIP Building as per Drawing No. SWROD-E1-18 comprising of: Incomer (4000 A) - 2 no. Bus coupler (4000 A) - 1 no. Outgoing (2500 A) - 1 no. Outgoing (1600 A) - 3 nos. Outgoing (1250 A) - 6 nos.	Set	1.00	47,68,320.00	47,68,320.00	1,50,202.08	49,18,522.08	
5.16	PCC-6 at Post Chlorine Building as per Drawing No. SWROD-E1-19 comprising of: Incomer (3200 A) - 2 no. Bus coupler (3200 A) - 1 no. Outgoing (1600 A) - 3 nos. Outgoing (1250 A) - 7 nos.	Set	1.00	42,39,045.00	42,39,045.00	1,33,529.92	43,72,574.92	
5.17	ACB Handling Maintenance Trolley/s for each MCC location	Set	6.00	55,000.00	3,30,000.00	0.00	3,40,395.00	0.00
5.20	ANNEXURE-E Motor Control Centre (MCCs) - For Feeder Details of individual MCCs refer							
5.20	MCC 1.01 at Intake Pump Station with 1 no. i/c from PCC-1 Approx. no. of feeders - 47 Approx. Length - 5.5 Mtr	Set	1.00	35,72,000.00	35,72,000.00	1,12,518.00	36,84,518.00	
5.20	MCC 1.02 at Filter B/W Holding Tank with 1 no. i/c from PCC-1 Approx. no. of feeders - 17 Approx. Length - 4.5 Mtr	Set	1.00	25,31,000.00	25,31,000.00	79,726.50	26,10,726.50	
5.20	MCC 2.01, 2.02, 2.03, 2.04 at Lamella System each with 1 no. i/c from PCc-1 Approx. no. of feeders - 43 Approx. Length - 5.5 Mtr each	Set	4.00	30,58,000.00	1,22,32,000.00	3,85,308.00	1,26,17,308.00	
5.20	MCC 3.01, 3.02, 3.03, 3.04 at DAF Building each with 1 no. i/c from PCC-2 & PCC-3 Approx. no. of feeders - 99 Approx. Length - 10.5 Mtr each	Set	4.00	69,02,000.00	2,76,08,000.00	8,69,652.00	2,84,77,652.00	

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
5.21	MCC 4.01 for DMGF System at Pre-Treatment Storage with 1 no. i/c from PCC-4 Approx. no. of feeders - 116 Approx. Length - 14.5 Mtr	Set	1.00	1,27,24,000.00	1,27,24,000.00	4,00,806.00	1,31,24,806.00	
5.21	MCC 4.02 for DMF System - DMGF Building with 1 no. i/c from PCC-4 Approx. no. of feeders - 25 Approx. Length - 5 Mtr	Set	1.00	42,72,000.00	42,72,000.00	1,34,568.00	44,06,568.00	
5.21	MCC 4.03 for DMF System - RO Feed Tank (PMCC-1) with 2 no. i/c & 1 b/c Approx. no. of feeders - 41 Approx. Length - 9 Mtr	Set	1.00	88,87,000.00	88,87,000.00	2,79,940.50	91,66,940.50	
5.21	MCC 5.01 for CIP Building with 1 no. i/c from PCC-5 Approx. no. of feeders - 36 Approx. Length - 7.5 Mtr	Set	1.00	62,48,000.00	62,48,000.00	1,96,812.00	64,44,812.00	
5.21	MCC 5.02 for Chemical Storage for RO with 1 no. i/c from PCC-5 Approx. no. of feeders - 40 Approx. Length - 6.5 Mtr	Set	1.00	50,01,000.00	50,01,000.00	1,57,531.50	51,58,531.50	
5.21	MCCC 5.03 for RO Plant Electrical Building (PMCC-2) with 2 no. i/c & 1 b/c Approx. no. of feeders - 84 Approx. Length - 9 Mtr	Set	1.00	80,20,000.00	80,20,000.00	2,52,630.00	82,72,630.00	
5.21	MCC 6.01 for Potabilization - Lime Plant with 1 no. i/c from PCC-6 Approx. no. of feeders - 124 Approx. Length - 14.5 Mtr	Set	1.00	1,31,49,000.00	1,31,49,000.00	4,14,193.50	1,35,63,193.50	
5.21	MCC 6.02 for Potabilization - Chlorination with 1 no. i/c from PCC-6 Approx. no. of feeders - 72 Approx. Length - 11.5 Mtr	Set	1.00	91,18,000.00	91,18,000.00	2,87,217.00	94,05,217.00	
5.21	MCC 7.01 for Product Water Building (PMCC-5) with 2 no. i/c & 1 b/c Approx. no. of feeders - 76 Approx. Length - 10 Mtr	Set	1.00	1,08,30,000.00	1,08,30,000.00	3,41,145.00	1,11,71,145.00	
5.21	MCCC 8.01 & 8.02 for Sludge Treatment (PMCC-3 & PMCC-4) each with 2 no. i/c & 1 b/c Approx. no. of feeders - 60 Approx. Length - 8.5 Mtr each	Set	2.00	96,53,000.00	1,93,06,000.00	6,08,139.00	1,99,14,139.00	
5.22	ACB Handling Maintenance Trolleys for Each MCC location	Set	21.00	55,000.00	11,55,000.00	0.00	36,382.50	11,91,382.50
5.30	415V LV Bus Ducts				0.00	0.00	0.00	0.00

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
5.31	2500A (approx. Length - 15 Mtr each)	Sets	4.00	7,49,000.00	29,96,000.00	94,374.00	30,90,374.00	
5.32	3200A (approx. Length - 15 Mtr each)	Sets	6.00	10,50,000.00	63,00,000.00	1,98,450.00	64,98,450.00	
5.33	4000A (approx. Length - 15 Mtr each)	Sets	12.00	12,72,000.00	1,52,64,000.00	4,80,816.00	1,57,44,816.00	
5.40	Local Push Button Stations (FRP / GRP Enclosure)				0.00	0.00	0.00	
5.41	Local Push Button Station DOL for MCCs	Nos	104.00	2,700.00	2,80,800.00	8,845.20	2,89,645.20	
5.42	Local Push Button Station RDOL for MCCs	Nos	292.00	4,100.00	11,97,200.00	37,711.80	12,34,911.80	
5.50	LV Capacitor Banks							C
5.51	LV APFCP & Capacitor (415 V, 600 KV/AR)	Nos	2.00	7,30,100.00	14,60,200.00	45,996.30	15,06,196.30	
5.52	LV APFCP & Capacitor (415 V, 700 KV/AR)	Nos	3.00	8,27,400.00	24,82,200.00	78,189.30	25,60,389.30	
5.53	LV APFCP & Capacitor (415 V, 800 KV/AR)	Nos	6.00	9,33,100.00	55,98,600.00	1,76,355.90	57,74,955.90	
6.00	MOTORS (11kV, 690V & 415V), MV CAPACITORS (11 Kv) & IRS							
6.10	11 KV Slip Ring Motors for inc. in Mechanical							
6.11	RO High Pressure Pumps (2500kW, 2900 rpm)	Nos	17.00	60,43,000.00	10,27,31,000.00	32,36,026.50	10,59,67,026.50	MR PG 133
6.20	690 V Squirrel Cage Motors for							
6.21	ERD Re-Circulation Pump (280kW, 1000-1500 rpm)	Nos	17.00	11,150,000.00	1,95,50,000.00	6,15,825.00	2,01,65,825.00	MR PG 133
6.22	ERD Feed Booster Pump (315kW, 1000-1500 rpm)	Nos	17.00	12,25,000.00	2,08,25,000.00	6,55,987.50	2,14,80,987.50	
6.23	RO CIP Pump (500kW, 1000-1500 rpm)	Nos	3.00	16,40,000.00	49,20,000.00	1,54,980.00	50,74,980.00	
6.24	RO Feed Booster Pump (630kW, 1000-1500 rpm)	Nos	17.00	20,25,000.00	3,44,25,000.00	10,84,387.50	3,55,09,387.50	
6.21	Product Water Pumps (630kW, 750-1000 rpm)	Nos	9.00	20,25,000.00	1,82,25,000.00	5,74,087.50	1,87,99,087.50	
6.30	415 V LV Slip Ring & Squirrel Cage Motors							
6.31	415 V LV Slip Ring & Squirrel Cage Motors for							MR PG 137
a	DMF Scour Air Blower, 250 kW, 1000-1500 rpm	Nos	6.00	5,05,719.00	30,34,314.00	95,580.89	31,29,894.89	
b	RO CIP - Heater/Coolant Allowance, 200 kW, 1000-1500 rpm	Nos	3.00	5,05,719.00	15,17,157.00	47,790.45	15,64,947.45	
c	B/W Disposal Pump, 180 kW, 1000-1500 rpm	Nos	3.00	5,05,719.00	15,17,157.00	47,790.45	15,64,947.45	
d	RO Flushing, 150 kW, 1000-1500 rpm	Nos	3.00	5,05,719.00	15,17,157.00	47,790.45	15,64,947.45	

Chennai Metro Water Supply and Sewerage Board
400 MLD SWROD Plant for Chennai City

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
e	DMF Filter Backwash Pump-Low, 90 kW, 1000-1500 rpm	Nos	20.00	3,31,226.00	66,24,520.00	2,08,672.38	68,33,192.38	
f	Chlorine Crane, 75 kW, 1000-1500 rpm	Nos	4.00	2,63,409.00	10,53,636.00	33,189.53	10,86,825.53	
g	RO CIP Neutralization Pump / Mix, 55 kW, 1000-1500 rpm	Nos	2.00	1,87,249.00	3,74,498.00	11,796.69	3,86,294.69	
h	Recirculation PMP, 45 kW, 1000-1500 rpm	Nos	68.00	1,87,249.00	1,27,32,932.00	4,01,087.36	1,31,24,019.36	
i	Coagulation/Rapid Mixing, 37 kW, 1000-1500 rpm	Nos	8.00	1,87,249.00	14,97,992.00	47,186.75	15,45,178.75	
j	Process Water Pumps, 30 kW, 1000-1500 rpm	Nos	18.00	1,09,004.00	19,62,072.00	61,805.27	20,23,877.27	
k	Chlorine Evaporator, 22 kW, 1000-1500 rpm	Nos	7.00	1,09,004.00	7,63,028.00	24,035.38	7,87,063.38	
l	Lime Sludge Pump, 15 kW, 1000-1500 rpm	Nos	6.00	64,421.00	3,86,526.00	12,175.57	3,98,701.57	
m	Screen Backwash System, 11 kW, 1000-1500 rpm	Nos	6.00	36,212.00	2,17,272.00	6,844.07	2,24,116.07	
n	Filter Press, 7.5 kW, 1000-1500 rpm	Nos	6.00	29,106.00	1,74,636.00	5,501.03	1,80,137.03	
o	Lime Slurry Mixer, 5.5 kW, 1000-1500 rpm	Nos	18.00	18,027.00	3,24,486.00	10,221.31	3,34,707.31	
p	Lime Saturator Mixer, 2.2 kW, 1000-1500 rpm	Nos	30.00	10,603.00	3,18,090.00	10,019.84	3,28,109.84	
q	RO Chemical Dosing - SBS Dosing Pump, 0.75 kW, 1000-1500 rpm	Nos	328.00	6,329.00	20,75,912.00	65,391.23	21,41,303.23	
6.32 415 V LV Slip Ring & Squirrel Cage Motors for								
a	Centrifuge Motors, 110 kW, 750-1000 rpm	Nos	12.00	4,02,633.00	48,31,596.00	1,52,195.27	49,83,791.27	
b	Potabilization CO2 Plant, 75 kW, 750-1000 rpm	Nos	2.00	3,37,145.00	6,74,290.00	21,240.14	6,95,530.14	
c	Screw Pumps, 55 kW, 750-1000 rpm	Nos	24.00	2,70,155.00	64,83,720.00	2,04,237.18	66,87,957.18	
d	HVAC Switch Room, 30 kW, 750-1000 rpm	Nos	16.00	1,49,508.00	23,92,128.00	75,352.03	24,67,480.03	
e	Compressed Air System, 22 kW, 750-1000 rpm	Nos	6.00	1,11,185.00	6,67,110.00	21,013.97	6,88,123.97	
f	Sludge Mixers, 15 kW, 750-1000 rpm	Nos	4.00	92,169.00	3,68,676.00	11,613.29	3,80,289.29	
g	Mixer and Poly Dosing system, 11 kW, 750-1000 rpm	Nos	64.00	50,548.00	32,35,072.00	1,01,904.77	33,36,976.77	
h	Thickener, 7.5 kW, 750-1000 rpm	Nos	4.00	36,914.00	1,47,656.00	4,651.16	1,52,307.16	
6.40 MV Capacitors & Series Reactor for 11kV Slip Ring Motors for								
6.41	RO High Pressure Pumps (11 KV, 2500 kW, 2900 rpm) Capacitor Rating at 12.1 KV -1000 kVAR and Reactor Rating at 12.1 KV is 1% of the capacitor rating	No	17.00	3,54,000.00	60,18,000.00	1,89,567.00	62,07,567.00	
6.50 Liquid Resistance Starters for 11kV Slip Ring Motors for								
6.51	RO Pressure Pump (2500 kW / 2900 rpm)	Set	17.00	10,00,000.00	1,70,00,000.00	5,35,500.00	1,75,35,500.00	
7.00 VARIABLE FREQUENCY DRIVES / CONVERTER TRANSFORMERS / FIELD MOUNTED CONTROL UNITS								
								MR PG 142



**Chennai Metro Water Supply and Sewerage Board
400 MLD SWROD Plant for Chennai City**

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
7.10	690 V Variable Frequency Drives for Squirrel Cage MV motors for							
7.11	ERD Re-Circulation Pump (280 kW, 1000-1500 rpm)	No	17.00	9,21,000.00	1,56,57,000.00	4,93,195.50	1,61,50,195.50	
7.12	ERD Feed Booster Pump (315 kW, 1000-1500 rpm)	No	17.00	9,21,000.00	1,56,57,000.00	4,93,195.50	1,61,50,195.50	
7.13	RO CIP Pump (500 kW, 1000-1500 rpm)	No	3.00	25,37,000.00	76,11,000.00	2,39,746.50	78,50,746.50	
7.14	RO Feed Booster Pump (630 kW, 1000-1500 rpm)	No	17.00	26,19,000.00	4,45,23,000.00	14,02,474.50	4,59,25,474.50	
7.15	Product Water Pump (630 kW, 750-1000 rpm)	No	9.00	26,19,000.00	2,35,71,000.00	7,42,486.50	2,43,13,486.50	
7.16	Intake Water Pump (700 kW, 500-1000 rpm)	No	9.00	43,90,000.00	3,95,10,000.00	12,44,565.00	4,07,54,565.00	
					0.00	0.00	0.00	
7.20	11/0.690/0.690 kV, Three Winding Convertor Transformers for 690V VFDs - of following ratings	Nos	34.00	7,50,000.00	2,55,00,000.00	8,03,250.00	2,63,03,250.00	
7.21	630kVA	Nos	3.00	12,84,000.00	38,52,000.00	1,21,338.00	39,73,338.00	
7.22	1000kVA	Nos	26.00	15,39,000.00	4,00,14,000.00	12,60,441.00	4,12,74,441.00	
7.23	1250kVA	Nos	9.00	19,71,222.00	1,77,40,998.00	5,58,841.44	1,82,99,839.44	
7.30	415 V Variable Frequency Drives for							
7.31	1000 - 1500 rpm, 415 V LV Squirrel Cage Motors for							
a	DMF Scour Air Blower (250 kW, 1000-1500 rpm)	Nos	6.00	13,66,000.00	81,96,000.00	2,58,174.00	84,54,174.00	
b	RO CIP - Heater/Coolant Allowance (200 kW, 1000-1500 rpm)	Nos	3.00	10,68,000.00	32,04,000.00	1,00,926.00	33,04,926.00	
c	B/W Disposal Pump (180 kW, 1000-1500 rpm)	Nos	3.00	10,68,000.00	32,04,000.00	1,00,926.00	33,04,926.00	
d	RO Flushing (150 kW, 1000-1500 rpm)	Nos	3.00	9,15,000.00	27,45,000.00	86,467.50	28,31,467.50	
e	DMF Filter Backwash Pump-Low (90 kW, 1000-1500 rpm)	Nos	20.00	6,76,000.00	1,35,20,000.00	4,25,880.00	1,39,45,880.00	
f	Chlorine Crane (75 kW, 1000-1500 rpm)	Nos	4.00	5,53,000.00	22,12,000.00	69,678.00	22,81,678.00	
g	RO CIP Neutralisation Pump / Mix (55 kW, 1000-1500 rpm)	Nos	2.00	4,95,000.00	9,90,000.00	31,185.00	10,21,185.00	
h	Recirculation PMP (45 kW, 1000-1500 rpm)	Nos	68.00	4,29,000.00	2,91,72,000.00	9,18,918.00	3,00,90,918.00	
i	Coagulation/Rapid Mixing (37 kW, 1000-1500 rpm)	Nos	8.00	3,38,000.00	27,04,000.00	85,176.00	27,89,176.00	
j	Process Water Pumps (30 kW, 1000-1500 rpm)	Nos	18.00	3,05,000.00	54,90,000.00	1,72,935.00	56,62,935.00	
k	Chlorine Evaporator (22 kW, 1000-1500 rpm)	Nos	7.00	2,72,000.00	19,04,000.00	59,976.00	19,63,976.00	
l	Lime Sludge Pump (15 kW, 1000-1500 rpm)	Nos	6.00	2,42,000.00	14,52,000.00	45,738.00	14,97,738.00	
m	Screen Backwash System (11 kW, 1000-1500 rpm)	Nos	6.00	2,28,000.00	13,68,000.00	43,092.00	14,11,092.00	
n	Filter Press (7.5 kW, 1000-1500 rpm)	Nos	6.00	2,28,000.00	13,68,000.00	43,092.00	14,11,092.00	
o	Lime Slurry Mixer (5.5 kW, 1000-1500 rpm)	Nos	18.00	2,10,000.00	37,80,000.00	1,19,070.00	38,99,070.00	
p	Lime Saturator Mixer (2.2 kW, 1000-1500 rpm)	Nos	30.00	1,81,000.00	54,30,000.00	1,71,045.00	56,01,045.00	
q	RO Chemical Dosing - SBS Dosing Pump (0.75 kW, 1000-1500 rpm)	Nos	328.00	1,74,415.00	5,72,08,120.00	18,02,055.78	5,90,10,175.78	

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
7.32	750 - 1000 rpm, 415 V LV Squirrel Cage Motors for							
a	Centrifuge Motors (110 kW, 750-1000 rpm)	No	12.00	6,76,000.00	81,12,000.00	2,55,528.00	83,67,528.00	
b	Potabilization CO2 Plant (75 kW, 750-1000 rpm)	No	2.00	5,53,000.00	11,06,000.00	34,839.00	11,40,839.00	
c	Screw Pumps (55 kW, 750-1000 rpm)	No	24.00	4,95,000.00	1,18,80,000.00	3,74,220.00	1,22,54,220.00	
d	HVAC Switch Room (30 kW, 750-1000 rpm)	No	16.00	3,05,000.00	48,80,000.00	1,53,720.00	50,33,720.00	
e	Compressed Air System (22 kW, 750-1000 rpm)	No	6.00	2,72,000.00	16,32,000.00	51,408.00	16,83,408.00	
f	Sludge Mixers (15 kW, 750-1000 rpm)	No	4.00	2,41,970.00	9,67,880.00	30,488.22	9,98,368.22	
g	Mixer and Poly Dosing system (11 kW, 750-1000 rpm)	No	64.00	2,28,000.00	1,45,92,000.00	4,59,648.00	1,50,51,648.00	
h	Thickener (7.5 kW, 750-1000 rpm)	No	4.00	2,28,000.00	9,12,000.00	28,728.00	9,40,728.00	
7.40	Field mounted Control Units (FRP / GRP Enclosure) for							
7.41	690 V MV Inverter Drives	Nos	72.00	5,600.00	4,03,200.00	12,700.80	4,15,900.80	
7.42	415 V LV Drives	Nos	668.00	4,000.00	26,72,000.00	84,168.00	27,56,168.00	
8.00	LIGHTING / ILLUMINATION							MR PG 115
8.10	415/415V Energy Saver Lighting Transformer							
8.11	63 kVA	Nos	1.00	2,09,000.00	2,09,000.00	6,583.50	2,15,583.50	
8.12	100 kVA	Nos	2.00	2,90,000.00	5,80,000.00	18,270.00	5,98,270.00	
8.13	125 kVA	Nos	8.00	3,34,000.00	26,72,000.00	84,168.00	27,56,168.00	
8.14	160 kVA	Nos	3.00	4,16,000.00	12,48,000.00	39,312.00	12,87,312.00	
8.15	250 kVA	Nos	2.00	5,60,000.00	11,20,000.00	35,280.00	11,55,280.00	
8.20	Distribution Boards							
8.20	Main Lighting and Power Distribution Board (MLPDB-01) at Intake Water Building. The Board (50 KA Fault Level) shall be fabricated from Engineering Plastic / GRP / Polycarbonate material and provided with 2x1250A 4P EDO ACB as incomer (one from normal supply & other from DG set - Both the incomers are wired with auto/manual AMF change-over mode) and 1x400, 2x250, 4x200A TPN MCCB as outgoings as per Drg. No SWROD-E4-01	Nos.	1.00	7,61,400.00	7,61,400.00	23,984.10	7,85,384.10	

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
8.20	Main Lighting and Power Distribution Board (MLPDB-02) at RO Plant Electrical Building. The Board (50 KA fault Level) shall be fabricated from Engineering Plastic / Polycarbonate / GRP material and provided with 2x800A 4P EDO ACB as incomer (one from normal supply & other from DG set - Both the incomers are wired with auto/manual AMF change-over mode) and 1x400, 2x200, 1x160 & 1x125 TPN MCCB as outgoings as per Drg. No SWROD-E4-02	Nos.	1.00	6,08,720.00	6,08,720.00	19,174.68	6,27,894.68	
8.20	Main Lighting and Power Distribution Board (MLPDB-03) at Product Water Building. The Board (50 KA fault Level) shall be fabricated from Engineering Plastic / Polycarbonate / GRP material and provided with 2x630A 4P EDO ACB as incomer (one from normal supply & other from DG set - Both the incomers are wired with auto/manual AMF change-over mode) and 1x250, 2x200, 1x160 TPN MCCB as outgoings as per Drg. No SWROD-E4-03	Nos.	1.00	5,72,930.00	5,72,930.00	18,047.30	5,90,977.30	
8.20	Auxiliary Lighting and Power Distribution Board (ALPDB-015 & 023) at DAF Building and RO Plant Building. The Board (50 KA fault Level) shall be fabricated from Engineering Plastic / Polycarbonate / GRP material and provided with following: Incomer: 1No. 400A, 4P, MCCB Microprocessor Type with adjustable O/L, SC & E/F (40-100%) 1 Nos. [0-500V] Voltmeter (96mm x 96mm) with S/S 1 Nos. [0-400A] Ammeter (96mm x 96mm) with CT's and S/S 1 Set of ON/OFF/ Trip and Phase Indicating Lights with HRC fuses Busbars: 4 x 600A, Electrolytic Aluminium Bus-Bars of equal cross section. Outgoings: All MCCB to be of adjustable O/L & S/C protection. 100A / 63A / 40A TPN MCCBs as outgoings as per Drg. No SWROD-E4-01 & SWROD-E4-02 Auxiliary Lighting and Power Distribution Board (ALPDB-012, 013 & 031) at Lamella Building (2 nos.) and Administration Building. The Board (50 KA fault Level) shall be fabricated from Engineering Plastic / Polycarbonate / GRP material and provided with following: Incomer: 1 Nos. 250A, 4P, MCCB Microprocessor Type with adjustable O/L, SC & E/F (40-100%) 1 Nos. [0-500V] Voltmeter (96mm x 96mm) with S/S	Nos.	2.00	4,34,470.00	8,68,940.00	27,371.61	8,96,311.61	

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
	1 Nos. [0-250A] Ammeter (96mm x 96mm) with CT's and S/S							
	1 Set of ON/OFF / Trip and Phase Indicating Lights with HRC fuses							
	Busbars:							
	4 x 400A, Electrolytic Aluminium Bus-Bars of equal cross section.							
	Outgoings:							
	All MCCB to be of adjustable O/L & S/C protection. 100A / 63A / 40A TPN MCCBs as outgoings as per Drg. No SWROD-E4-01 & SWROD-E4-03							
	Auxiliary Lighting and Power Distribution Board (ALPDB-011, 014, 016, 017, 021, 022, 032 & 033) at Intake, Dirty Water, DMGF (2 nos.), MRSS, Electrical Building for RO Plant, Workshop & Chlorine Buildings. The Board (50 KA fault Level) shall be fabricated from Engineering Plastic / Polycarbonate / GRP material and provided with following:	Nos.	8.00	3,16,620.00	25,32,960.00	79,788.24	26,12,748.24	
	Incomer:							
	1 Nos. 200A, 4P, MCCB Microprocessor Type with adjustable O/L, SC & E/F (40-100%)							
	1 Nos. [0-500V] Voltmeter (96mm x 96mm) with S/S							
	1 Nos. [0-200A] Ammeter (96mm x 96mm) with CT's and S/S							
	1 Set of ON/OFF / Trip and Phase Indicating Lights with HRC fuses							
	Busbars:							
	4 x 300A, Electrolytic Aluminium Bus-Bars of equal cross section.							
	Outgoings:							
	All MCCB to be of adjustable O/L & S/C protection. 100A / 63A / 40A TPN MCCBs as outgoings as per Drg. No SWROD-E4-01, SWROD-E4-02 & SWROD-E4-03							
	Auxiliary Lighting and Power Distribution Board (ALPDB-024 & 034) at Chemical Storage & Potabilization Buildings. The Board (50 KA fault Level) shall be fabricated from Engineering Plastic / Polycarbonate / GRP material and provided with following:	Nos.	2.00	1,86,670.00	3,73,340.00	11,760.21	3,85,100.21	
	Incomer:							
	1 Nos. 160A, 4P, MCCB Microprocessor Type with adjustable O/L, SC & E/F (40-100%)					0.00	0.00	0.00
	1 Nos. [0-500V] Voltmeter (96mm x 96mm) with S/S							
	1 Nos. [0-160A] Ammeter (96mm x 96mm) with CT's and S/S							
	1 Set of ON/OFF / Trip and Phase Indicating Lights with HRC fuses							
	Busbars:							
	4 x 300A, Electrolytic Aluminium Bus-Bars of equal cross section							

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
Outgoings:								
All MCCB to be of adjustable O/L & S/C protection. 63A / 40A TPN MCCBs as outgoings as per Dir. No SWROD-E4-02 & SWROD-E4-03								
8.21	Auxiliary Lighting and Power Distribution Board (ALPDB-025) at STP Building. The Board (50 KA fault Level) shall be fabricated from Engineering Plastic / GRP/ Polycarbonate material and provided with following:	Nos.	1.00	1,79,900.00	1,79,900.00	5,666.85	1,85,566.85	
Incomer:								
1 Nos. 125A, 4P, MCCB Microprocessor Type with adjustable O/L, SC & E/F (40-100%)								
1 Nos. [0-500V] Voltmeter (96mm x 96mm) with S/S								
1 Nos. [0-120A] Ammeter (96mm x 96mm) with CT's and S/S								
1 Set of ON/OFF / Trip and Phase Indicating Lights with HRC fuses								
Busbars:								
4 x 300A, Electrolytic Aluminium Bus-Bars of equal cross section								
Outgoings:								
All MCCB to be of adjustable O/L & S/C protection. 63A / 40A TPN MCCBs as outgoings as per Dir. No SWROD-E4-02								
Street Lighting Feeder Pillar (Master). The Board (35 kA fault Level) shall be fabricated from 14/16 SWG non-magnetic stainless steel sheet / Engineering Plastic / Polycarbonate / GRP material and provided with 2 nos. 100 A 4-P MCCB each in series with 100A 4-P Contactor. The Contactors shall be wired in auto-change-over Mode, with timer / photo-electric & 100A 4-P bye pass Contactor as incomer and 2- Nos. 40A/63A TPN MCCB Outgoings & 12 nos 10/16/32A SP MCB as outgoings. The Board shall incorporate suitable Changeover section for shift of power from Electrical to Solar source.								
8.21	Street Lighting Feeder Pillar (Slave). The Board (35 kA fault Level) shall be fabricated from Engineering Plastic / Polycarbonate / GRP material and provided with 1 no. 40A/63A 4-P MCB as incomer and 12 nos 10/16/20/25/32A SP MCB as outgoings.	Nos.	7.00	1,58,579.00	11,10,053.00	34,966.67	11,45,019.67	
8.21	Street Lighting Feeder Pillar (Normal). The Board (35 kA fault Level) shall be fabricated from Engineering Plastic / Polycarbonate / GRP material and provided with 1 no 100A 4-P MCB as incomer and 12 nos 10/16/32A SP MCB + 2Nos. 32/63 A 3-phase MCBs as outgoings.	Nos.	2.00	32,516.00	65,032.00	2,048.51	67,080.51	

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
8.21	Flame Proof, weather proof MCCB conforming to Group-IIA 7B as per IS 2148/1981 and degree of protection IP 55 as per IS : 2147/1962 and enclosure with cast alum alloy LM 6 as required 100/75 A 4P MCCB (35 KA) for Cranes	Each	14.00	35,520.00	4,97,280.00	15,664.32	5,12,944.32	
8.30	Indoor LDBs & PDBs				0.00	0.00	0.00	
	LDBs and PDBs shall be of cubicle type dust and vermin proof 10 kA fault level TPN MCB DB made of 16 SWG CRCA sheet steel / GRP material. The DB should be suitable for wall mounting with lockable double hinged door construction and painted with stove enamel paint of desired shade. The DBs shall conform to latest IS Code and provided with incoming and outgoing connections and bus bars of solid electrolytic copper and 10 kA current limiting type MCBs. The DB's shall be provided with solid copper neutral & earthing links and fabricated in a manner as approved by engineer-in-charge. All the RCCB's shall have 100 mA sensitivity.							
8.31	Lighting and Power DB'S (Vertical Bus Bars)							
	8-Way TPN MCB DB (vertical type) as above and provided with following: a. 63/80A, 4P, MCCB (25 KA fault level) as Incomer - 1 No. b. 100A Copper Bus Bars of equal ratings - 3 Nos. c. 6/10/16/20/32A MCB as outgoing in each phase - 6 Nos. d. 10 Way copper earth/neutral links - 4 Nos.	Nos.	27.00	13,737.00	3,70,899.00	11,683.32	3,82,582.32	
8.32	Lighting DB'S (Segregated Bus Bars)							
	8-Way TPN MCB DB (segregated phase type) as above and provided with following: a. 63A, 4P, MCCB (25 KA fault level) as Incomer - 1 No. b. 40A, DP RCBO in series with 40A DP Contactor with 2-NO/NC contacts as Incomer in each phase - 1 No. These phase contactors shall be utilised as auto switching unit. c. 100A Copper Bus Bars of equal ratings - 3 Nos. d. 6/10/16/20/32A MCB as outgoing in each phase - 8Nos. e. 10 Way copper earth/neutral links - 4 Nos.	Nos.	35.00	26,044.00	9,11,540.00	28,713.51	9,40,253.51	

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
8.32	<u>6-Way TPN MCB DB (segregated phase type) as above and provided with following:</u> a. 63A, 4P, MCCB (25 KA fault level) as Incomer - 1 No. b. 40A, DP RCBO in series with 40A DP Contactor with 2-NO/NC contacts as Incomer in each phase - 1 No. These phase contactors shall be utilised as auto switching unit. c. 100A Copper Bus Bars of equal ratings - 3 Nos. d. 6/10/16/20/32A MCB as outgoing in each phase - 6Nos. e. 10 Way copper earth/neutral links - 4 Nos.	Nos.	6.00	25,077.00	1,50,462.00	4,739.55	1,55,201.55	
8.32	<u>4-Way TPN MCB DB (segregated phase type) as above and provided with following:</u> a. 63A, 4P, MCCB (25 KA fault level) as Incomer - 1 No. b. 40A, DP RCBO in series with 40A DP Contactor with 2-NO/NC contacts as Incomer in each phase - 1 No. These phase contactors shall be utilised as auto switching unit. c. 100A Copper Bus Bars of equal ratings - 3 Nos. d. 6/10/16/20/32A MCB as outgoing in each phase - 4Nos. e. 10 Way copper earth/neutral links - 4 Nos.	Nos.	5.00	23,214.00	1,16,070.00	3,656.21	1,19,726.21	
8.32	<u>8-Way SPN MCB DB as above and provided with following:</u> a. 2-Nos. 100 A Copper Bus Bars of equal ratings b. 1-No. 40A, DP MCB as Incomer c. 1-No. 32A, DP RCBO in series with above MCB Incomer d. 8-Nos. 6/10/16/20/32A MCB as outgoing e. 2-Nos. 12 Way copper earth/neutral links f. 1 Set of ON/OFF / Trip and Phase Indicating Lights in each incomer.	Nos.	2.00	13,678.00	27,356.00	861.71	28,217.71	
8.40	Solar Panels (For 8-hrs Solar Energy Back UP)				0.00	0.00	0.00	
8.41	Micro Solar Farms consisting of 10 nos. of Photo Voltaic Sheets or as required to capture around 10 kW of Solar Energy	Nos.	7.00	1,45,000.00	10,15,000.00	31,972.50	10,46,972.50	
8.42	Power Conditioning Unit (PCU) / Inverter of suitable rating and capacity to handle 10 kW of power.	Nos.	7.00	1,50,000.00	10,50,000.00	33,075.00	10,83,075.00	
8.43	Solar PCU Units with Battery Banks, each consisting of 2V or 12V batteries in adequate quantities to store 2x5, 10 kW of Solar Energy	Nos.	7.00	9,60,300.00	67,22,100.00	2,11,746.15	69,33,846.15	
8.50	Socket Outlets							

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
8.51 Commercial Type - Polycarbonate Material								
8.51	230V, 6A Universal Domestic Plug Socket Output	Nos.	196.00	487.00	95,452.00	3,006.74	98,458.74	
8.51	16A MCB box (1 phase, Metal Clad Socket with MCB)	Nos.	132.00	2,238.00	2,95,416.00	9,305.60	3,04,721.60	
8.51	20A MCB box (1 phase, Metal Clad Socket with MCB)	Nos.	30.00	2,238.00	67,140.00	2,114.91	69,254.91	
8.51	32A MCB box (1 phase, Metal Clad Socket with MCB)	Nos.	2.00	2,828.00	5,656.00	178.16	5,834.16	
8.52	32A MCB box (3 phase, Metal Clad Socket with MCB)	Nos.	8.00	3,908.00	31,264.00	984.82	32,248.82	
8.52	63A, 3 phase Welding Socket (Male Female type with Interlocking)	Nos.	2.00	7,544.00	15,088.00	475.27	15,563.27	
					0.00	0.00	0.00	
8.52 Industrial Type - Moulded IP-65 Plug & Socket Units								
8.52	16A MCB box (1 phase, Industrial Metal Clad Socket with MCB)	Nos.	104.00	2,238.00	2,32,752.00	7,331.69	2,40,083.69	
8.52	20A MCB box (1 phase, Industrial Metal Clad Socket with MCB)	Nos.	85.00	2,238.00	1,90,230.00	5,992.25	1,96,222.25	
8.52	32A MCB box (1 phase, Industrial Metal Clad Socket with MCB)	Nos.	63.00	2,828.00	1,78,164.00	5,612.17	1,83,776.17	
8.52	32A, 3 phase Welding Socket (Male Female type with Interlocking)	Nos.	31.00	3,908.00	1,21,148.00	3,816.16	1,24,964.16	
8.53	63A MCB box (3 phase, Industrial Metal Clad Socket with MCB)	Nos.	6.00	7,544.00	45,264.00	1,425.82	46,689.82	
8.60 Lighting Fixtures								
8.61 Indoor Commercial								
8.61	Fancy Surface Mounted Light Fitting suitable for 2x18W CFL complete with brass holder, lamps, Ballast etc. Crompton Cat. No. DDSH218EB/G CFL Lamp or Equivalent.	Nos.	47.00	1,100.00	51,700.00	1,628.55	53,328.55	
8.62 Indoor/Outdoor Industrial								
8.62	Indoor							



Chennai Metro Water Supply and Sewerage Board
400 MLD SWROD Plant for Chennai City

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
	SON Type High Bay Light Fitting with external reflector and SON Lamp including built in control gear box and lamps as required							
a	Integral High Bay 400W, SON Light Fitting Philips Cat # OPTIBAY HPK205 1xSON400W WB GL or Equivalent	Nos.	723.00	5,100.00	36,87,300.00	1,16,149.95	38,03,449.95	
b	Integral Medium Bay 250 W, SON Light Fitting similar to Philips Cat # OPTIBAY HPK205 1x250WSON WB GL.	Nos.	205.00	4,300.00	8,81,500.00	27,767.25	9,09,267.25	
c	Non Integral Well Glass 150 W, SON Light Fitting similar to Philips Cat # NDC-021 & 1x150W SONWB GL.	Nos.	351.00	4,520.00	15,86,520.00	49,975.38	16,36,495.38	
					0.00	0.00	0.00	
8.62	Flood Lights				0.00	0.00	0.00	
a	150W Asymmetrical Flood Light & Gear Tray MACH-3 Integral Asymmetrical Flood Light 250W, Metal Halide Fitting Crompton Cat # CG MACH 5-30608 WITH 250W HPSV/MH-T LAMP and GT2S5 Mach Gear Tray or Equivalent	Nos.	167.00	4,000.00	6,68,000.00	21,042.00	6,89,042.00	
b	1000W, Halogen Flood Light Fitting suitable for 2x500W or 1x1000W Halogen Lamp.	Nos.	6.00	22,400.00	1,34,400.00	4,233.60	1,38,633.60	
					0.00	0.00	0.00	
8.63	Street Lighting				0.00	0.00	0.00	
					0.00	0.00	0.00	
					0.00	0.00	0.00	
8.63	Pole Lights				0.00	0.00	0.00	
a	60W LED pole light fitting similar to Crompton NEXUS+ Cat # LSTO30/CDL for 5 mtrs Poles complete with reducer and adaptors connected on a top of pole for attaching the light fitting.	Nos.	39.00	9,900.00	3,86,100.00	12,162.15	3,98,262.15	
b	DESIGNER DECORATIVE flood light fitting with suitable Raised Base Mount with 250W post top Lanterns side mounting as per Bajaj Cat No. BRSGL 250 SV TM Complete or equivalent.	Nos.	68.00	45,000.00	30,60,000.00	96,390.00	31,56,390.00	
c	Supplying and Storing of pole light fitting with SON Lamp and as per Crompton Cat No. STRALET, LED FIXTURE LSTA2-115-CDL (COMPLETE) and external Ignitor Post Top Luminaire similar to PHILIPS Cat# HCS370 1XCDMTT Light, Ballast & 70W Lamp GR.	Nos.	5.00	8,000.00	40,000.00	1,260.00	41,260.00	
d	Post Top Luminaire similar to PHILIPS Cat# HCS370 1XCDMTT Light, Ballast & 70W Lamp GR.	Nos.	60.00	5,460.00	3,27,600.00	10,319.40	3,37,919.40	
					0.00	0.00	0.00	
					0.00	0.00	0.00	
8.63	Boundary Wall Lights							
a	Post Top Luminaire similar to Philips Cat# HPS 370 1XCDMTT-150 GR, 150W Ballast and 1-150W CDMT Lamp.	Nos.	174.00	6,840.00	11,90,160.00	37,490.04	12,27,650.04	

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
8.63	Gate Light							
a	Post Top Luminaires similar to Philips Cat# CDS 570 CDMT-150W C 240V 50Hz E.	Nos.	4.00	9,000.00	36,000.00	1,134.00	37,134.00	
8.64	EMERGENCY EXIT LIGHTS							
	Maintenance Free 24V, 60 minutes Battery back up Exit Signs constructed from 18 gauge steel enamelled MS ventilated box of suitable size with MS grooved channels for sliding of acrylic sheet. Signage frontal facia shall be of white acrylic sheet with figure and arrow in green complete with accessories as per Agni Suraksha / MK Cat. No. or Equivalent							
a	Maintenance Free Battery back up emergency light of 1 hours duration complete with maintenance free 24V battery and lamp as per MK/Agni Suraksha	Nos.	32.00	1,600.00	51,200.00	1,612.80	52,812.80	
b	Self illuminating Exit Signs made from Self charging illuminating tapes of 25mm / 32mm wide strips as per Agni Suraksha or Equivalent.	Nos.	48.00	600.00	28,800.00	907.20	29,707.20	
c	Safety Lamp 2 x 40 W with Battery Back up for surface type mounting	Nos.	5.00	2,000.00	10,000.00	315.00	10,315.00	
d	Safety Lamp 2 x 40 W with Battery Back up for recessed type mounting	Nos.	5.00	2,200.00	11,000.00	346.50	11,346.50	
e	Portable 220V / 24V, 1 phase transformer with 3 nos. 3 pin socket and cable	Nos.	10.00	16,000.00	160,000.00	5,040.00	1,65,040.00	
f	24 V 100W hand lamp	Nos.	10.00	6,800.00	68,000.00	2,142.00	70,142.00	
8.70	Flood Lighting Poles							
8.71	13M GRP mast shaft in tapered section suitable for 50m/sec wind speed, with 1000W Halogen, 250-400 MHE or SON luminaries (2, 3 or 4 will be used) luminaries in symmetrical arrangement, junction box, lightening finial, wiring material, power cable between panel and mast, DP MCB in JB compartment, stainless steel mounting clamp and bolts, luminary mounting bolt are not included.	Nos.	14.00	57,590.00	8,06,260.00	25,397.19	8,31,657.19	
8.72	Material for Highmast Foundation	Nos.	14.00	7,925.00	1,10,950.00	3,494.93	1,14,444.93	
8.73	Asymmetrical floodlight luminaries type CG MACH 5-30608 (Crompton Greaves) or equivalent with 1x250W SV T lamp and its control gear box including CG mounting clamp and bolts.	Nos.	40.00	5,350.00	2,14,000.00	6,741.00	2,20,741.00	
8.74	Twin dome aviation obstruction lights of type BAOL 2 or equivalent with 2 Nos. no. Neon/LED lamps.	Nos.	14.00	3,800.00	53,200.00	1,675.80	54,875.80	
8.80	Street Light Poles							
	Glass Re-inforced Polymer Poles (68-72 glass) confirming to IEC/BIS/VDE							

Chennai Metro Water Supply and Sewerage Board
400 MLD SWROD Plant for Chennai City

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit	Total Amount (INR)	Reference
8.81	5 mtr high Street Lighting Pole	Nos.	39.00	7,775.00	3,03,225.00	9,551.59	3,12,776.59	
8.82	7 mtr high Street Lighting Pole	Nos.	5.00	10,400.00	52,000.00	1,638.00	53,638.00	
8.83	9 mtr high Street Lighting Pole	Nos.	48.00	13,400.00	6,43,200.00	20,260.80	6,63,460.80	
8.84	10 mtr high Street Lighting Pole	Nos.	20.00	14,500.00	2,90,000.00	9,135.00	2,99,135.00	
8.85	GRP Lighting Brackets 1000mm length.	Nos.	162.00	2,200.00	3,56,400.00	11,226.60	3,67,626.60	
8.86	Die Cast Aluminium / FRP Junction Boxes with Hardwares	Nos.	126.00	3,000.00	3,78,000.00	11,907.00	3,89,907.00	
8.90	Fans / Coolers							
8.91	Ceiling Fans							
	Ceiling Fans complete with motor, a set of blades, down rod but with electronic regulator i/c wiring the down rod with 2x1.5 sq.mm. PVC insulated copper conductor wire as reqd:							
8.91	1200 mm Sweep	Nos.	77.00	2,205.00	1,69,785.00	5,348.23	1,75,133.23	
8.91	1400 mm Sweep	Nos.	11.00	2,425.00	26,675.00	840.26	27,515.26	
8.92	Exhaust Fans							
	900 rpm, Exhaust Fans complete with motor, a set of blades, cowl, adjustable type louvres, grouting bolts, power improvement capacitors including making holes in the wall to suit the size of fan and as per Haveis Heavy Duty Metal Exhaust Fans or Equivalent							
8.92	300 mm dia.	Nos.	16.00	3,255.00	52,080.00	1,640.52	53,720.52	
8.92	380 mm dia.	Nos.	32.00	3,865.00	1,23,680.00	3,895.92	1,27,575.92	
8.92	450 mm Dia.	Nos.	109.00	5,140.00	5,60,260.00	17,648.19	5,77,908.19	
8.93	Man Coolers							
8.93	450mm Wall Mounted Air Circulators	Nos.	32.00	7,375.00	2,36,000.00	7,434.00	2,43,434.00	
9.00	DIESEL GENERATOR (DG) SETS							MR PG 120
9.01	Auto-Main Failure 0.8 p.f., 3 phase, 50Hz Diesel Generating Sets with heavy duty air cooled engine mounted Radiator System all in an acoustic enclosure to restrict noise level to 75dBa at 1 mtr. distance complete with following:							

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
	The unit shall be complete with AMF Logic Control Panel (630, 800, 1250A, 4P ACB) along with Generator Protection Relay for DG Set, ON/ OFF indicating lamps (LED), 3 Nos. Ammeter and Electronic Energy Meter with viewing toughened glass window and Emergency Trip Push Buttons. The Engine Panel (Preferably Digital Type - Control circuitry shall be suitable for interfacing with plant PLC / DCS for remote monitoring, switching and control) shall be housed inside the Enclosure.							
	990 Ltrs. fuel storage Tank at the base duly provided with fuel gauge. The unit shall be provided with fully charged 24V Lead Acid Battery Bank, and trickle boost Automatic Battery Charging set, Residential type Silencer and heat insulated exhaust manifold with rock wool insulation (150kg/meter cube density) and aluminium cladding etc. A suitable Heat Exchanger System with Stainless Steel flexible belows for connection to Heat Exchanger. The secondary water to be cooled in FRP cooling Tower located remotely at Terrace etc., if required.							
	Acoustic enclosure shall be made out of 14 SWG CRCA sheet steel. Sound proofing shall be done with high quality fire proof rock wool of suitable thickness and density (150kg) confirming to IS 8183. It shall be desired to place silencer outside the acoustic enclosure.							
a	380 kVA for Product Water Area connected to MLPDB-03	Nos.	1.00	25,45,793.00	25,45,793.00	80,192.48	26,25,985.48	
b	625 kVA for RO Plant Area connected to MLPDB-02	Nos.	1.00	35,54,700.00	35,54,700.00	1,11,973.05	36,66,673.05	
c	800 kVA for Intake Water Area connected to MLPDB-01	Nos.	1.00	44,53,830.00	44,53,830.00	1,40,295.65	45,94,125.65	
9.02	Initial Supply as well as first replacement of Lube Oil, Fuel for 8-Hours for Full Load test run before handing over of the sets to the Owners.				0.00	0.00	0.00	
a	380 kVA for Product Water Area connected to MLPDB-03	Nos.	1.00	62,761.00	62,761.00	1,976.97	64,737.97	
b	625 kVA for RO Plant Area connected to MLPDB-02	Nos.	1.00	71,178.00	71,178.00	2,242.11	73,420.11	
c	800 kVA for Intake Water Area connected to MLPDB-01	Nos.	1.00	99,072.00	99,072.00	3,120.77	1,02,192.77	
9.03	EXHAUST SYSTEM: 50 mm thick layer of LRB rock wool having 96kg/m ³ density, cladding with 26 gauge aluminium sheet all-round the exhaust pipe complete as required at site for following pipes inclusive of bends, elbows etc.				0.00	0.00	0.00	
a	125 mm dia NB "B" class from each 380 & 625kVA DG Sets	Mtrs	150.00	1,984.00	2,97,600.00	9,374.40	3,06,974.40	
b	200 mm dia. NB 4.85 mm thick 2x200mm from 800kVA DG to outside atmosphere	Mtrs	100.00	3,174.00	3,17,400.00	9,998.10	3,27,398.10	
c	300mm dia. NB 5.2 mm thick 2x200mm from 800kVA DG to outside atmosphere	Mtrs	100.00	4,761.00	4,76,100.00	14,997.15	4,91,097.15	
9.04	Thermal insulation of Residential Silencer with 50 mm thick LRB / Rock Wool with wire mesh & covered with 24 gauge Al. Sheet	Nos.	3.00	9,619.00	28,857.00	909.00	29,766.00	

Chennai Metro Water Supply and Sewerage Board

400 MLD SWROD Plant for Chennai City

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
9.05	SUPPORTING STRUCTURE: MS Support Structure with angle / channel etc. for exhaust pipe, Cooling Water pipes etc.	Tonne	8.00	84,163.00	6,73,304.00	21,209.08	6,94,513.08	
9.06	Supply and fixing of Aviation Light with Battery Charger and Maintenance Free lead acid storage Batteries of suitable rating.			0.00	0.00	0.00	0.00	
a	Aviation Lights	Nos.	10.00	24,047.00	240,470.00	7,574.81	2,48,044.81	
b	100AH Battery Charger	Nos.	5.00	60,116.00	3,00,580.00	9,468.27	3,10,048.27	
c	100AH Battery Bank	Nos.	5.00	36,070.00	1,80,350.00	5,681.03	1,86,031.03	
d	3x4 Sq.mm Cu Armoured Cable i/c laying and Termination at both ends.	Mtrs	250.00	248.00	62,000.00	1,953.00	63,953.00	
9.07	CONTROL PANEL FOR 380KVA DG SET: Supply, erection, testing and commissioning of DG Set Electric AMF Control Panel in IP-65 Enclosure as follows:	Sets	1.00	3,90,756.00	3,90,756.00	12,308.81	4,03,064.81	
(a)	4 Nos. 600A Electrolytic Aluminium PVC Sleeved Aluminium Bus Bars of equal cross-section							
(b)	1 No. 630A, 50Hz, 3 phase, neutral, 4P EDO ACB for 380kVA DG Set with							
(i)	1 No. CT Operated, 4 Wire Digital Energy Meter							
(ii)	1 No. Kilowatt Meter							
(iii)	3 Nos. Ammeters (0-300-600) complete with CT's one in each phase							
(iv)	1 No. (0-500V) Voltmeter with selector switch							
(v)	1 Set of ON/OFF & Phase indicating lights with fuses							
(vi)	1 No. Generator Protection Relay (Similar to MC-12A relay of L&T)							
(vii)	1 No. Reverse Power Relay							
(c)	The AMF Logic of above DG Sets to be interlinked with Transformer Incoming to accomplish the desired Manual / Auto Change-Over etc.							
(d)	The Panel shall be suitable for 3x4x185 sq.mm. XLPEAA Incoming and Outgoing Cable Connections							
9.08	CONTROL PANEL FOR 625KVA DG SET: Supply, erection, testing and commissioning of DG Set Electric AMF Control Panel in IP-65 Enclosure as follows:	Sets	1.00	4,50,872.00	4,50,872.00	14,202.47	4,65,074.47	
(a)	4 Nos. 1000A Electrolytic Aluminium PVC Sleeved Aluminium Bus Bars of equal cross-section							
(b)	1 No. 1000A, 50Hz, 3 phase, neutral, 4P EDO ACB for 625kVA DG Set with							
(i)	1 No. CT Operated, 4 Wire Digital Energy Meter							
(ii)	1 No. Kilowatt Meter							
(iii)	3 Nos. Ammeters (0-500-1000) complete with CT's one in each phase							
(iv)	1 No. (0-500V) Voltmeter with selector switch							
(v)	1 Set of ON/OFF & Phase indicating lights with fuses							

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
(vi)	1 No. Generator Protection Relay (Similar to MC-12A relay of L&T)							
(vii)	1 No. Reverse Power Relay							
(c)	The AMF Logic of above DG Sets to be interlinked with Transformer Incomer to accomplish the desired Manual / Auto Change-Over etc.							
(d)	Cable Connections							
9.09	CONTROL PANEL FOR 800KVA DG SET: Supply, erection, testing and commissioning of DG Set Electric AMF Control Panel in IP-65 Enclosure as follows:	Sets	1.00	4,80,930.00	4,80,930.00	15,149.30	4,96,079.30	
(a)	4 Nos. 1200A Electrolytic Aluminium PVC Sleeved Aluminium Bus Bars of equal cross-section							
(b)	1 No. 1200A, 50Hz, 3 phase, neutral, 4P EDO ACB for 800kVA DG Set with							
(i)	1 No. CT Operated, 4 Wire Digital Energy Meter							
(ii)	1 No. Kilowatt Meter							
(iii)	3 Nos. Ammeters (0-600-1200) complete with CT's one in each phase							
(iv)	1 No. (0-500V) Voltmeter with selector switch							
(v)	1 Set of ON/OFF & Phase indicating lights with fuses							
(vi)	1 No. Generator Protection Relay (Similar to MC-12A relay of L&T)							
(vii)	1 No. Reverse Power Relay							
(c)	The AMF Logic of above DG Sets to be interlinked with Transformer Incomer to accomplish the desired Manual / Auto Change-Over etc.							
(d)	Cable Connections							
9.10	Supplying, laying, connecting and testing of Class C Black MS fuel pipe work including bends, flanges, nuts bolts, packing etc from Bulk Storage Tanks to Day Tanks and from Day Tanks to Engines and back in an approved manner as per follows:							
a	25 mm dia.	Mtrs.	60.00	361.00	21,660.00	682.29	22,342.29	
b	25 mm dia S/S Ball Valve.	Nos.	6.00	3,607.00	21,642.00	681.72	22,323.72	
c	990 Litres Fuel Tank(for Overflow)	No.	3.00	36,070.00	1,08,210.00	3,408.62	1,11,618.62	
9.11	Supply and erection of canopy type MS structure made out of 40 mm medium class MS pipe (class B), 25x25x3 mm angle iron from work and 14 SWG GI sheet structure shall be grouted in 1:2:4 CC foundation for handling 4 nos 9 lit each fire fighting buckets including providing buckets with two coats of anticorrosive paints etc. complete as required.	Sets	3.00	1,803.00	5,409.00	170.38	5,579.38	

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
10.00 CABLES								MR PG 121
10.10 Armoured Cables	11kV (UE), Aluminium Conductor, XLPE Insulated, Screened, PVC extruded,	Mtrs	50,000.00	1,111.00	55,50,000.00	17,49,825.00	5,72,99,825.00	
10.11 3C x 300		Mtrs	2,500.00	965.00	24,12,500.00	75,993.75	24,83,493.75	
10.12 3C x 240								
10.20 Cables	1.1kV, Stranded Copper Conductor, PVC Insulated, PVC Sheathed, Unarmoured	Mtrs	2,000.00	105.00	2,10,000.00	6,615.00	2,16,615.00	
10.21 2C x 6		Mtrs	6,000.00	166.00	9,96,000.00	31,374.00	10,27,374.00	
10.22 2C x 10		Mtrs	6,000.00	238.00	14,28,000.00	44,982.00	14,72,982.00	
10.23 2C x 16		Mtrs	500.00	374.00	1,87,000.00	5,890.50	1,92,890.50	
10.24 2C x 25								
10.30 Cables	1.1kV grade, Stranded Copper Conductor, PVC Insulated, PVC Sheathed, armoured	Mtrs	1,000.00	16.00	16,000.00	504.00	16,504.00	
10.30 1C x 2.5		Mtrs	1,000.00	65.80	65,800.00	2,072.70	67,872.70	
10.30 2C x 2.5		Mtrs	60,000.00	82.60	49,56,000.00	1,56,114.00	51,12,114.00	
10.30 3C x 2.5		Mtrs	1,000.00	103.60	1,03,600.00	3,263.40	1,06,863.40	
10.30 4C x 2.5		Mtrs	400.00	143.50	57,400.00	1,808.10	59,208.10	
10.31 6C x 2.5		Mtrs	500.00	182.70	91,350.00	2,877.53	94,227.53	
10.31 8C x 2.5		Mtrs	5,500.00	110.60	6,08,300.00	19,161.45	6,27,461.45	
10.31 3C x 4		Mtrs	6,000.00	152.60	9,15,600.00	28,841.40	9,44,441.40	
10.31 3C x 6		Mtrs	100.00	233.10	23,310.00	734.27	24,044.27	
10.31 3C x 10		Mtrs	200.00	140.70	28,140.00	886.41	29,026.41	
10.31 4C x 4		Mtrs	2,000.00	196.70	3,93,400.00	12,392.10	4,05,792.10	
10.31 4C x 6		Mtrs	800.00	300.30	2,40,240.00	7,567.56	2,47,807.56	
10.40 armoured Power Cables	1.1kV grade, Stranded Aluminium Conductor, XLPE Insulated, PVC Sheathed,							
10.40 3C x 10		Mtrs	16,000.00	74.90	11,98,400.00	37,749.60	12,36,149.60	
10.40 3C x 16		Mtrs	4,000.00	79.80	3,19,200.00	10,054.80	3,29,254.80	
10.40 3C x 25		Mtrs	1,500.00	100.80	1,51,200.00	4,762.80	1,55,962.80	



BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
10.40	3C x 35	Mtrs	6,000.00	127.40	7,64,400.00	24,078.60	7,88,478.60	
10.41	3C x 50	Mtrs	1,000.00	161.00	1,61,000.00	5,071.50	1,66,071.50	
10.41	3C x 70	Mtrs	6,500.00	217.00	14,10,500.00	44,430.75	14,54,930.75	
10.41	3C x 95	Mtrs	1,000.00	269.50	2,69,500.00	8,489.25	2,77,989.25	
10.41	3C x 120	Mtrs	1,000.00	322.00	3,22,000.00	10,143.00	3,32,143.00	
10.41	3C x 150	Mtrs	4,000.00	396.90	15,87,600.00	50,009.40	16,37,609.40	
10.41	3C x 185	Mtrs	500.00	485.10	2,42,550.00	7,640.33	2,50,190.33	
10.41	3C x 240	Mtrs	500.00	620.90	3,10,450.00	9,779.18	3,20,229.18	
10.41	3C x 300	Mtrs	60,000.00	750.40	4,50,24,000.00	14,18,256.00	4,64,42,256.00	
10.41	4C x 6	Mtrs	1,000.00	67.20	67,200.00	2,116.80	69,316.80	
10.41	4C x 10	Mtrs	5,000.00	85.40	4,27,000.00	13,450.50	4,40,450.50	
10.42	4C x 16	Mtrs	8,000.00	95.20	7,61,600.00	23,990.40	7,85,590.40	
10.42	4C x 25	Mtrs	4,000.00	122.50	4,90,000.00	15,435.00	5,05,435.00	
10.42	3.5C x 35	Mtrs	1,000.00	143.50	1,43,500.00	4,520.25	1,48,020.25	
10.42	3.5C x 50	Mtrs	7,000.00	186.20	13,03,400.00	41,057.10	13,44,457.10	
10.42	3.5C x 70	Mtrs	1,500.00	252.70	3,79,050.00	11,940.08	3,90,990.08	
10.42	3.5C x 95	Mtrs	250.00	305.90	76,475.00	2,408.96	78,883.96	
10.42	3.5C x 120	Mtrs	1,500.00	381.50	5,72,250.00	18,025.88	5,90,275.88	
10.42	3.5C x 150	Mtrs	3,000.00	452.20	13,56,600.00	42,732.90	13,99,332.90	
10.42	3.5C x 185	Mtrs	1,000.00	564.20	5,64,200.00	17,772.30	5,81,972.30	
10.42	3.5C x 240	Mtrs	1,500.00	709.80	10,64,700.00	33,538.05	10,98,238.05	
10.43	3.5C x 300	Mtrs	9,000.00	870.10	78,30,900.00	2,46,673.35	80,77,573.35	
10.43	4C x 300	Mtrs	20,000.00	979.30	1,95,86,000.00	6,16,959.00	2,02,02,959.00	

B Control & Instrumentation Equipment

Scope includes:

- | | |
|---|--|
| a | Design, Engineering, Testing at Works and Supply of items |
| b | Receiving and Storing at site |
| c | Issue for Installation |
| d | Unpacking at site |
| e | Fabrication and Erection of base frames / mounting accessories |
| f | Supply of accessories required for installation of equipment |
| g | Erection / Installation |

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
h	Checking / testing / no load trials of installed equipment							
i	Load trials and commissioning							
j	Training of Plant Personnel							
k	Documentation and As-Built Drawings							
l	Handling Over of the Equipments							
Note:								
a	The configuration, rating and quantity of items indicated in the Schedule of Quantities given below are							
b	All the statutory fee will be paid by the Purchaser.							
c	Unit Rate of all the items in scope of erection shall be furnished.							
d	Bidder shall visit site & assess the exact volume of Work.							
1.00 DISTRIBUTED CONTROL SYSTEM (DCS)								
1.10	One Set - Control desks; servers and redundant servers; computers for operator stations, plant overview, process optimization, information management system, peripherals; programmable controllers (PCs); quantity of I/O; power supplies; ethernet switches; distributed / remote I/O panels as per details shown in enclosed drawings no. SWROD-I2-01. Monitor for plant overview shall be min. 56" Plasma Type.			Lot	1.00	0.00		
1.20	One Lot - Special cables like OFC, screened & unscreened cables, co-axial cables, STP, UTP cables etc. as per the requirement of the application for data communication between I/Os and PCs, for communication between different programmable controllers & High speed ethernet network; Field bus cables for field instruments, variable speed drives, numeric relays on electrical panels and sub-control systems; Data cables to I/Os integrated to Motor Control Centers (MCC); and Data cables required for plant optimization system and MIS computers.			Lot	1.00	0.00		
1.30	One number PC based Engineering Station with keyboard, mouse and colour monitor with necessary licensed software loaded which shall be able to work as operating station as well.			Set	1.00	0.00		
1.40	One number Laptop computer of latest configuration with necessary licensed software loaded as Portable Programming Unit for the programmable controller and other field instruments / devices / drives.			Set	1.00	0.00		

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

Chennai Metro Water Supply and Sewerage Board
400 MLD SWROD Plant for Chennai City

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BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
1.00	Online Chlorine measurement consists of sensor element, transmitter and flow assembly for range: 0-5 PPM. It shall be microprocessor based with 4-20mA isolated/ field bus output, 2 electrode design, cathode electrode of Platinum & Anode electrode of silver, accuracy of + 0.2% of FS with local display facility, compatible for 230V AC power supply, automatic temperature compensation, sampling unit, flow assembly, inbuilt temp. sensor, calibration facility with its equipments, mounting arrangement, measuring cable between the sensor and transmitter, Isolation valve, etc. Location: Common outlet of Dual Media Gravity Filter.	Nos.	1	2,76,096.00	2,76,096.00	8,697.02	2,84,793.02	
2.00	Online Conductivity measurement consists of sensor element, transmitter and flow assembly for range: 0-100000 mS/cm, accuracy of $\pm 0.5\%$ of measuring range. It shall be microprocessor based with 4-20mA (24V DC loop powered)/ profibus output. It shall have local display facility, automatic temperature compensation, flow/ immersion fittings as applicable, inbuilt temp. sensor, calibration facility with its equipments, mounting arrangements, measuring cable between the sensor and transmitter, Isolation valve, etc.			0.00	0.00	0.00	0.00	
2.10	Location: Cartridge filter common outlet	Nos.	17	97,197.00	16,52,349.00	52,048.99	17,04,397.99	
2.20	Location: RO permeate outlet	Nos.	17	97,197.00	16,52,349.00	52,048.99	17,04,397.99	
3.00	Online ORP measurement consists of sensor element, transmitter and flow assembly for range: -1500 to +1500mV with accuracy of $\pm 20\text{mV}$. It shall be microprocessor based with 4-20mA (24V DC loop powered)/ profibus output, sensor element of platinum electrode with suitable reference electrode with local display facility, automatic temperature compensation, sampling unit, calibration facility with its equipments, measuring cable between the sensor and transmitter, mounting arrangements, Isolation valve, etc. Location: Cartridge filter common outlet	Nos.	17	90,177.00	15,33,009.00	48,289.78	15,81,298.78	
4.00	Online pH measurement consists of sensor element, transmitter and flow assembly for range: 0-14pH with accuracy of better than 0.1pH. It shall be microprocessor based with 4-20mA (24V DC loop powered)/ profibus output, automatic temperature compensation, measuring electrode shall be glass with silver reference electrode preferably. It shall have local display facility, inbuilt temp. sensor, and shall be complete with sampling unit, auto cleaning, auto calibration facility with its equipments, measuring cable between the sensor and transmitter, mounting arrangements, Isolation valve, etc. Location: Cartridge filter common outlet	Nos.	17	90,177.00	15,33,009.00	48,289.78	15,81,298.78	



**Chennai Metro Water Supply and Sewerage Board
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BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
4.20	Location: RO permeate outlet	Nos.	17	90,177.00	15,33,009.00	48,289.78	15,81,298.78	
4.30	Location: Lime clarification unit	Nos.	1	90,177.00	90,177.00	2,840.58	93,017.58	
4.40	Location: CIP pump discharge unit	Nos.	1	90,177.00	90,177.00	2,840.58	93,017.58	
5.00	Online TOC/DOC measurement shall consists of sensor element, transmitter and flow assembly for range: 0-100 PPM. It shall be microprocessor based with (24V DC loop powered)/ profibus output, automatic temperature compensation, autocleaning with suitable sensor element. It shall have local display facility, built in temperature sensor, sampling unit, flow assembly, calibration facility with its equipments, measuring cable between the sensor and transmitter, mounting arrangements, isolation valve, etc.	Nos.	1	24,53,645.00	24,53,645.00	77,289.82	25,30,934.82	
5.10	Location: Intake pump discharge header (TOC)	Nos.	1	24,53,645.00	24,53,645.00	77,289.82	25,30,934.82	
5.20	Location: Intake pump discharge header (DOC)	Nos.	1	24,53,645.00	24,53,645.00	77,289.82	25,30,934.82	
5.30	Location: Common outlet of gravity dual media filter (TOC)	Nos.	1	24,53,645.00	24,53,645.00	77,289.82	25,30,934.82	
5.40	Location: Common outlet of gravity dual media filter (DOC)	Nos.	1	24,53,645.00	24,53,645.00	77,289.82	25,30,934.82	
6.00	Online Turbidity measurement consists of light source, transmitter and flow assembly (if applicable) for range: 0- 5, 100 & 200 NTU, accuracy of min ± 2% of reading/ + 0.02 below 40NTU and + 5% of rdg above 40NTU, automatic temperature compensation, autocleaning. It shall be microprocessor based with 4-20mA isolated/profibus bus output. It shall have local display facility, built in temperature sensor, sampling unit, flow assembly, calibration facility with its equipments, measuring cable between the sensor and transmitter, isolation valve, necessary accessories, etc.	Nos.	1	24,53,645.00	24,53,645.00	77,289.82	25,30,934.82	
6.10	0 to 5 NTU - Location: Common outlet of gravity dual media filter	Nos.	1	1,91,446.00	1,91,446.00	6,030.55	1,97,476.55	
6.20	0 to 100 NTU - Location: Lamella clarifier outlet header.	Nos.	1	2,39,139.00	2,39,139.00	7,532.88	2,46,671.88	
6.30	0 to 100 NTU - Location: Common DAF outlet	Nos.	1	2,39,139.00	2,39,139.00	7,532.88	2,46,671.88	
6.40	0 to 200 NTU - Location: Intake pump discharge headers.	Nos.	1	2,39,139.00	2,39,139.00	7,532.88	2,46,671.88	
7.00	Full bore Electromagnetic Flow meter with sensor & transmitter of programmable type for the following with local digital display, 230 V AC power supply, 4-20mA / profibus output, accuracy of + 0.3% or better. Platinum/ Iridium electrode, enclosure protection IP-67 with necessary calibration unit and other accessories including followings, 1) Reducer & expander (wherever line size is greater than flow meter bore), 2) Straight length pipe of min. 5 D in the upstream and 3 D in the downstream, 3) Fasteners & gaskets, 4) Spool piece with flange on both side for replacement of meter: 1 No. for each size wherever qty <10 & 2 Nos. for each size wherever qty >10.							

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S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
7.10	0 to 6000 m3/hr - Location: Back wash pumps	Nos.	1	23,07,692.00	23,07,692.00	72,692.30	23,80,384.30	
7.20	0 to 21500 m3/hr - Location: RO flushing pump discharge header	Nos.	1	32,76,923.00	32,76,923.00	1,03,223.07	33,80,146.07	
7.30	0 to 21500 m3/hr - Location: High pressure pump suction	Nos.	17	32,76,923.00	5,57,07,691.00	17,54,792.27	5,74,62,483.27	
7.40	0 to 21500 m3/hr - Location: RO permeate outlet	Nos.	17	32,76,923.00	5,57,07,691.00	17,54,792.27	5,74,62,483.27	
8.00	Online Metal Tube Rota meter with accuracy of + 2% of full scale and repeatability of +1% with inlet, outlet & isolation valves, flanges, etc.							
8.10	0 to 20 m3/hr - Location: Acid unloading pump discharge header	Nos.	1	40,985.00	40,985.00	1,291.03	42,276.03	
8.20	0 to 20 m3/hr - Location: FeCl3 unloading pump discharge header	Nos.	1	40,985.00	40,985.00	1,291.03	42,276.03	
8.30	150 to 900 LPH - Location: Acid dosing pump common discharge	Nos.	1	40,985.00	40,985.00	1,291.03	42,276.03	
8.40	150 to 900 LPH - Location: FeCl3 dosing pump common discharge	Nos.	1	40,985.00	40,985.00	1,291.03	42,276.03	
8.50	150 to 900 LPH - Location: Anti-scalant dosing pump common discharge	Nos.	1	40,985.00	40,985.00	1,291.03	42,276.03	
8.60	150 to 900 LPH - Location: SMBs dosing pump common discharge	Nos.	1	40,985.00	40,985.00	1,291.03	42,276.03	
8.70	150 to 900 LPH - Location: Poly dosing pump common discharge	Nos.	1	40,985.00	40,985.00	1,291.03	42,276.03	
9.00	Level sensor (Ultrasonic) and transmitter with 4-20 mA (24V DC loop powered) / profibus output, accuracy of + 0.25% or better with digital local display facility, necessary accessories, noise suppression software (if applicable), etc.							
9.01	0-930 mm - Location: Gravity dual media filter	Nos.	40	69,231.00	27,69,240.00	87,231.06	28,56,471.06	
9.02	0-1120 mm - Location: Intake pump discharge header	Nos.	1	69,231.00	69,231.00	2,180.78	71,411.78	
9.03	0-1540 mm - Location: Antiscalant dosing tank	Nos.	1	69,231.00	69,231.00	2,180.78	71,411.78	
9.04	0-1540 mm - Location: Antiscalant dosing tank	Nos.	1	69,231.00	69,231.00	2,180.78	71,411.78	
9.05	0-1540 mm - Location: SMBs dosing tank	Nos.	1	69,231.00	69,231.00	2,180.78	71,411.78	
9.06	0-1540 mm - Location: SMBs dosing tank	Nos.	1	69,231.00	69,231.00	2,180.78	71,411.78	
9.07	0-1540 mm - Location: Poly Dosing Tank	Nos.	1	69,231.00	69,231.00	2,180.78	71,411.78	
9.08	0-1540 mm - Location: Poly Dosing Tank	Nos.	1	69,231.00	69,231.00	2,180.78	71,411.78	
9.09	0-2940 mm - Location: Acid Dosing Tank	Nos.	1	69,231.00	69,231.00	2,180.78	71,411.78	
9.10	0-2940 mm - Location: Acid Dosing Tank	Nos.	1	69,231.00	69,231.00	2,180.78	71,411.78	
9.11	0-2940 mm - Location: FeCl3 Dosing Tank	Nos.	1	69,231.00	69,231.00	2,180.78	71,411.78	
9.12	0-2940 mm - Location: FeCl3 Dosing Tank	Nos.	1	69,231.00	69,231.00	2,180.78	71,411.78	
9.13	0-3100 mm - Location: Dual Media Gravity Filter	Nos.	40	69,231.00	27,69,240.00	87,231.06	28,56,471.06	
9.14	0-5683 mm - Location: Bulk FeCl3 storage tank	Nos.	2	69,231.00	1,38,462.00	4,361.55	1,42,823.55	
9.15	0-5683 mm - Location: Bulk acid storage tanks	Nos.	2	69,231.00	1,38,462.00	4,361.55	1,42,823.55	
9.16	0-5683 mm - Location: CIP tank	Nos.	1	69,231.00	69,231.00	2,180.78	71,411.78	
9.17	0-5683 mm - Location: Carbon dioxide storage tanks	Nos.	2	69,231.00	1,38,462.00	4,361.55	1,42,823.55	
9.18	0-5683 mm - Location: Lime clarification unit	Nos.	1	69,231.00	69,231.00	2,180.78	71,411.78	
9.19	0-5683 mm - Location: Back wash holding tank	Nos.	2	69,231.00	1,38,462.00	4,361.55	1,42,823.55	

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
9.20	0-5683 mm - Location: RO permeate tank	Nos.	2	69,231.00	1,38,462.00	4,361.55	1,42,823.55	
10.00	Temperature Gauge bi-metallic of range: 0-60 Deg C, accuracy of + 1% with thermowell & other accessories. Location: On instrument air system	Nos.	1	10,258.00	10,258.00	323.13	10,581.13	
11.00	Single point Pt-100 RTD of range: 0-40 Deg C, class A accuracy, (-) 100 deg C to (+) 300 Deg C, SS 316L sheath with thermowell, flanges, mounting accessories, etc. Location: Cartridge filter common outlet	Nos.	17	17,468.00	2,96,956.00	9,354.11	3,06,310.11	
12.00	Temperature transmitter of range: 0-60 Deg C, for 3 wire RTD, pt-100 shall be with 4-20 mA (24V DC loop powered)/ profibus output, accuracy of + 0.1% of calibrated or better, digital local display, etc. Location: Cartridge filter common outlet	Nos.	17	12,308.00	2,09,236.00	6,590.93	2,15,826.93	
13.00	Pressure Gauge (bourdon type), accuracy of + 1% of FSD, with snubber, pulsation dampener, gauge cock, valve manifold, etc	Nos.	1	14,843.00	14,843.00	467.55	15,310.55	
13.10	0-10 kg/cm ² - Location: On instrument air system	Nos.	1	14,843.00	14,843.00	467.55	15,310.55	
13.20	0-10 kg/cm ² - Location: On instrument air system	Nos.	1	21,766.00	21,766.00	685.63	22,451.63	
13.30	0-10 kg/cm ² - Location: Anti-scalant dosing pump	Nos.	1	21,766.00	21,766.00	685.63	22,451.63	
13.40	0-10 kg/cm ² - Location: Anti-scalant dosing pump	Nos.	1	21,766.00	21,766.00	685.63	22,451.63	
13.50	0-10 kg/cm ² - Location: SMB5 dosing pump	Nos.	1	21,766.00	21,766.00	685.63	22,451.63	
13.60	0-10 kg/cm ² - Location: SMB5 dosing pump	Nos.	1	21,766.00	21,766.00	685.63	22,451.63	
13.70	0-10 kg/cm ² - Location: Poly dosing pump	Nos.	1	21,766.00	21,766.00	685.63	22,451.63	
13.80	0-10 kg/cm ² - Location: Poly dosing pump	Nos.	1	21,766.00	21,766.00	685.63	22,451.63	
14.00	Pressure Gauge (diaphragm seal type), accuracy of +/- 1% of FSD with snubber, pulsation dampener, gauge cock, etc for the high pressure line of Max. 100 Bar.							
14.01	0 to 2.5 kg/cm ² - Location: CIP pump discharge	Nos.	2	21,766.00	43,532.00	1,371.26	44,903.26	
14.02	0 to 2.5 kg/cm ² - Location: RO flushing pump discharge	Nos.	2	21,766.00	43,532.00	1,371.26	44,903.26	
14.03	0 to 2.5 kg/cm ² - Location: Acid unloading pump	Nos.	2	21,766.00	43,532.00	1,371.26	44,903.26	
14.04	0 to 2.5 kg/cm ² - Location: FeCl3 unloading pump	Nos.	2	21,766.00	43,532.00	1,371.26	44,903.26	
14.05	0 to 6 kg/cm ² - Location: Air blowers	Nos.	3	21,766.00	65,298.00	2,056.89	67,354.89	
14.06	0 to 6 kg/cm ² - Location: Back wash pumps	Nos.	2	21,766.00	43,532.00	1,371.26	44,903.26	
14.07	0 to 6 kg/cm ² - Location: Cartridge filter inlet	Nos.	1	21,766.00	21,766.00	685.63	22,451.63	
14.08	0 to 6 kg/cm ² - Location: Cartridge filter outlet	Nos.	1	21,766.00	21,766.00	685.63	22,451.63	
14.09	0 to 10 kg/cm ² - Location: FeCl3 dosing pump	Nos.	1	21,766.00	21,766.00	685.63	22,451.63	
14.10	0 to 10 kg/cm ² - Location: FeCl3 dosing pump	Nos.	1	21,766.00	21,766.00	685.63	22,451.63	
14.11	0 to 10 kg/cm ² - Location: Acid dosing pump	Nos.	1	21,766.00	21,766.00	685.63	22,451.63	

Chennai Metro Water Supply and Sewerage Board
400 MLD SWROD Plant for Chennai City

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit	Total Amount (INR)	Reference
14.12	0 to 10 kg/cm ² - Location: Acid dosing pump	Nos.	1	21,766.00	21,766.00	685.63	22,451.63	
14.13	0 to 15 kg/cm ² - Location: FRD booster pump	Nos.	17	21,766.00	370,022.00	11,655.69	381,677.69	
14.14	0 to 18 kg/cm ² - Location: Cartridge filter inlet	Nos.	17	21,766.00	370,022.00	11,655.69	381,677.69	
14.15	0 to 18 kg/cm ² - Location: Cartridge filter outlet	Nos.	17	21,766.00	370,022.00	11,655.69	381,677.69	
14.16	0 to 18 kg/cm ² - Location: High pressure pump suction	Nos.	17	21,766.00	370,022.00	11,655.69	381,677.69	
14.17	0 to 18 kg/cm ² - Location: High pressure pump discharge	Nos.	17	21,766.00	370,022.00	11,655.69	381,677.69	
14.18	0 to 18 kg/cm ² - Location: Dirty water transfer pump discharge	Nos.	3	21,766.00	65,298.00	2,056.89	67,354.89	
14.19	0 to 50 kg/cm ² - Location: RO booster pump	Nos.	17	21,766.00	370,022.00	11,655.69	381,677.69	
15.00	Pressure transmitter (diaphragm seal) with 4-20 mA (24V DC loop powered)/ profibus output, accuracy of + 0.075% or better with local digital display, etc for high pressure line of 100 Bar Max.							
15.10	0-4 kg/cm ² - Location: Lime clarification unit	Nos.	1	69,231.00	69,231.00	2,180.78	71,411.78	
15.20	0-4 kg/cm ² - Location: CIP pump discharge header	Nos.	1	69,231.00	69,231.00	2,180.78	71,411.78	
15.30	0-4 kg/cm ² - Location: RO flushing pump discharge	Nos.	1	69,231.00	69,231.00	2,180.78	71,411.78	
15.40	0-55 kg/cm ² - Location: High pressure pump suction	Nos.	17	69,231.00	11,76,927.00	37,073.20	12,14,000.20	
15.50	0-55 kg/cm ² - Location: High pressure pump discharge	Nos.	17	69,231.00	11,76,927.00	37,073.20	12,14,000.20	
15.60	0-55 kg/cm ² - Location: RO brine reject	Nos.	17	69,231.00	11,76,927.00	37,073.20	12,14,000.20	
15.70	0-75 kg/cm ² - Location: RO feed	Nos.	17	69,231.00	11,76,927.00	37,073.20	12,14,000.20	
16.00	Differential Pressure transmitter (diaphragm seal) with 4-20 mA (24V DC loop powered)/ profibus output, accuracy of + 0.075% or better with local digital display, etc for high pressure line of 90 Bar Max.							
16.10	0-1 kg/cm ² - Location: Across cartridge filter (sea water)	Nos.	17	84,615.00	14,38,455.00	45,311.33	14,83,766.33	
16.20	0-1 kg/cm ² - Location: Across cartridge filter (acid/ caustic)	Nos.	1	84,615.00	84,615.00	2,665.37	87,280.37	
17.00	Pressure Switch with diaphragm seal shall have pot free contact type micro switches of minimum rating of 5A, 230V AC, valves, etc.							
17.10	-1 to +1 Bar - Location: RO feed	Nos.	17	43,077.00	732,309.00	23,067.73	755,376.73	
17.20	-1 to +1 Bar - Location: RO brine reject	Nos.	17	43,077.00	732,309.00	23,067.73	755,376.73	
17.30	0-7.5 kg/cm ² - Location: On instrument air system	Nos.	1	33,846.00	33,846.00	1,066.15	34,912.15	
17.40	0-7.5 kg/cm ² - Location: On instrument air system	Nos.	1	33,846.00	33,846.00	1,066.15	34,912.15	
17.50	0-7.5 kg/cm ² - Location: Acid unloading pump discharge header	Nos.	1	33,846.00	33,846.00	1,066.15	34,912.15	
17.60	0-7.5 kg/cm ² - Location: FeCl3 unloading pump discharge header	Nos.	1	33,846.00	33,846.00	1,066.15	34,912.15	



BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
18.00	Online Automatic Silt Density Index monitoring system shall be microprocessor based with 4-20 mA (24V DC loop powered)/ profibus output with filters, local panels, battery with charger, facility for auto flushing, auto replacement of filters for each cycle, fault detection, contacts for alarms, etc. Range - 0 to 200 SDI Location: Common outlet of gravity dual media filter	Nos.	17	20,01,645.00	3,40,27,965.00	10,71,880.90	3,50,99,845.90	
19.00	Level Gauge (diaphragm seal type), accuracy of +/- 1% of FSD with snubber, pulsation dampener, gauge cock, etc for the high pressure line of Max. 100 Bar.							
19.10	0 to 6, 0 to 100 M, % - Location: CIP tank	Nos.	1	1,19,331.00	1,19,331.00	3,758.93	1,23,089.93	
19.20	0 to 6, 0 to 100 M, % - Location: Bulk acid storage tanks	Nos.	2	1,19,331.00	2,38,662.00	7,517.85	2,46,179.85	
19.30	0 to 6, 0 to 100 M, % - Location: Bulk FeCl3 storage tanks	Nos.	2	1,19,331.00	2,38,662.00	7,517.85	2,46,179.85	
20.00	Online oil analyzer consists of sensor element, transmitter and mounting assembly for range: 0-10 & 50 PPM. It shall be microprocessor based with 4-20mA isolated/ field bus output. It shall have local display facility, flow/ immersion fittings as applicable, calibration facility with its equipments, mounting arrangements, measuring cable between the sensor and transmitter, Isolation valve, etc.							
20.10	0 to 10 PPM - Location: Common DAF header	Nos.	1	18,46,154.00	18,46,154.00	58,153.85	19,04,307.85	
20.20	0 to 50 PPM - Location: Intake pump discharge header	Nos.	1	18,46,154.00	18,46,154.00	58,153.85	19,04,307.85	
21.00	Level Gauge (magnetic type) shall be with rustproof finish, vent & drain connection with all necessary accessories like safety ball check offset type gauge cocks, vent and drain connection (with 1/2" vent & drain valves), nipples, caps, etc				0.00	0.00	0.00	
21.01	0 to 1200 mm - Location: Acid dosing tank	Nos.	1	53,846.00	53,846.00	1,696.15	55,542.15	
21.02	0 to 1200 mm - Location: Acid dosing tank	Nos.	1	53,846.00	53,846.00	1,696.15	55,542.15	
21.03	0 to 1200 mm - Location: FeCl3 dosing tank	Nos.	1	53,846.00	53,846.00	1,696.15	55,542.15	
21.04	0 to 1200 mm - Location: FeCl3 dosing tank	Nos.	1	53,846.00	53,846.00	1,696.15	55,542.15	
21.05	0 to 1200 mm - Location: Anti-saccharin dosing tank	Nos.	1	53,846.00	53,846.00	1,696.15	55,542.15	
21.06	0 to 1200 mm - Location: Anti-saccharin dosing tank	Nos.	1	53,846.00	53,846.00	1,696.15	55,542.15	
21.07	0 to 1200 mm - Location: SMBs dosing tank	Nos.	1	53,846.00	53,846.00	1,696.15	55,542.15	
21.08	0 to 1200 mm - Location: SMBs dosing tank	Nos.	1	53,846.00	53,846.00	1,696.15	55,542.15	
21.09	0 to 1200 mm - Location: Poly dosing tank	Nos.	1	53,846.00	53,846.00	1,696.15	55,542.15	
21.10	0 to 1200 mm - Location: Poly dosing tank	Nos.	1	53,846.00	53,846.00	1,696.15	55,542.15	

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
7.00	CONTROL & INSTRUMENTATION CABLES							MR PG 243
7.10	1.1KV Grade Unscreened Armoured PVC Copper Cables	Mtrs	40,000.00	162.00	64,80,000.00	2,04,120.00	66,84,120.00	
7.10	2 x 1.5 sq.mm. (flexible)	Mtrs	30,000.00	200.00	60,00,000.00	1,89,000.00	61,89,000.00	
7.10	3 x 1.5 sq.mm.	Mtrs	50,000.00	242.00	1,21,00,000.00	3,81,150.00	1,24,81,150.00	
7.10	4 x 1.5 sq.mm.	Mtrs	2,500.00	284.00	7,10,000.00	22,365.00	7,32,365.00	
7.10	5 x 1.5 sq.mm.	Mtrs	1,85,000.00	325.00	6,01,25,000.00	18,93,937.50	6,20,18,937.50	
7.11	6 x 1.5 sq.mm.	Mtrs	8,000.00	389.00	31,12,000.00	98,028.00	32,10,028.00	
7.11	8 x 1.5 sq.mm.	Mtrs	2,500.00	517.00	12,92,500.00	40,713.75	13,33,213.75	
7.11	10 x 1.5 sq.mm.	Mtrs	7,000.00	596.00	41,72,000.00	1,31,418.00	43,03,418.00	
7.11	12 x 1.5 sq.mm.	Mtrs	7,000.00	678.00	47,46,000.00	1,49,499.00	48,95,499.00	
7.11	14 x 1.5 sq.mm.	Mtrs	8,500.00	1,018.00	86,53,000.00	2,72,569.50	89,25,569.50	
7.11	24 x 1.5 sq.mm.	Mtrs	6,500.00	212.00	13,78,000.00	43,407.00	14,21,407.00	
7.11	2 x 2.5 sq.mm.	Mtrs	2,000.00	340.00	6,80,000.00	21,420.00	7,01,420.00	
7.11	4 x 2.5 sq.mm.	Mtrs	2,000.00	463.00	9,26,000.00	29,169.00	9,55,169.00	
7.11	4 x 4.0 sq.mm.			0.00	0.00	0.00	0.00	
7.20	1.1KV Grade Screened Armoured PVC Copper Cables	Mtrs	2,500.00	33.00	82,500.00	2,598.75	85,098.75	
7.21	1 x 2 x 1.0 sq.mm.	Mtrs	23,000.00	64.00	14,72,000.00	46,368.00	15,18,368.00	
7.22	2 x 2 x 1.0 sq.mm.	Mtrs	500.00	39.00	19,50,000.00	614.25	20,114.25	
7.23	1 x 3 x 1.0 sq.mm.	Mtrs	35,000.00	70.00	24,50,000.00	77,175.00	25,27,175.00	
7.24	2 x 3 x 1.0 sq.mm.	Mtrs	35,000.00	169.00	59,15,000.00	1,86,322.50	61,01,322.50	
7.25	6 x 3 x 1.0 sq.mm.			0.00	0.00	0.00	0.00	
C	GENERAL (FOR BOTH ELECTRICAL & C&I EQUIPMENTS)							MR PG 123
1.00	FRP CABLE TRAYS							
1.10	Ladder type Pre-fabricated trays (standard length 3 mtrs)	Mtrs	3,000.00	397.00	11,91,000.00	37,516.50	12,28,516.50	
1.11	150mm wide ("C" Channel Size:75x25x3 mm Th.)	Mtrs	7,000.00	539.00	37,73,000.00	1,18,849.50	38,91,849.50	
1.12	300mm wide ("C" Channel Size:75x25x4 mm Th.)	Mtrs	6,000.00	614.00	36,84,000.00	1,16,046.00	38,00,046.00	

**Chennai Metro Water Supply and Sewerage Board
400 MLD SWROD Plant for Chennai City**

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
1.14	600mm wide ("C" Channel Size:100x35x4 mm Th.)	Mtrs	8,500.00	796.00	67,66,000.00	2,13,129.00	69,79,129.00	
1.15	750mm wide ("C" Channel Size:100x35x4 mm Th.)	Mtrs	1,500.00	860.00	12,90,000.00	40,635.00	13,30,635.00	
1.16	FRP Joining Coupler Plate Size: 200x50x3mm thick with 4 Sets of SS304 hardware Size: M 6x25mm.	Nos.	10,500.00	52.00	5,46,000.00	17,199.00	5,63,199.00	
1.17	FRP Joining Coupler Plate Size: 200x70x3mm thick with 8 Sets of SS304 hardware Size: M 6x25mm.	Nos.	6,500.00	77.00	5,00,500.00	15,765.75	5,16,265.75	
1.20	Perforated type Pre-fabricated trays (standard length 3 mtrs)				0.00	0.00	0.00	
1.21	50mm wide x 30mm height x 3mm thickness	Mtrs	1,000.00	122.00	1,22,000.00	3,843.00	1,25,843.00	
1.22	100mm wide x 50mm height x 3mm thickness	Mtrs	1,500.00	212.00	3,18,000.00	10,017.00	3,28,017.00	
1.23	150mm wide x 50mm height x 3mm thickness	Mtrs	12,500.00	263.00	32,87,500.00	1,03,556.25	33,91,056.25	
1.24	300mm wide x 50mm height x 4mm thickness	Mtrs	2,500.00	546.00	13,65,000.00	42,997.50	14,07,997.50	
1.25	FRP Joining Coupler Plate Size: 200x50x3mm thick with 4 Sets of SS304 hardware Size: M 6x25mm.	Nos.	10,000.00	52.00	5,20,000.00	16,380.00	5,36,380.00	
2.00	EARTHING, GROUNDING AND LIGHTNING PROTECTION							
2.10	Earthing & Grounding							
2.10	75 x 8 mm Gi Flat	Mtrs	400.00	650.00	2,60,000.00	8,190.00	2,68,190.00	
2.10	75 x 6 mm Gi Flat	Mtrs	20,000.00	500.00	1,00,00,000.00	3,15,000.00	1,03,15,000.00	
2.10	50 x 8 mm Gi Flat	Mtrs	400.00	450.00	1,80,000.00	5,670.00	1,85,670.00	
2.10	50 x 6 mm Gi Flat	Mtrs	9,600.00	400.00	38,40,000.00	1,20,960.00	39,60,960.00	
2.11	50 x 6 mm Cu Flat	Mtrs	4,700.00	1,250.00	58,75,000.00	1,85,062.50	60,60,062.50	
2.11	40 x 5 mm Gi Flat	Mtrs	100.00	250.00	25,000.00	787.50	25,787.50	
2.11	25 x 6 mm Gi Flat	Mtrs	100.00	150.00	15,000.00	472.50	15,472.50	
2.11	25 x 3 mm Aluminium strip along with cable tray	Mtrs	25,000.00	135.00	33,75,000.00	1,06,312.50	34,81,312.50	
2.11	25 x 3 mm Gi Flat	Mtrs	15,500.00	135.00	20,92,500.00	65,913.75	21,58,413.75	
2.11	4 SWG Gi wire	Mtrs	1,000.00	30.00	30,000.00	945.00	30,945.00	
2.11	6 SWG Gi wire	Mtrs	500.00	35.00	17,500.00	551.25	18,051.25	
2.11	8 SWG Gi wire	Mtrs	4,000.00	45.00	1,80,000.00	5,670.00	1,85,670.00	
2.11	10 SWG Gi wire Providing & fixing of state of the art Earth Testing Station at 1200 mm above Finished Floor Level.	Mtrs	100.00	60.00	6,000.00	189.00	6,189.00	3,29,254.80
		Nos.	76.00	4,200.00	3,19,200.00	10,054.80		



**Chennai Metro Water Supply and Sewerage Board
400 MLD SWROD Plant for Chennai City**

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
2.12	Earth Pits							
a	Treated earth pit with 1200 x 1200 x 12 mm Cu plate and 16 mm dia copper electrode	Nos.	100.00	28,000.00	28,00,000.00	88,200.00	28,88,200.00	
b	Transformer & DG Set Neutral: 600x600x6mm Cu Plate Earth	Nos.	86.00	22,000.00	18,92,000.00	59,598.00	19,51,598.00	
c	Transformer, DG Set and MV Panels / Motors Body: 600x600x6mm GI Plate Earth	Nos.	234.00	16,500.00	38,61,000.00	1,21,621.50	39,82,621.50	
d	3500 mm x 38 mm dia GI pipe Earth Pits for LV VFD / Motors / MLPPDB / ALPDB / Feeder Pillars & Isolation Transformers	Nos.	58.00	9,500.00	5,51,000.00	17,356.50	5,68,356.50	
e	Earth Pits for Electronic Equipment etc. 3000 mm length x 16 mm dia Cu Coated 300 x 6000 mm dia. earth pits duly filled with black cotton soil & ground enhancement materials with 15 ohm-cms resistivity value.	Nos.	96.00	14,500.00	13,92,000.00	43,848.00	14,35,848.00	
f	Supply and Installation of Advance Maintenance Free JMV 1730 environment friendly Chemical Earthing system consisting of 3 no. of 3 mtr length, 17 mm dia. earth electrode made of high tensile low carbon steel circular rods, molecularly bonded copper on outer surface (minimum copper bonding thickness-250 microns) with terminals to connect incoming strips with 6 bags (25 Kgs each) of environment friendly JAM FILL compound and it must be tested from Spectro Lab. FRP earth pit chamber (300mm x 300mm) for DCS / PCS / UPS / Instruments	Set	34.00	28,000.00	9,52,000.00	29,988.00	9,81,988.00	
2.12	Common Earth Bus Bar for electrical equipment earthing 200x10 Cu flat, 1500 mm long with tapped holes or studs at 80 mm staggered pitch and 4 nos. 1.1 kV insulator blocks. The Grid Earth Plate shall be placed near Panels.	Nos.	16.00	8,500.00	1,36,000.00	4,284.00	1,40,284.00	
2.12	Common earth bus bar for electronic earthing 100x6 Cu flat 300 mm long with 2 nos. 1.1 kV insulator blocks	Nos.	16.00	6,500.00	1,04,000.00	3,276.00	1,07,276.00	
2.12	30 x 5mm Cu strips from Cu earth pits to the Earthing Grid. Each Earthing Grid plate shall have 4-earth pit connections	Mtrs	650.00	950.00	6,17,500.00	19,451.25	6,36,951.25	
2.12	1C x 185 sq mm Insulated Armoured Copper cables from earth stations to Earthing Grid Plates in HDPE Pipes.	Mtrs	800.00	1,125.00	9,00,000.00	28,350.00	9,28,350.00	
2.12	1C x 70 sq mm Insulated Unarmoured Copper Cables	Mtrs	11,000.00	450.00	49,50,000.00	1,55,925.00	51,05,925.00	
2.12	1C x 50 sq mm Insulated Unarmoured Copper Cables	Mtrs	500.00	390.00	1,95,000.00	6,142.50	2,01,142.50	
2.12	1C x 35 sq mm Insulated Unarmoured Copper Cables	Mtrs	200.00	320.00	64,000.00	2,016.00	66,016.00	

Chennai Metro Water Supply and Sewerage Board
400 MLD SWROD Plant for Chennai City

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

S. No.	Item Description	Unit	Qty	Unit Rate Supply (INR)	Amount Supply (INR)	Packing, Forwarding, Transport and Transit Insurance	Total Amount (INR)	Reference
2.20	Lightning Protection							
2.20	Level-3 early streamers for protection level 62 mtr dia & 99 mtr dia protection complete with fixing clamp for the roof 1-1X70 sqmm Cu cable in pipe to earth testing station & chemical earth pits.							
2.20	ESE Lightning Arrestor							
2.20	Supply of LPS from Type-III Ion Streamer 1.0 Early Streamer Emission type Lightning Protection complete with the Lightning Air Terminal made of lead coated copper based on pro-active Early Streamer Emission (ESE) Technology. Device shall emit electromagnetic impulse in the form of a controlled emission of streamers into the air microseconds earlier than naturally formed streamers. Device shall confirm to NFC17-102 standards and must be CPR1 tested. Appropriate mounting arrangement like insulator at top of Mast should be there. The device mounted at 5 meter clear to the highest point on the roof top.							
a	3 mtr tall Mast with Insulator suitable for LA and appropriate for 3 meter mast to insulate the LA and mast.	Set	29.00	1,10,000.00	31,90,000.00	1,00,485.00	32,90,485.00	
b	5 mtr tall Mast with Insulator suitable for LA and appropriate for 3 meter mast to insulate the LA and mast.	Set	9.00	1,45,000.00	13,05,000.00	41,107.50	13,46,107.50	
2.20	Lightning Strike Recorder - (6 digits display) BDL-6D of not resettable type in an IP 67 enclosure with the minimum sensitivity of 1500A & maximum capacity of 220 kA (8/20 micro second waveform)	Set	76.00	30,000.00	22,80,000.00	71,820.00	23,51,820.00	
2.20	One Side Down conductor of 70 sq.mm single core insulated flexible Copper cable with necessary accessories, etc	Mtrs	5,700.00	890.00	50,73,000.00	1,59,799.50	52,32,799.50	
2.21	Porcelain Insulators	Nos.	145.00	281.00	40,745.00	1,283.47	42,028.47	
2.21	25 x 3 Cu Flat	Mtrs	4,750.00	850.00	40,37,500.00	1,27,181.25	41,64,681.25	
2.21	50 x 6 Cu flat	Mtrs	200.00	1,150.00	2,30,000.00	7,245.00	2,37,245.00	
2.21	Treated earth pit with 1200 x 1200 x 12 mm Cu plate and 16 mm dia copper electrode - Electronic Type	Nos.	145.00	28,000.00	40,60,000.00	1,27,890.00	41,87,890.00	

BUDGET FOR ELECTRICAL AND C&I EQUIPMENTS

Item	Description	Unit	Unit Price (INR)	Quantity	Amount with out Tax (INR)	Source
CP-2. Construction of Pumping station and reservoirs						
2a. Porur pumping station						
(1) Civil work						
Construction of Pump house and 45m x 15m Electrical bulding (Civil works) including all civil, water supply, sanitary and all allied works etc., complete	m ²	20270.00	675		1,36,82,250	CMWSSB SoR Rate Analysis
Foundation Pile 450 mm	RC pile, 400 mm dia, 33 piles x 23 m	m	4,970	759	37,72,230	RA
(2) Mechanical Work					1,74,54,480	
Supply & delivery of Centrifugal pump with motor with SS impeller of duty x235kW 42000 lpm against a total head of 25m with all accessories	Nos.	37,00,000	6		2,22,00,000	Market Rate - Quotation
Supply and delivery of 2Nos. 315HP x 6 Nos = 1890 HP transformers of 2 MVA capacity each for full capacity with HT panels and DG set of 2.5 MVA to operate the plant during TNB power failure, necessary control panels, Motor Control Centre, power and control cables, earthing, safety equipment, tools, etc., complete. -one set	HP	18,254	1,890		3,45,00,000	
Butterfly valve of 600 mm dia PN 16	Automatic	Nos.	2,77,283	6	16,63,700	TWAD 16-17, pg-74
Butterfly valve of 600 mm dia	Manual	Nos.	1,64,886	12	19,78,632	CMWSSB SoR 2016-17 Civil S No.4 (14) Pg. No.154
Check valve of 600 mm dia PN 16		Nos.	6,95,007	6	41,70,043	TWAD 16-17, pg-74
MS pipe 1600 mm dia	m	37,620.95	800		3,00,96,760	TWAD, pg-63
Laying, jointing, Hydrostatic field Test pressure	m	6,713.58	800		53,70,864	TWAD, pg-197, 206
Providing SCADA System for new & existing system	set	2,00,00,000.0	1.0		2,00,00,000	
Providing crane	Nos.	90,00,000.0	1.0		90,00,000	
(3) Others					12,89,79,999	
Erection of E&M equipments - 5%			64,49,000.0	1.0	64,49,000	
Commissioning of E&M equipments - 5%			64,49,000.0	1.0	64,49,000	
					Total	15,93,32,479

CIVIL WORK COST ESTIMATE FOR 400 MLD

Construction of Chlorinator room at Porur				PORUR CHLORINATION BUILDING (10 W x 12 L)m		Reference as per CPWD SOR 2016-17	Reference as per CMWSSB 2016-17
Sl.No	Description	Unit	Rates/unit	Qty	Amount		
1	Excavation in soft/sandy soils including dewatering, disposal of excavated earth up to 1 Km						
0 -2.0 m	M ³	122.40	481	58846			
2.0 -3.0 m	M ³	134.40	288	38769		Schedule No. 31	
3.0 -4.0 m	M ³	146.60	192	28192		Pg. No. 35	
2	P.C.C. M10	M ³	4090.00	86	350258		
3	450 Dia Pile (33piles x 23 m)	RM	4970.00	759	3772230		
4	Concrete					RA	
(a)	M35 WITH W.P.C (Water and non water Retaining Structures)	M ³	7523.55			Item No. 5.33.2+5.34.2+5.35 Pg. No. 102	
(b)	M30 For Building	M ³	7386.83	591	4362172	Item No. 5.33.2+5.34.1+5.35 Pg. No. 102	
5	Fusion bonded epoxy painted Steel Reinforcement(i/c cutting,bending and placing)	MT	74700.00	71	5339982		
6	Formwork(Steel/WP Ply)	M ²				Item No. 4.19.2 Pg. No. 95 + Item No. 22 a Pg. No. 91	
(a)	Plane	M ²	888.00	3574	3173965	Item No. 4.20 Pg. No. 95	
7	Plinth Protection 750 mm wide all around the building	RM	450.35	94	42514	Item No. 4.17 Pg. No. 90	
8	250 x 150 mm deep Drain along plinth protection	RM	810.00	100	81000 RA		
9	DPC - 50 MM THK 1:2:4	RM	460.10	100	46010	Item No. 4.11, 4.12, 4.13 Pg. No. 90	


Executive Engineer (Design)
 Chennai Metropolitan Water Supply
 Sewerage & Drainage Corporation
 Chennai

SI.NO	DESCRIPTION	UNIT	Rates/unit	Qty	Amount	
10	Outside plastering - 20 thk. (1:4) WITH W.P.C	M ²	304.00	650	197600	Item No. 11.7 Pg. No.104
11	Inside plastering - 20 thk. (1:3) WITH W.P.C	M ²	322.00	875	281798	Item No. 11.6 Pg. No.104
12	Ceiling plastering - 6 thk (1:3)	M ²	205.20	577	118434	Item No. 11.11 Pg. No.104
13	Aluminum Doors /windows	M ²	6500.00	76	494000	Item No. 6 Pg. No. 124
14	Rolling shutter(MS epoxy painted)	M ²	5080.00	42	214986	Item No. 5 Pg. No. 124
15	Steel ventilators	M ²	3297.00	30	98959	Item No. 1 Pg. No. 121
16	Ceiling - OBD	M ²	74.00	577	42710	Item No. 13.11 Pg. No.105
17	OBD - Internal walls	M ²	76.00	875	66511	Item No. 13.6 Pg. No.105
18	cPVC Rainwater pipes (100 dia)	RM	985.00	135	132975	Item No. 8644 Pg. No.317
19	Roof treatment	M ²	459.65	577	265294	Item No. 22.15 Pg. No.384 + Item No. 12.56 Pg. No. 220
20	Acid Alkali Floor	M ²	1073.35	750	805013	Item No. 11.21 Pg. No.194
21	Non Skid Ceremic tile Flooring	M ²	660.20	120	79224	Item No. 11.37/A Pg. No.196
22	Rubble soling	M ³	499.65	124	61957	Item No. 16.11 Pg. No.266
23	230 thk Brickwork (1:3)	M ³	6273.00	288	1803488	Item No.5.19 Pg. No.99
24	115 thk Brickwork (1:3)	M ³	7877.00	6	47262	Item No.5.11 Pg. No. 98 + Item No.5.19 Pg. No. 99
25	Cement wash (2 coats)	M ²	92.00	750	69000	Item No.13.12 Pg. No.105
26	Sand filling	M ³	594.00	100	59430	Item No.3.3 Pg. No.92
27	Hand Rail SS	m	472.40	50	23620	Item No. 10.28 Pg. No.185
28	IPS Flooring	M ²	1883.00	30	56490	MR & Executive Engineer Executive Water Supply & Chennai Metropolitan Board Sewerage Board Chennai - 600 002.

CP-3 COST ESTIMATE FOR 400 MLD						
Item	Description	Quantity	Unit	Rate INR	Amount (INR) without tax	Reference
CP-3 Installation of Product water transmission mains						
CP-3-1 (L=17,000 m)						
A. Open Cut						
(1) Earth work						
Cutting asphaltic concrete road	Bus route	44,200	m2	171.00	75,58,200.00	CMWSSB SoR 2016-17 SECTION -1, No.37
	Non bus route	23,800	m2	85.00	20,23,000.00	CMWSSB SoR 2016-17 SECTION -1, No.37
	Sheet pile including walling and strut	1,700	m	5,925.90	1,00,74,030.00	Vide separate calculation based on CMWSSB rates
Excavation	0-2 m	1,112,200	m3	122.40	1,37,33,280.00	CMWSSB SoR 2016-17 SECTION -1, S.No.31
	2-3 m	68,000	m3	134.40	91,39,200.00	CMWSSB SoR 2016-17 SECTION -1, S.No.31
	3-4 m	13,600	m3	146.60	19,93,760.00	CMWSSB SoR 2016-17 SECTION -1, S.No.31
Backfilling with excavated earth		1,64,220	m3	21.50	35,30,730.00	DSR 2.25, 2.26.1 Pg. No. 79
Disposal of excess earth	Loading, conveying to Perur DSP, unloading	77,180	m3	287.60	2,21,96,968.00	DSR 1.1.2 Pg. No. 68
Dewatering	including motor and fuel fee	8,450	hr	213.80	18,06,610.00	CMWSSB SoR 2016-17 SECTION -2, S.No.6L
(2) Pipe Installation work						
MS pipe of 2000 dia	including internal & external lining and delivery	16,900	m	54,993.60	92,93,91,840.00	TWAD BOARD SOR 2016-17, Sno 10.1, 67
Pipe laying, Jointing, Hydrostatic Filed Test Pressure	CP-3-1000 dia	16,900	m	6,714.58	11,34,76,402.00	TWAD BOARD SOR 2016-17, Sno 2 Pg. No. 221 + Sno 11e Pg. No. 206 + Sno 8e Pg. No. 202 + Sno 7d Pg. No. 197
2) Valve						
Air valve	D-200mm	17	set	59,025.00	10,03,425.00	TWAD BOARD SOR 2016-17, Sno 12.4 (5) Pg. No. 70
Butterfly valve	2000 mm dia	5	set	66,08,212.00	3,30,41,060.00	Telangana SOR 16-17, Pg-512
Scour Valve	1200 mm dia	8	set	9,87,738.75	79,01,910.00	TWAD BOARD SOR 2016-17, Sno 12 (21) Pg. No. 67
3) MS Specials for all bends, expander, reducer, flanges, tee for all valves etc	Taken at 6.4kg per m length of pipe	1,08,160	kg	83.33	90,12,972.80	TWAD BOARD SOR 2016-17, Sno 10.2 (1) Pg. No. 64
4) Thrust Blocks						
Thrust Block for 2000mm MS 90 DEG BEND 9.2m x 5.0m x 3.8m		4	no	5,96,100.00	23,84,400.00	
Thrust Block for 2000mm MS 60 DEG BEND 6.9m x 4.0m x 3.8m		6	no	4,27,600.00	25,65,600.00	Rate Analysis
Thrust Block for 2000mm MS 45 DEG BEND 5.3m x 4.0m x 3.8m		9	no	3,40,400.00	30,63,600.00	
Thrust Block for 2000mm MS 22.5 DEG BEND 2.0m x 2.0m x 2.3m		8	no	1,83,500.00	14,68,000.00	
5) Backfillation on both sides of the trench		33,800	m	53.00	17,91,400.00	CMWSSB SoR 2016-17
6) Supplying and driving ventek wood bearing piles of 150mm x 150mm size (including cost of materials)	5% of the length	155	(Pessal) Executive Engineer (Pessal) Metropolitain Water Supply & Sewerage Board	47,365.90	73,20,184.55	Rate Analysis
7) Dismantling stone or brick masonry works	Taken at 0.5% of total pipe length	141.10		11,993.50	CMWSSB Item No. 1.1.4 Pg. No.88	Chennai - 600 002.

Item	Description	Quantity	Unit	Rate INR	Amount (INR) without tax	Reference
8) Dismantling R.C.C works	Taken at 0.125% of total pipe length	22	m3	3,674.00	80,828.00	CMWSSB Item No. 1.2.2 Pg. No.88
9) Valve chamber						
Air Valve chamber		17	nos	1,86,167.00	31,64,839.00	
Butterfly valve chamber		5	nos	4,38,408.00	21,92,040.00	Rate Analysis
Scour Butterfly valve chamber		8	nos	2,85,458.00	22,83,664.00	
(3) Miscellaneous Work						
Road Restoration Charges	Bus route	44,200	m2	4,005.00	17,70,21,000.00	As provided by GCC
	Non bus route	23,800	m2	2,745.00	6,53,31,000.00	
B. Pipe Jacking						
	Pipe jacking method of 2500 mm dia	80	m	2,79,815.00	2,23,85,200.00	Trenchless Society Item No.2.4.7.3 Pg. No. 54
	including setting and driving works					
	including internal & external lining and delivery	80	m	84,786.00	67,82,880.00	TWAD BOARD SOR 2016-17, Sno 10.1.
C. Pipe Bridge						
	Pipe bridge D:2000	1,700	m	1,06,100.00	18,03,70,000.00	Rate Analysis
				Sub-Total	1,64,41,00,016.8	

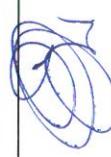


Executive Engineer (Desai)
Chennai Metropolitan Water Supply &
Sewerage Board
Chennai - 600 002.

Item	Description	Quantity	Unit	Rate INR	Amount (INR) without tax	Reference
CP 3-2 (L=21,550 m)						
A. Open Cut						
(1) Earth work						
Cutting asphaltic concrete road	Bus route	49,500	m2	171.00	84,64,500.00	CMWSSB SoR 2016-17 SECTION -1, No.37
	Non bus route	26,700	m2	85.00	22,69,500.00	CMWSSB SoR 2016-17 SECTION -1, No.37
Sheet pile including wailing and strut	5% of total length	2,155	m	5,925.90	1,27,70,314.50	Vide separate calculation based on CMWSSB rates
Excavation	0-2 m	1,25,730	m3	122.40	1,53,89,352.00	CMWSSB SoR 2016-17 SECTION -1, S.No.31
	2-3 m	68,200	m3	134.40	91,66,080.00	CMWSSB SoR 2016-17 SECTION -1, S.No.31
	3-4 m	13,240	m3	146.60	19,40,984.00	CMWSSB SoR 2016-17 SECTION -1, S.No.31
Backfilling with excavated earth	1,77,948 m3			21.50	38,25,882.00	DSR 2.25, 2.26.1 Pg. No. 79
Disposal of excess earth	Loading, conveying to Perur DSP, unloading	82,562	m3	287.60	2,37,44,831.20	DSR 1.1.2 Pg. No. 68
Dewatering	including motor and fuel fee	10,775	hr	213.80	23,03,695.00	CMWSSB SoR 2016-17 SECTION 2, S.No.6L
(2) Pipe Installation work						
1) Pipe						
	including internal & external lining and delivery	5,000	m	17,640.55	8,82,02,750.00	TWAD BOARD SOR 2016-17, Sno 10.1.48
	including internal & external lining and delivery	16,550	m	54,993.60	91,01,44,080.00	TWAD BOARD SOR 2016-17, Sno 10.1. 67
	for 1000 mm dia	5,000	m	5,611.45	2,80,57,250.00	TWAD BOARD SOR 2016-17, Sno 21 + Sno 11e Pg. No. 206 + Sno 8e Pg. No. 202 + Sno 7d Pg. No. 197
Laying, Jointing, Hydrostatic Filed Test Pressure	Laying, Jointing, Hydrostatic Filed Test Pressure for 2000 mm dia	16,550	m	6,714.58	11,11,26,299.00	TWAD BOARD SOR 2016-17, Sno 2 Pg. No. 221 + Sno 11e Pg. No. 206 + Sno 8e Pg. No. 202 + Sno 7d Pg. No. 197
2) Valve						
Air valve	150 mm , PN 16, supply and delivery included	5	nos.	50,592.00	2,52,960.00	TWAD BOARD SOR 2016-17, Sno 12.4 (4) Pg. No. 70
Air valve	200 mm, supply and delivery included	15	nos.	59,025.00	8,85,375.00	TWAD BOARD SOR 2016-17, Sno 12.4 (5) Pg. No. 70
Butterfly valve	1000 mm dia, PN 16	2	nos.	9,18,489.00	18,36,978.00	Telangana SOR 16-17, Pg-512
Butterfly valve	2000 mm dia	5	nos.	66,08,212.00	3,30,41,060.00	Telangana SOR 16-17, Pg-512
Scour Valve	700 mm dia	2	set	2,72,814.35	5,45,628.70	TWAD BOARD SOR 2016-17, Sno 12 (21) Pg. No. 67
Scour Valve	1200 mm dia	10	set	9,87,738.75	98,77,387.50	TWAD BOARD SOR 2016-17, Sno 12 (21) Pg. No. 67
3) MS Specials for all bends, expander, reducer, flanges, tee for all valves etc	Taken at 6.4kg per m length of pipe	1,37,971	kg	83.33	1,14,97,140.10	TWAD BOARD SOR 2016-17, Sno 10.2 (1) Pg. No. 64

Engineer (Detail)
Executive Engineer Water Supply &
Executive Metropolitan Board
Chennai Metropoitan Board
Severage, 002.
Chennai - 600 002.

Item	Description	Quantity	Unit	Rate INR	Amount (INR) without tax	Reference
4A) Thrust Blocks						
Trust Block for 2000mm MS 90 DEG BEND 9.2m x 5.0m x 3.8m		4	no	5,96,100.00	23,84,400.00	
Trust Block for 2000mm MS 60 DEG BEND 6.9m x 4.0m x 3.8m		6	no	4,27,600.00	25,65,600.00	Rate Analysis
Trust Block for 2000mm MS 45 DEG BEND 5.3m x 4.0m x 3.8m		9	no	3,40,400.00	30,63,600.00	
Trust Block for 2000mm MS 22.5 DEG BEND 2.0m x 2.0m x 2.3m		8	no	1,83,500.00	14,68,000.00	
4B) Thrust Blocks						
Trust Block for 1000mm MS 90 DEG BEND 2m x 2m x 2.4m		2	no	41,222.00	82,444.00	
Trust Block for 1000mm MS 60 DEG BEND 2m x 2.7m x 2m		2	no	40,550.00	81,100.00	Rate Analysis
Trust Block for 1000mm MS 45 DEG BEND 2m x 2.5m x 1.8m		2	no	20,489.00	40,978.00	
Trust Block for 1000mm MS 22.5 DEG BEND 1.3m x 1.5m x 1.5m		4	no	11,777.00	47,108.00	
5) Barrication on both sides of the trench		43,100	m	53.00	22,84,300.00	CMWSSB SoR 2016-17
6) Supplying and driving ventek wood bearing piles of 150mm x 150mm size (including cost of materials)		196	no	47,365.90	92,79,410.41	Rate Analysis
7) Dismantling stone or brick masonry works	Taken at 0.5% of total pipe length	108	m3	141.10	15,238.80	CMWSSB Item No. 1.1.4 Pg. No.88
8) Dismantling R.C.C works	Taken at 0.125% of total pipe length	27	m3	3,674.00	99,198.00	CMWSSB Item No. 1.2.2 Pg. No.88
9) Valve chamber						
Air Valve chamber		5	nos	93,192.00	4,65,960.00	
Air Valve chamber		15	nos	1,86,167.00	27,92,505.00	
Butterfly valve chamber		2	nos	2,28,078.00	4,56,156.00	Rate Analysis
Butterfly valve chamber		5	nos	4,38,408.00	21,92,040.00	
Scour Butterfly valve chamber		2	nos	1,87,158.00	3,74,316.00	
Scour Butterfly valve chamber		10	nos	2,85,458.00	28,54,580.00	
(3) Miscellaneous Work						
Road Restoration Charges		49,500	m2	4,005.00	19,82,47,500.00	
Bus route		26,700	m2	2,745.00	7,32,91,500.00	As provided by GCC
Non bus route						
	Sub-Total				1,57,74,27,981.2	


 Executive Engineer (Desai)
 Chennai Metropolitan Water Supply &
 Sewerage Board
 Chennai - 600 002.

Item	Description	Quantity	Unit	Rate INR	Amount (INR) without tax	Reference
CP 3-3 (L=14,550 m)						
A. Open Cut						
(1) Earth work						
Cutting asphaltic concrete road	Bus route	25,820	m ²	171.00	44,15,220.00	CMWSSB SoR 2016-17 SECTION -1, No.37
	Non bus route	28,100	m ²	85.00	23,88,500.00	CMWSSB SoR 2016-17 SECTION -1, No.37
Sheet pile including walling and strut	10% of total length	1,455	m	5,925.90	86,22,184.50	Vide separate calculation based on CMWSSB rates
Excavation	0.2 m	88,968	m ³	122.40	1,08,89,683.20 S.No.31	CMWSSB SoR 2016-17 SECTION -1, S.No.31
	2.3 m	48,952	m ³	134.40	65,79,148.80 S.No.31	CMWSSB SoR 2016-17 SECTION -1, S.No.31
	3.4 m	40	m ³	146.60	5,864.00 S.No.31	CMWSSB SoR 2016-17 SECTION -1, S.No.31
Backfilling with excavated earth	1	1,23,479	m ³	21.50	26,54,798.50	DSR 2.25, 2.26, 1 Pg. No. 79
Disposal of excess earth	Loading, conveying to Perur DSP, unloading including motor and fuel fee	52,225	m ³	287.60	1,50,19,910.00	DSR 1.1, 2 Pg. No. 68
Dewatering		7,275	hr	213.80	15,55,395.00	CMWSSB SoR 2016-17, Section-2, S.No.61
(2) Pipe Installation work						
1) Pipe	Manufacture, supply and delivery for M.S. pipe of 1600 mm dia	6,550	m	37,620.95	24,64,17,222.50 61	TWAD BOARD SOR 2016-17, Sno 10.1.
	ditto	6,550	m	6,714.58	4,39,80,499.00 No. 221 + Sno 11e Pg. No. 206 + Sno 8e Pg. No. 202 + Sno 7d Pg. No. 197	TWAD BOARD SOR 2016-17, Sno 2 Pg. No. 221+Sno 11e Pg. No. 206+Sno 8e Pg. No. 202 + Sno 7d Pg. No. 197
Laying, Jointing, Hydrostatic Filed Test Pressure	for M.S. pipe of 1800 mm dia	7,650	m	44,768.75	34,24,80,937.50 64	TWAD BOARD SOR 2016-17, Sno 10.1.
Manufacture, supply and delivery	ditto	7,650	m	6,314.47	4,83,05,695.50 No. 221+Sno 11e Pg. No. 206+Sno 8e Pg. No. 202 + Sno 7d Pg. No. 197	TWAD BOARD SOR 2016-17, Sno 2 Pg. No. 221+Sno 11e Pg. No. 206+Sno 8e Pg. No. 202 + Sno 7d Pg. No. 197
Laying, Jointing, Hydrostatic Filed Test Pressure						
2) Valve	200 mm, supply and delivery included	18	nos.	59,025.00	10,62,450.00 (5) Pg. No. 70	TWAD BOARD SOR 2016-17, Sno 12.4
Air valve	1600 mm dia	8	nos.	31,53,850.00	2,52,30,880.00	Telangana SOR 16-17, Pg-512
Butterfly valve	1800 mm dia	3	nos.	38,68,391.00	1,16,05,173.00	Telangana SOR 16-17, Pg-512
	1000 mm dia	6	set	6,35,563.30	38,13,379.80 (21) Pg. No. 67	TWAD BOARD SOR 2016-17, Sno 12
Scour Valve	3) MS Specials for all bends, expander, reducer, flanges, tee for all valves etc	90,880	kg	83.33	75,73,030.40 (1) Pg. No. 64	TWAD BOARD SOR 2016-17, Sno 10.2


Engineer (Desai)
Executive Engineer Water Supply &
Executive Metropolitan Board
Chennai Metropolitan Board
Sewerage 002.
Chennai - 600 002.

Item	Description	Quantity	Unit	Rate INR	Amount (INR) without tax	Reference
4A) Thrust Blocks						
Trust Block for 1800mm MS 90 DEG BEND 6.4m x 4.0m x 3.5m		2	no	4,98,900.00	9,97,800.00	
Trust Block for 1800mm MS 60 DEG BEND 4.6m x 4.0m x 3.5m		3	no	3,44,600.00	10,33,800.00	Rate Analysis
Trust Block for 1800mm MS 45 DEG BEND 3.6m x 3.5m x 3.5m		4	no	2,66,900.00	10,67,600.00	Rate Analysis
Trust Block for 1800mm MS 22.5 DEG BEND 1.75m x 2m x 2m		7	no	1,47,800.00	10,34,600.00	
4B) Thrust Blocks						
Trust Block for 1600mm MS 90 DEG BEND 5.4m x 3.8m x 3.3m		2	no	2,91,500.00	5,83,000.00	
Trust Block for 1600mm MS 60 DEG BEND 3.8m x 3.8m x 3.3m		3	no	2,09,000.00	6,27,000.00	Rate Analysis
Trust Block for 1600mm MS 45 DEG BEND 3.5m x 3.5m x 3.0m		4	no	1,62,400.00	6,49,600.00	Rate Analysis
Trust Block for 1600mm MS 22.5 DEG BEND 1.75m x 1.8m x 1.8m		6	no	90,600.00	5,43,600.00	
5) Barrication on both sides of the trench		28,400	m	53.00	15,05,200.00	CMWSSB SoR 2016-17
6) Supplying and driving ventek wood bearing piles of 150mm x 150mm size (including cost of materials)						
a) 1800 mm dia for 760m	5% of length	69	no	46,200.78	31,92,053.89	Rate Analysis
b) 1600 mm dia for 6950	5% of length	63	no	45,035.67	28,45,435.51	Rate Analysis
7) Dismantling stone or brick masonry works	Taken at 0.5% of total pipe length	71	m3	141.10	10,018.10	CMWSSB Item No. 1.1.4 Pg. No.88
8) Dismantling R.C.C works	Taken at 0.125% of total pipe length	18	m3	3,674.00	66,132.00	CMWSSB Item No. 1.2.2 Pg. No.88
9) Valve chamber						
Air Valve chamber	for 1600 mm dia	11	nos.	1,44,900.00	15,93,900.00	
Air Valve chamber	for 1800 mm dia	7	nos.	1,77,670.00	12,43,690.00	
Butterfly valve chamber	for 1600 mm dia	8	nos.	3,23,487.00	25,87,896.00	Rate Analysis
Butterfly valve chamber	for 1800 mm dia	3	nos.	4,12,184.00	12,36,552.00	
Scour valve chamber	1000 mm dia	6	nos.	1,87,158.00	11,22,948.00	
(3) Miscellaneous Work						
Road Restoration Charges	Bus route	28,000.0	m2	4,005.00	11,21,40,000.00	
	Non bus route	30,200.0	m2	2,745.00	8,28,99,000.00	As provided by GCC
B. Pipe jacking						
Pipe jacking method D: 2500	including setting and driving works	250	m	2,79,815.00	6,99,53,750.00	Trenchless Society Item No.2.4.6.3 Pg. No.54
M.S. pipe of 2500 mm dia as casing pipe	including internal & external lining and delivery	250	m	84,786.00	2,11,96,500.00	TWAD BOARD SOR 2016-17, Sno 10.1.66
	Sub-Total				1,09,07,30,047.2	



Executive Engineer (Desai)
 Chennai Metropolitan Water Supply &
 Sewerage Board
 Chennai - 600 002.

Item	Description	Quantity	Unit	Rate INR	Amount (INR) without tax	Reference
CP 3-4 (L: 12,200 m)						
A. Open Cut						
(1) Earth work						
	Cutting asphaltic concrete road	18,500	m2	171.00	31,63,500.00	CMWSSB SoR 2016-17 SECTION -1, No.37
	Bus route	25,420	m2	85.00	21,60,700.00	CMWSSB SoR 2016-17 SECTION -1, No.37
	Non bus route	1,220	m	5,844.85	71,30,717.00	Vide separate calculation based on CMWSSB rates
	Sheet pile including wailing and strut	0-2 m		72,468	122.40	88,70,083.20 S.No.31
Excavation		2-3 m		35,136	134.40	47,22,278.40 S.No.31
	Backfilling with excavated earth	98,459	m3	21.50	21,16,868.50	DSR 2.25, 2.26 1 Pg. No. 79
	Disposal of excess earth	39,889	m3	287.60	1,14,72,076.40	DSR 1.1.2 Pg. No. 68
Dewatering	including motor and fuel fee	6,100	hr	213.80	13,04,180.00	CMWSSB SoR 2016-17, Section-2, S.No.61.
(2) Pipe Installation work						
	1) Pipe					
	M.S. pipe of 1600 mm dia	12,200	m	37,620.95	45,89,75,590.00	TWAD BOARD SOR 2016-17, Sno 10.1.61
	including manufacture and carriage					
	Laying, Jointing, Hydrostatic Filed Test Pressure	12,200	m	6,714.58	8,19,17,876.00	TWAD BOARD SOR 2016-17, Sno 2 Pg. No. 221 + Sno 11e Pg. No. 206 + Sno 8e Pg. No. 202 + Sno 7d Pg. No. 197
(2) Valve						
Air valve	200 mm, supply and delivery included	15	set	59,025.00	8,85,375.00	TWAD BOARD SOR 2016-17, Sno 12.4 (5) Pg. No. 70
Butterfly valves	1600 mm dia PN 16	5	set	31,53,860.00	1,57,69,300.00	Telangana SOR 16-17, Pg-512
	1000 mm dia, PN 16	6	set	6,35,563.30	38,13,379.80	TWAD BOARD SOR 2016-17, Sno 12 (19) Pg. No. 67
Scour Valve						
(3) MS Specials for all bends, expander, reducer, flanges, tee for all valves etc	Taken at 6.4kg per m length of pipe	75,648	kg	83.33	63,03,747.84	TWAD BOARD SOR 2016-17, Sno 10.2 (1) Pg. No. 64
4) Thrust Blocks						
Trust Block for 1600mm MS 90 DEG BEND 5.4m x 3.8m x 3.3m		3	no	2,91,500.00	8,74,500.00	
Trust Block for 1600mm MS 60 DEG BEND 3.8m x 3.8m x 3.3m		4	no	2,09,000.00	8,36,000.00	
Trust Block for 1600mm MS 45 DEG BEND 3.5m x 3.5m x 3.0m		6	no	1,62,400.00	9,74,400.00	
Trust Block for 1600mm MS 22.5 DEG BEND 1.75m x 1.8m x 1.8m		10	no	90,600.00	9,06,000.00	
5) Barrication on both sides of the trench		23,640	m	53.00	12,52,920.00	CMWSSB SoR 2016-17
6) Supplying and driving ventek wood bearing piles of 150mm x 150mm size (including cost of materials)	5% of length	111	no	45,035.67	49,94,865.22	Rate Analysis
7) Dismantling stone or brick masonry works	Taken at 0.5% of total pipe length	60	m3	141.10	8,466.00	CMWSSB Item No. 1.1.4 Pg. No. 88
8) Dismantling R.C.C works	Taken at 0.125% of total pipe length	15	m3	3,674.00	55,110.00	CMWSSB Item No. 1.2.2 Pg. No. 88
9) Valve chamber						
Air Valve chamber	for 1600 mm dia PIPE	15 nos.		1,44,900.00	21,73,500.00	
Butterfly valve chamber	for 1600 mm dia			3,23,487.00	16,17,435.00	Rate Analysis
	1000 mm dia			1,87,156.00	11,22,948.00	
(4) Miscellaneous Work						
Chennai Metropolitan Board						

Item	Description	Quantity	Unit	Rate INR	Amount (INR) without tax	Reference
Road Restoration Charges as per Corporation/Highway State	Bus route	20,500	m ²	4,005.00	8,21,02,500.00	
B. Pipe jacking	Non bus route	28,300	m ²	2,745.00	7,76,83,500.00	
	including setting and driving works					
	including internal & external lining and delivery	80	m	2,69,789.00	2,15,83,120.00	Trenchless Society Item No.2.4.6.3 Pg. No. 54
C. Pipe Bridge	M.S. pipe of 2200 mm dia	80	m	55,371.70	44,29,736.00	TWAD BOARD SOR 2016-17, Sno 10.1.
	Pipe beam type	200.0	m	85,000.00	1,70,00,000.00	Rate Analysis
					82,62,20,672	
					5,13,84,78,718	

Executive Engineer (Desai)
**Chennai Metropolitan Water Supply &
Sewerage Board
Chennai - 600 002.**

CP 4 Improvement of the existing water distribution networks

Sl.No.	Description	Amount INR without GST
4a.	Reinforcement of the existing water distribution networks (101km, D100-600)	53,58,63,753
4b.	Reinforcement of storage capacity by UGT (1 location, 4.33 ML)	2,74,26,333
4c.	Reinforcement of storage capacity by ESRs (14 locations, 49.32 ML)	1,12,24,77,242
4d.	Replacement of existing pipes (375 km, D100-450)	1,60,66,02,678
4e.	Installation of supplementary pipes (113 km, D100-300)	45,56,92,474
4f.	Setup of DMAs	9,47,65,863
4g.	Replacement and new installation of service connections including water meters (in the section for above works)	Nos. 185,496 1,15,66,41,758
4h.	Installation of water meters (for 100% metering in the Corporation)	Nos 614,029 1,27,10,42,100
Total		6,27,05,12,202

Executive Engineer (Desal)
 Chennai Metropolitan Water Supply &
 Sewerage Board
 Chennai - 600 002.

CMWSSB - Perur 400 mld DSP

4a) Reinforcement of the existing water distribution networks in core city of CMWSSB

Sl. No.	Description	Detailed and Abstract Estimate					Rate without Taxes Rs	Per Rate without tax Rs	Amount without tax Rs
		No.	L	B	D	Qty.			
1	Supplying and delivery of the following sizes of DI S/S pipes of class K7 conforming to IS:8329/2000, as specified in Technical specifications in standard lengths including labour charges for loading, unloading and stacking at site etc. complete as per standard specifications and as directed by the Departmental Engineer.								
i	150 mm dia pipes	1	57590				57590	1222.00	7,03,74,980
ii	200 mm dia pipes	1	18070				18070	1552.00	2,80,44,640
iii	250 mm dia pipes	1	12100				12100	2046.00	2,47,56,600
iv	300 mm dia pipes	1	1840				1840	2597.00	47,78,480
v	350 mm dia pipes	1	3080				3080	3114.00	95,91,120
vi	400 mm dia pipes	1	2970				2970	3738.00	1,11,01,860
vii	450 mm dia pipes	1	80				80	4400.00	3,52,000
viii	500 mm dia pipes	1	2770				2770	5133.00	1,42,18,410
viii	600 mm dia pipes	1	1140				1140	6805.00	77,57,700
ix	700 mm dia pipes	1	950				950	9110.00	86,54,500
			100590						
2	Supply of Sluice Valve for isolation including labour charges for loading, unloading and stacking at site etc. complete as per standard specifications and as directed by the Departmental Engineer.								
i	150 mm dia valves	17	1				17	8954.00	1,52,218
ii	200 mm dia valves	6	1				6	15632.00	93,792
iii	250 mm dia pipes	4	1				4	24771.00	99,084
iv	300 mm dia pipes	1	1				1	31078.00	31,078
v	350 mm dia pipes	1	1				1	47919.00	47,919
vi	400 mm dia pipes	1	1				1	61034.00	61,034
vii	450 mm dia pipes	1	1				1	77155.00	77,155
viii	500 mm dia pipes	1	1				1	96951.00	96,951
viii	600 mm dia pipes	1	1				1	142533.00	1,42,533
ix	700 mm dia pipes	1	1				1	273499.00	2,73,499
		34							


Executive Engineer (Desai)
 Chennai Metropolitan Water Supply &
 Sewerage Board
 Chennai - 600 002.

Sl. No.	Description	No.	L	B	D	Qty.	Rate without Taxes Rs	Per	Amount without tax Rs
3	Supply of Scour valve i.e Sluice Valve for scouring including labour charges for loading, unloading and stacking at site etc. complete as per standard specifications and as directed by the Departmental Engineer.					4	8954.00	E	35,816
i	150 mm dia valves	4	1			2	15632.00	E	31,264
ii	200 mm dia valves	2	1			1	24771.00	E	24,771
iii	250 mm dia pipes	1	1			1	31078.00	E	31,078
iv	300 mm dia pipes	1	1			1	47919.00	E	47,919
v	350 mm dia pipes	1	1			1	61034.00	E	61,034
vi	400 mm dia pipes	1	1			1	77155.00	E	77,155
vii	450 mm dia pipes	1	1			1	96951.00	E	96,951
viii	500 mm dia pipes	1	1			1	142533.00	E	1,42,533
viii	600 mm dia pipes	1	1			1	273499.00	E	2,73,499
		14							
4	Supply & Delivery of DI plunger type Flow Control cum Pressure reducing valve PN 16 to the required Specifications with necessary Socket/Spigot Tail pieces, MJ Collar with rubber insertion or any equivalent to the required specifications					6	630152.33	E	37,80,914
i	150 mm dia valves	6	1			4	724181.70	E	28,96,727
ii	200 mm dia valves	4	1			10			
5	Supply of Double air valve including labour charges for loading, unloading and stacking at site etc. complete as per standard specifications and as directed by the Departmental Engineer.								
i	80 mm dia valves (provided in the 200mm to 700mm pipes)	11	1			11	7169.00	E	78,859
6	Supply and delivery of DI specials of conforming to IS 9523/2000 specifications at site of work including all taxes, duties, loading, transportation, unloading, insurance etc., complete and as directed by Engineer in charge.								
a	Bends								
i	150mm dia								
22.5 deg		768	14.00			10752	109.00	Kg	11,71,968
45 deg		384	16.00			6144	109.00	Kg	6,69,696
90 deg		288	20.00			5760	109.00	Kg	6,27,840
ii	200mm dia								
22.5 deg		241	22.00			5302	109.00	Kg	5,77,918
45 deg		121	26.00			3146	109.00	Kg	3,42,914

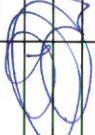
Weight of DI specials taken from Standard data from Preetam Pipes Syndicate

Sl. No.	Description	No.	L	A	B	C	D	Qty.	Rate without Taxes Rs	Per	Amount without tax Rs
90 deg		91	32.00					2912	109.00 Kg		3,17,408
iii 250mm dia		162	31.00					5022	109.00 Kg		5,47,398
22.5 deg		81	36.00					2916	109.00 Kg		3,17,844
45 deg		61	46.00					2806	109.00 Kg		3,05,854
iv 300mm dia		25	41.00					1025	109.00 Kg		1,11,725
22.5 deg		13	49.00					637	109.00 Kg		69,433
45 deg		10	65.00					650	109.00 Kg		70,850
v 350mm dia		42	52.00					2184	109.00 Kg		2,38,056
22.5 deg		21	65.00					1365	109.00 Kg		1,48,785
45 deg		16	87.00					1392	109.00 Kg		1,51,728
vi 400mm dia		40	67.00					2680	109.00 Kg		2,92,120
22.5 deg		20	82.00					1640	109.00 Kg		1,78,760
45 deg		15	113.00					1695	109.00 Kg		1,84,755
vii 450mm dia		2	85.00					170	109.00 Kg		18,530
22.5 deg		1	107.00					107	109.00 Kg		11,663
45 deg		1	147.00					147	109.00 Kg		16,023
viii 500mm dia		37	107.00					3959	109.00 Kg		4,31,531
22.5 deg		19	135.00					2565	109.00 Kg		2,79,585
45 deg		14	187.00					2618	109.00 Kg		2,85,362
ix 600mm dia		16	157.00					2512	109.00 Kg		2,73,808
22.5 deg		8	204.00					1632	109.00 Kg		1,77,888
45 deg		6	285.00					1710	109.00 Kg		1,86,390
ix 700mm dia		13	214.00					2782	159.00 Kg		4,42,338
22.5 deg		7	280.00					1960	159.00 Kg		3,11,640
45 deg		5	402.00					2010	159.00 Kg		3,19,590
b Specials for End cap of all sizes		96	10.00					960	109.00 Kg		1,04,640
150mm dia		31	17.00					527	109.00 Kg		57,443
200mm dia		21	23.00					483	109.00 Kg		52,647
250mm dia		4	35.00					140	109.00 Kg		15,260
300mm dia		6	49.00					294	109.00 Kg		32,046
350mm dia		5	63.00					315	109.00 Kg		34,335
400mm dia		81	109.00 Kg								8,829
450mm dia											

Executive Engineer (Desai)
Chennai Metropolitan Water Supply & Sewerage Board
Chennai - 600 002.

Chennai Corporation
Chennai Metropolitan Sewerage Board
Ex-Executive Engineer (Dessal) 32
Ex-Executive Engineer (Water Supply) 42

Sl. No.	Description	D (No.)	L	B	D	Qty.	Rate without Taxes Rs	Per Amount without tax Rs
500mm dia		5	101.00			505	109.00	Kg 55,045
600mm dia		2	157.00			314	109.00	Kg 34,226
700mm dia		2	218.00			436	159.00	Kg 69,324
c Flanged Socket Specials for Sluice valve								
150mm dia		17	14.00			238	113.00	Kg 26,894
200mm dia		6	21.00			126	113.00	Kg 14,238
250mm dia		4	28.00			112	113.00	Kg 12,656
300mm dia		1	37.00			37	113.00	Kg 4,181
350mm dia		1	48.00			48	113.00	Kg 5,424
400mm dia		1	61.00			61	113.00	Kg 6,893
450mm dia		1	76.00			76	113.00	Kg 8,588
500mm dia		1	96.00			96	113.00	Kg 10,848
600mm dia		1	132.00			132	113.00	Kg 14,916
700mm dia		1	166.00			166	167.00	Kg 27,722
d Flanged Spigot Specials for Sluice valve								
150mm dia		17	16.00			272	113.00	Kg 30,736
200mm dia		6	23.00			138	113.00	Kg 15,594
250mm dia		4	32.00			128	113.00	Kg 14,464
300mm dia		1	42.00			42	113.00	Kg 4,746
350mm dia		1	56.00			56	113.00	Kg 6,328
400mm dia		1	70.00			70	113.00	Kg 7,910
450mm dia		1	88.00			88	113.00	Kg 9,944
500mm dia		1	110.00			110	113.00	Kg 12,430
600mm dia		1	159.00			159	113.00	Kg 17,967
700mm dia		1	196.00			196	167.00	Kg 32,732
e Flanged Socket Specials for Scour valve								
150mm dia		4	14.00			56	113.00	Kg 6,328
200mm dia		2	21.00			42	113.00	Kg 4,746
250mm dia		1	28.00			28	113.00	Kg 3,164
300mm dia		1	37.00			37	113.00	Kg 4,181
350mm dia		1	48.00			48	113.00	Kg 5,424
400mm dia		1	61.00			61	113.00	Kg 6,893
450mm dia		1	76.00			76	113.00	Kg 8,588
500mm dia		1	96.00			96	113.00	Kg 10,848
600mm dia		1	132.00			132	113.00	Kg 14,916
700mm dia		1	166.00			166	167.00	Kg 27,722
f Flanged Spigot Specials for Scour valve								
150mm dia		4	16.00			64	113.00	Kg 7,232
200mm dia		2	23.00			46	113.00	Kg 5,198
250mm dia		1	32.00			32	113.00	Kg 3,616
300mm dia		1	42.00			42	113.00	Kg 4,746

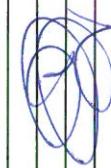


 Chennai Metropolitan Sewerage Board
 Chennai - 600 002.

Sl. No.	Description	No.	L	B	D	Qty.	Rate without Taxes Rs	Per Kg	Amount without tax Rs
	Excluding Duties (₹)								
350mm dia		1	56.00			56	113.00	Kg	6,328
400mm dia		1	70.00			70	113.00	Kg	7,910
450mm dia		1	88.00			88	113.00	Kg	9,944
500mm dia		1	110.00			110	113.00	Kg	12,430
600mm dia		1	159.00			159	113.00	Kg	17,967
700mm dia		1	196.00			196	167.00	Kg	32,732
g Flanged Socket Specials for Air valve									
250mm dia		4	28.00			112	113.00	Kg	12,656
300mm dia		1	37.00			37	113.00	Kg	4,181
350mm dia		1	48.00			48	113.00	Kg	5,424
400mm dia		1	61.00			61	113.00	Kg	6,893
450mm dia		1	76.00			76	113.00	Kg	8,588
500mm dia		1	96.00			96	113.00	Kg	10,848
600mm dia		1	132.00			132	113.00	Kg	14,916
700mm dia		1	166.00			166	167.00	Kg	27,722
h Flanged Spigot Specials for Air valve									
250mm dia		4	32.00			128	113.00	Kg	14,464
300mm dia		1	42.00			42	113.00	Kg	4,746
350mm dia		1	56.00			56	113.00	Kg	6,328
400mm dia		1	70.00			70	113.00	Kg	7,910
450mm dia		1	88.00			88	113.00	Kg	9,944
500mm dia		1	110.00			110	113.00	Kg	12,430
600mm dia		1	159.00			159	113.00	Kg	17,967
700mm dia		1	196.00			196	167.00	Kg	32,732
i All Flanged TEE for Air valve									
250mm x 80mm		4	45.00			180	113.00	Kg	20,340
300mm x 80mm		1	58.00			58	113.00	Kg	6,554
350mm x 80mm		1	76.00			76	113.00	Kg	8,588
400mm x 80mm		1	95.00			95	113.00	Kg	10,735
450mm x 80mm		1	176.00			176	113.00	Kg	19,888
500mm x 80mm		1	219.00			219	113.00	Kg	24,747
600mm x 80mm		1	250.00			250	113.00	Kg	28,250
700mm x 80mm		1	280.00			280	167.00	Kg	46,760
j All socket Tees									
150mm x 100mm		20	21.00			420	109.00	Kg	45,780
150mm x 150mm		4	24.00			96	109.00	Kg	10,464
200mm x 100mm		4	30.00			120	109.00	Kg	13,080
200mm x 150mm		2	34.00			68	109.00	Kg	7,412
200mm x 200mm		2	40.00			80	109.00	Kg	8,720
250mm x 200mm		2	49.00			98	109.00	Kg	10,682
250mm x 250mm		1	55.00			55	109.00	Kg	5,995

Chennai
Sewerage
Board
Specified Materials and Rates

Sl. No.	Description	No.	L	B	D	Qty.	Rate without Taxes Rs	Per Kg	Amount without tax Rs
	300mm x 300mm	1	77.00			77	109.00	Kg	8,393
	350mm x 350mm	2	100.00			200	109.00	Kg	21,800
	400mm x 400mm	1	128.00			128	109.00	Kg	13,952
	450mm x 450mm	1	165.00			165	109.00	Kg	17,985
	500mm x 500mm	1	207.00			207	109.00	Kg	22,563
	600mm x 600mm	1	307.00			307	109.00	Kg	33,463
	700mm x 700mm	1	412.00			412	159.00	Kg	65,508
k Double socket Reducer									
	150mm x 100mm	14	13.00			182	109.00	Kg	19,838
	200mm x 100mm	10	20.00			200	109.00	Kg	21,800
	200mm x 150mm	7	19.00			133	109.00	Kg	14,497
	250mm x 200mm	6	27.00			162	109.00	Kg	17,658
	300mm x 250mm	5	35.00			175	109.00	Kg	19,075
	350mm x 300mm	5	45.00			225	109.00	Kg	24,525
	400mm x 350mm	4	55.00			220	109.00	Kg	23,980
	450mm x 400mm	0	69.00			0	109.00	Kg	0
	500mm x 400mm	3	89.00			267	109.00	Kg	29,103
	600mm x 500mm	3	129.00			387	109.00	Kg	42,183
l Mechanical Joint Collar									
	150mm dia	14	25.00			350	109.00	Kg	38,150
	200mm dia	10	33.00			330	109.00	Kg	35,970
	250mm dia	7	50.00			350	109.00	Kg	38,150
	300mm dia	6	59.00			354	109.00	Kg	38,586
	350mm dia	5	80.00			400	109.00	Kg	43,600
	400mm dia	5	98.00			490	109.00	Kg	53,410
	450mm dia	4	113.00			452	109.00	Kg	49,268
	500mm dia	0	133.00			0	109.00	Kg	0
	600mm dia	3	168.00			504	109.00	Kg	54,936
	700mm dia	3	253.00			759	159.00	Kg	1,20,681
m Dismantling joint									
	150mm dia	14	30.00			420	109.00	Kg	45,780
	200mm dia	10	40.00			400	109.00	Kg	43,600
	250mm dia	7	58.00			406	109.00	Kg	44,254
	300mm dia	6	71.00			426	109.00	Kg	46,434
	350mm dia	5	91.00			455	109.00	Kg	49,595
	400mm dia	5	116.00			580	109.00	Kg	63,220
	450mm dia	4	135.00			540	109.00	Kg	58,860
	500mm dia	0	166.00			0	109.00	Kg	0
	600mm dia	3	227.00			681	109.00	Kg	74,229
	700mm dia	3	294.00			882	159.00	Kg	1,40,238


Executive Engineer (Desai)
Chennai Metropolitan Water Supply & Sewerage Board
 Chennai - 600 002.

Sl. No.	Description	No.	L	W	B	Flange D	Qty.	Rate without Taxes Rs	Per	Amount without tax Rs
n Double Flanged pipes of 3m length for Scour valve										
150mm dia		4	87.80				351.2	113.00 Kg		39,686
200mm dia		2	118.00				236	113.00 Kg		26,668
250mm dia		1	155.40				155.4	113.00 Kg		17,560
300mm dia		1	196.90				196.9	113.00 Kg		22,250
350mm dia		1	254.70				254.7	113.00 Kg		28,781
400mm dia		1	301.10				301.1	113.00 Kg		34,024
450mm dia		1	354.50				354.5	113.00 Kg		40,059
500mm dia		1	409.00				409	113.00 Kg		46,217
600mm dia		1	536.20				536.2	113.00 Kg		60,591
700mm dia		1	660.00				660	167.00 Kg		1,10,220
o Double Flanged Duckfoot bend 90deg for Scour valve										
150mm dia		4	27.00				108	113.00 Kg		12,204
200mm dia		2	45.00				90	113.00 Kg		10,170
250mm dia		1	69.00				69	113.00 Kg		7,797
300mm dia		1	99.00				99	113.00 Kg		11,187
350mm dia		1	136.00				136	113.00 Kg		15,368
400mm dia		1	179.00				179	113.00 Kg		20,227
450mm dia		1	231.00				231	113.00 Kg		26,103
500mm dia		1	296.00				296	113.00 Kg		33,448
600mm dia		1	457.00				457	113.00 Kg		51,641
700mm dia		1	605.00				605	167.00 Kg		1,01,035
p Double Flanged 90 deg bend for Scour valve										
150mm dia		4	21.00				84	113.00 Kg		9,492
200mm dia		2	31.00				62	113.00 Kg		7,006
250mm dia		1	50.00				50	113.00 Kg		5,650
300mm dia		1	70.00				70	113.00 Kg		7,910
350mm dia		1	97.00				97	113.00 Kg		10,961
400mm dia		1	128.00				128	113.00 Kg		14,464
450mm dia		1	165.00				165	113.00 Kg		18,645
500mm dia		1	214.00				214	113.00 Kg		24,182
600mm dia		1	325.00				325	113.00 Kg		36,725
700mm dia		1	419.00				419	167.00 Kg		69,973


 Executive Engineer (Desai) &
 Chennai Metropolitan Water Supply &
 Sewerage Board
 Chennai - 600 002.

Sl. No.	Description	No.	L	B	D	Qty.	Rate without Taxes Rs	Per m	Amount without tax Rs
7	Laying D.I. pipes including earthwork excavation for trenches in hard stiff clay, blackcotton, hard red earth, shales, murams, gravel, stoney earth and earth mixed with small size boulders and hard gravelly soil depositing the earth on banks with initial lead of 10 m and initial lift of 2m carting the pipes from any of the Board's Stores to the site of work lowering into the trenches, aligning, refilling the trenches with excavated soil, watering and ramming to consolidation, etc., complete for the pipes of following diametres.								
i	150 mm dia pipes	1	57590			57590	303.00		1,74,49,770
ii	200 mm dia pipes	1	18070			18070	361.00		65,23,270
iii	250 mm dia pipes	1	12100			12100	377.00		45,61,700
iv	300 mm dia pipes	1	1840			1840	417.00		7,67,280
v	350 mm dia pipes	1	3080			3080	466.00		14,35,280
vi	400 mm dia pipes	1	2970			2970	513.00		15,23,610
vii	450 mm dia pipes	1	80			80	562.00		44,960
viii	500 mm dia pipes	1	2770			2770	3881.00		1,07,50,370
ix	600 mm dia pipes	1	1140			1140	4022.00		45,85,080
ix	700 mm dia pipes	1	950			950	4138.00		39,31,100
			100590						
8	Jointing the DI S/S pipes and specials with rubber gaskets (tyton joint) including cost of lubricants, cost of jointing materials and testing to the required pressure with water etc., complete as per standard specifications and as directed by the Departmental Engineer.								
i	150 mm dia pipes	9599	1			9599	132.00	E	12,67,068
ii	200 mm dia pipes	3012	1			3012	177.00	E	5,33,124
iii	250 mm dia pipes	2017	1			2017	242.00	E	4,88,114
iv	300 mm dia pipes	307	1			307	279.00	E	85,653
v	350 mm dia pipes	514	1			514	324.00	E	1,66,536
vi	400 mm dia pipes	495	1			495	373.00	E	1,84,635
vii	450 mm dia pipes	14	1			14	422.00	E	5,908
viii	500 mm dia pipes	462	1			462	480.00	E	2,21,760
viii	600 mm dia pipes	190	1			190	580.00	E	1,10,200
ix	700 mm dia pipes	159	1			159	680.00	E	1,08,120
9	Conveying and fixing specials like "C.I.Tee" Branches, Bends and tapers including earthwork excavation as per schedule No.1.1 of CMWSSB. at any depth								
i	Specials for 150 mm dia pipes	1584	1				1584	348.00	E
ii	Specials for 200 mm dia pipes	526	1				526	441.00	E
iii	Specials for 250 mm dia pipes	362					362	549.00	E

ESTIMATING SHEET No. 2

Sl. No.	Description	No. (Qty)	L	B	D	Qty.	Rate without Taxes Rs	Per	Amount without tax Rs
iv	Specials for 300 mm dia pipes	72	1			72	617.00	E	44,424
v	Specials for 350 mm dia pipes	102	1			102	706.00	E	72,012
vi	Specials for 400 mm dia pipes	96	1			96	797.00	E	76,512
vii	Specials for 450 mm dia pipes	18	1			18	915.00	E	16,470
viii	Specials for 500 mm dia pipes	76	1			76	1189.00	E	90,364
viii	Specials for 600 mm dia pipes	42	1			42	1700.00	E	71,400
ix	Specials for 700 mm dia pipes	37	1			37	2303.00	E	85,211
10	Jointing the DI S/S pipes and specials with rubber gaskets (tyon joint) including cost of lubricants, cost of jointing materials and testing to the required pressure with water etc., complete as per standard specifications and as directed by the Departmental Engineer.								
i	Specials for 150 mm dia pipes	1584	1			1584	132.00	E	2,09,088
ii	Specials for 200 mm dia pipes	526	1			526	177.00	E	93,102
iii	Specials for 250 mm dia pipes	362	1			362	242.00	E	87,604
iv	Specials for 300 mm dia pipes	72	1			72	279.00	E	20,088
v	Specials for 350 mm dia pipes	102	1			102	324.00	E	33,048
vi	Specials for 400 mm dia pipes	96	1			96	373.00	E	35,808
vii	Specials for 450 mm dia pipes	18	1			18	422.00	E	7,596
viii	Specials for 500 mm dia pipes	76	1			76	480.00	E	36,480
viii	Specials for 600 mm dia pipes	42	1			42	580.00	E	24,360
ix	Specials for 700 mm dia pipes	37	1			37	680.00	E	25,160
11	Testing of M.S./C.I./P.V.C./D.I. pipes with hydraulic testing equipment by filling with water(including cost of water @ Rs.60/KL) and testing to recommended pressure in convenient stretches and attending the bursts if any occurred during the test, excluding the cost of pipes, including other incidental and operational charges, etc., complete for the following diametres of pipes.								
i	150 mm dia pipes	1	57590			57590	62.00	m	35,70,580
ii	200 mm dia pipes	1	18070			18070	75.00	m	13,55,250
iii	250 mm dia pipes	1	12100			12100	93.00	m	11,25,300
iv	300 mm dia pipes	1	1840			1840	113.00	m	2,07,920
v	350 mm dia pipes	1	3080			3080	133.00	m	4,09,640
vi	400 mm dia pipes	1	2970			2970	153.00	m	4,54,410
vii	450 mm dia pipes	1	80			80	176.00	m	14,080
viii	500 mm dia pipes	1	2770			2770	215.00	m	5,95,550
viii	600 mm dia pipes	1	1140			1140	255.00	m	2,90,700
ix	700 mm dia pipes	1	950			950	323.00	m	3,06,850

Executive Engineer (Mesar) 100590

Chennai Metropolitan Water Supply &
Sewerage Board
Chennai - 600 002.

Sl. No.	Description	No.	L	B	D	Qty.	Rate without Taxes Rs	Per	Amount without tax Rs
12	Disjointing and removing C.I./G.I. existing old pipes to stores including other incidental and operational charges, etc., complete for the following diametres of pipes.								
i	150 mm dia pipes	1	576			576	319.00	m	1,83,744
ii	200 mm dia pipes	1	181			181	409.00	m	74,029
iii	250 mm dia pipes	1	121			121	545.00	m	65,945
iv	300 mm dia pipes	1	19			19	617.00	m	11,723
v	350 mm dia pipes	1	31			31	688.00	m	21,328
vi	400 mm dia pipes	1	30			30	759.00	m	22,770
vii	450 mm dia pipes	1	1			1	836.00	m	836
viii	500 mm dia pipes	1	28			28	920.00	m	25,760
viii	600 mm dia pipes	1	12			12	1100.00	m	13,200
ix	700 mm dia pipes	1	10			10	1300.00	m	13,000
			1009						
13	Disjointing and returning to stores old specials such as tee branches, tapers and bends								
i	Specials for 150 mm dia pipes	16	1			16	182.00	E	2,912
ii	Specials for 200 mm dia pipes	6	1			6	261.00	E	1,566
iii	Specials for 250 mm dia pipes	4	1			4	382.00	E	1,528
iv	Specials for 300 mm dia pipes	1	1			1	454.00	E	454
v	Specials for 350 mm dia pipes	2	1			2	530.00	E	1,060
vi	Specials for 400 mm dia pipes	1	1			1	616.00	E	616
vii	Specials for 450 mm dia pipes	1	1			1	707.00	E	707
viii	Specials for 500 mm dia pipes	1	1			1	800.00	E	800
viii	Specials for 600 mm dia pipes	1	1			1	1000.00	E	1,000
ix	Specials for 700 mm dia pipes	1	1			1	1200.00	E	1,200
			34						
14	Connection work to existing main including cutting existing pipe, fixing branches, collars, lead jointing and bailing out water, etc., complete								
i	150 mm dia pipes	1	288			288	2,904.00	E	8,36,352
ii	200 mm dia pipes	1	91			91	5,721.00	E	5,20,611
iii	250 mm dia pipes	1	61			61	5,721.00	E	3,48,981
iv	300 mm dia pipes	1	10			10	10,077.00	E	1,00,770
v	350 mm dia pipes	1	16			16	10,077.00	E	1,61,232
vi	400 mm dia pipes	1	15			15	10,077.00	E	1,51,155
vii	450 mm dia pipes	1	1			1	10,077.00	E	10,077
viii	500 mm dia pipes	1	14			14	13,000.00	E	1,82,000
viii	600 mm dia pipes	1	6			6	16,000.00	E	96,000
ix	700 mm dia pipes	1	5			5	19,000.00	E	95,000

[Signature]
Executive Engineer (Desai) 507 &
Metropolitan Water Supply

General Workings
EXCITING & ENDING

Sl. No.	Description	No. b)	L	B	D	Qty.	Rate without Taxes Rs	Per	Amount without tax Rs
15	Cutting the DI Pipes true to axis and filing smoothly and finishing the ends complete								
i	150 mm dia pipes	1	1440			1440	155.00	E	2,23,200
ii	200 mm dia pipes	1	452			452	208.00	E	94,016
iii	250 mm dia pipes	1	303			303	268.00	E	81,204
iv	300 mm dia pipes	1	46			46	307.00	E	14,122
v	350 mm dia pipes	1	77			77	345.00	E	26,565
vi	400 mm dia pipes	1	75			75	384.00	E	28,800
vii	450 mm dia pipes	1	2			2	423.00	E	846
viii	500 mm dia pipes	1	70			70	578.00	E	40,460
viii	600 mm dia pipes	1	29			29	675.00	E	19,575
ix	700 mm dia pipes	1	24			24	850.00	E	20,400
16	Conveying and fixing sluice valves with tail pieces including fixing the surface boxes/valves, covers								
i	150 mm dia valves	17	1			17	823.00	E	13,991
ii	200 mm dia valves	6	1			6	988.00	E	5,928
iii	250 mm dia pipes	4	1			4	1235.00	E	4,940
iv	300 mm dia pipes	1	1			1	1646.00	E	1,646
v	350 mm dia pipes	1	1			1	2470.00	E	2,470
vi	400 mm dia pipes	1	1			1	3087.00	E	3,087
vii	450 mm dia pipes	1	1			1	4116.00	E	4,116
viii	500 mm dia pipes	1	1			1	9494.00	E	9,494
viii	600 mm dia pipes	1	1			1	13938.00	E	13,938
ix	700 mm dia pipes	1	1			1	16182.00	E	16,182
		34							
17	Conveying and fixing scour valves with tail pieces including fixing all the required specials								
i	150 mm dia valves	4	1			4	823.00	E	3,292
ii	200 mm dia valves	2	1			2	988.00	E	1,976
iii	250 mm dia pipes	1	1			1	1235.00	E	1,235
iv	300 mm dia pipes	1	1			1	1646.00	E	1,646
v	350 mm dia pipes	1	1			1	2470.00	E	2,470
vi	400 mm dia pipes	1	1			1	3087.00	E	3,087
vii	450 mm dia pipes	1	1			1	4116.00	E	4,116
viii	500 mm dia pipes	1	1			1	9494.00	E	9,494
viii	600 mm dia pipes	1	1			1	13938.00	E	13,938
ix	700 mm dia pipes	1	1			1	16182.00	E	16,182


 Executive Engineer Water Supply
 Chennai - 600 002.

Cusuma
Chennai Sewerage Extension

Sl. No.	Description	No. of pieces	L	B	D	Qty.	Rate without Taxes Rs	Per Amount without tax Rs
18	Conveying and fixing Double air valves with tail pieces including fixing all the required specials					11	603.00	E 6,633
i	80 mm dia valves (provided in the 200mm to 450mm pipes)	11	1					
19	Conveying and Fixing DI plunger type Flow Control cum Pressure reducing valve to the required Specifications with necessary Socket/Spigot Tail pieces, MJ Collar with rubber insertion or any equivalent to the required specifications with MS bolts and nuts etc. complete							
	150 mm dia pipes	6				6	63015	3,78,091
	200 mm dia pipes	4				4	72418	2,89,673
		10				10		
20	Construction of thrust blocks using Cement Concrete 1:3:6 ,40mm B.G.jelly for Plain Cement Concrete							
i	Specials for 150 mm dia pipes	1584	1			1584	5563.00	E 88,11,792
ii	Specials for 200 mm dia pipes	526	1			526	6177.00	E 32,49,102
iii	Specials for 250 mm dia pipes	362	1			362	6628.00	E 23,99,336
iv	Specials for 300 mm dia pipes	72	1			72	7313.00	E 5,26,536
v	Specials for 350 mm dia pipes	102	1			102	7709.00	E 7,86,318
vi	Specials for 400 mm dia pipes	96	1			96	8295.00	E 7,96,320
vii	Specials for 450 mm dia pipes	18	1			18	8797.00	E 1,58,346
viii	Specials for 500 mm dia pipes	76	1			76	9511.00	E 7,22,836
viii	Specials for 600 mm dia pipes	42	1			42	12628.00	E 5,30,376
viii	Specials for 700 mm dia pipes	37	1			37	20681.00	E 7,65,197
		2915						
21	Construction of Chambers for housing Isolation valves, scour valves and air valves as per type design and as per specification etc. complete							
i	For housing Valves 100 mm to 250 mm dia valves	44				44	33709.00	E 14,83,196
ii	For housing Valves 300 mm to 600 mm dia valves	14				14	41135.00	E 5,75,890
iii	For housing Air Valves	11				11	9848.00	E 1,08,328
22	Cutting asphaltic & concrete Roads							
	For laying 150 mm dia DI pipe	1	57590	0.60	1	34554.00		
	For laying 200 mm dia DI pipe	1	18070	0.80	1	14456.00		
	For laying 250 mm dia DI pipe	1	12100	0.80	1	9680.00		
	For laying 300 mm dia DI pipe	1	1840	0.80	1	1472.00		
	For laying 350 mm dia DI pipe	1	3080	0.90	1	2772.00		
	For laying 400 mm dia DI pipe	1	2970	0.90	1	2673.00		
	For laying 450 mm dia DI pipe	80	1.00	1	80.00			

Sl. No.	Description	No.	L	B	D	Qty.	Rate without Taxes Rs	Per	Amount without tax Rs
	For laying 500 mm dia DI pipe	1	2770	1.10	1	3047.00			
	For laying 600 mm dia DI pipe	1	1140	1.20	1	1368.00			
	For laying 700 mm dia DI pipe	1	950	1.30	1	1235.00			
	Bus route Road at 30% total quantity	100590				71337.00			
	Non Bus route Road at 70% total quantity					21401.10	171.00 sqm	36,59,588	
						49935.90	85.00 sqm	42,44,552	
23	Supply and Lowering the RCC Non Pressure pipes NP 4 class into the trench for crossing NH/SH and other roads (For encasing of pipes)								
	200 mm dia	1	1152			1152	723.90	m	8,33,933
	300 mm dia	1	362			362	1080.15	m	3,91,014
	400 mm dia	1	242			242	1953.20	m	4,72,674
	500 mm dia	1	37			37	2789.20	m	1,03,200
	600 mm dia	1	62			62	3214.80	m	1,99,318
	700 mm dia	1	60			60	4553.35	m	2,73,201
	800 mm dia	1	2			2	5678.15	m	11,356
	900 mm dia	1	56			56	6564.50	m	3,67,612
	1000 mm dia	1	23			23	7759.60	m	1,78,471
	1200 mm dia	1	19			19	12892.45	m	2,44,957
24	Providing iron barricading of size 6' (1.83 m) width and 3.5(1.07 m) height using 1.5" (38 mm) dia MS Sq. Tubular pipe for outer frame supports, 0.75" (20 mm) size small MS tubular square pipe for inner frame supports and 3' x 2' (0.9 x 0.6 m) size MS Sheet for name Board (as per drawing) including cutting, welding, fabrication charges and one coat of primer and 2 coats of enamel paint of approved quality with fixing of indication sticker and necessary interlocking arrangements with adjoining units and placing barricading units including watching during night fixing danger flags/reflectors units as directed at site etc. complete.	2015				201180	53.00	m	1,06,62,540
25	Road restoration charges to be paid								
	For laying 150 mm dia DI pipe	1	57590	0.60			34554.00		
	For laying 200 mm dia DI pipe	1	18070	0.80			14456.00		
	For laying 250 mm dia DI pipe	1	12100	0.80			9680.00		
	For laying 300 mm dia DI pipe	1	1840	0.80			1472.00		
	For laying 350 mm dia DI pipe	1	1840	0.90			2772.00		
	For laying 400 mm dia DI pipe	1	2970	0.90			2673.00		
	For laying 450 mm dia DI pipe	1	80	1.00			80.00		


 Executive Engineer (D.P.S.D.O)

 Engineer-in-Charge
 Executive Engineer Board
 Chennai Metro Sewerage - 600 002
 Chennai - 600 002

**Executive Engineer (Desai)
Chennai Metropolitan Water Supply &
Sewerage Board
Chennai - 600 002.**

Exe

Sl. No.	Description	No.	L (in B.)	D	Qty.	Rate without Taxes Rs	Per	Amount without tax Rs
1 Construction of 4.33 ML - 1 Nos , Under Ground Tanks including Pipe connections								
Core City								
1 Kilpauk			0.00	0				
2 Anna Poonga			0.00	0				
3 Kannapar Thidal			0.00	0				
4 Triplicane			0.00	0				
5 KK Nagar			0.00	0				
6 Velachery			0.00	0				
7 Velachery New			0.00	0				
8 Ekkadu Thangal			0.00	0				
9 Choolai Medu			0.00	0				
10 Kolathur			0.00	0				
11 Vysarpadi			0.00	0				
12 Patel Nagar			0.00	0				
13 Pallipattu			0.00	0				
14 Thiruvanmiyur			4.33	43,30,000				
15 Nandanam			0.00	0				
16 Mylapore			0.00	0				
17 Valluvar Kottam			0.00	0				
18 Southern Headworks			0.00	0				
UG SUMP at Thiruvanmiyur - 4.33 ML capacity i.e 38m x 38m x 3m water depth + 0.5m FB						4.33		
Earth filled top level						6.80 m		
Roof slab top level						6.50 m		
Roof slab bottom level						6.25 m		
Maximum water level						5.75 m		
Finished ground level						4.30 m		
Floor level of tank						2.75 m		
Bottom slab (600mm thick) bottom level						2.15 m		
PCC (300mm thick) bottom level						1.85 m		
Sand filling (150mm thick) bottom level						1.70 m		
Side wall bottom thickness						0.45 m		
Side wall top thickness						0.25 m	Engineer 23/10/2018	
Inside columns 600 x 600						25 no	Executive Engineer 23/10/2018	
Drop panel to support roof slab 3500 x 3500 x 500						25 no	Chennai Metro Sewerage Board	
							Chennai - 600 002.	

Sl. No.	Description	No.	L	B	D	Qty.	Rate without Taxes Rs	Per	Amount without tax Rs
	Roof slab thickness		0.25 m						
	Bottom slab - Toe projection outside		0.45 m						
	Liquid depth		3.00 m						
	Free board		0.50 m						
1a	Earth work excavation 0 - 2 m deep	41.8	41.8	2	3494.48	122.4 cum	4,27,724		
1b	2.00m to 3.00m deep	41.8	41.8	0.6	1048.344	134.6 cum	1,41,107		
2	Supplying and filling sand for foundations including watering consolidating ramming, etc., complete	39.8	39.8	0.15	237.606	594 cum	1,41,138		
3	Cement concrete 1:3:6 using 40mm gauge hard broken stone jelly for plain cement concrete works including laying in layers of not more than 15cm thick including ramming curing etc. complete for foundation and concrete block	39.8	39.8	0.3	475.212	3535 cum	16,79,874		
4	Ready mixed concrete work M30 using 20mm gauge hard broken stone jelly for reinforced concrete works excluding centering shuttering and cost of steel reinforcement but including laying in position compacting, curing, finishing etc. complete	39.8	39.8	0.3	475.212	3535 cum	16,79,874		
	Bottom slab	39.8	39.8	0.6	950.42				
	Side wall rectangular portion L = 4*38.25 = 153.00	153	0.25	3.5	133.88				
	Side wall Triangular portion L = 4*38.766 = 155.064	155.064	0.1	3.5	54.27				
	25 Columns upto bottom of drop panel	25	0.36	3.25	29.25				
	25 drop panels (excluding roof slab thickness)	25	12.25	0.25	76.56				
	Roof slab	38.5	38.5	0.25	370.56				
	Parapet wall over roof slab to retain earth (L = 4*38.25)	153	0.25	0.3	11.48				
	Add for staircase				1.00				
	Deductions								
	M.H cover 2 no 600mm x 600mm	-2	0.36	0.25	-0.18				
	Vent Pipe, 4 no 300mm dia	-4	0.09	0.25	-0.09				
					1,627.15	5741 cum	93,41,476		
5	Supplying and fabricating and laying in position m.s. rods or RTS rods including cost of reinforcement								

Executive Engineer (Detail)

Chennai Metropolitan Water Supply &
Sewerage Board
Chennai - 600 002.

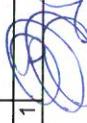
Sl. No.	Description	No.	L	B	D	Qty.	Rate without Taxes Rs	Per	Amount without tax Rs
	binding wire cutting, bending, cranking and tying in position with binding wire assembling etc complete								
	Steel reinforcement at 120kg/cum of concrete	1	1,627.15	120	195258.168	57 kg	1,11,29,716		
6	Providing form work with centering for soffits or RCC slabs or plain surface including strutting								
6A	Form work upto 3m high from bottom								
	Bottom slab		4	39.8	0.6	95.52			
	Side wall inside		4	38	2.4	364.80			
	Side wall outside		4	38.9	2.4	373.44			
	25 Columns all four sides	25	2.4	2.4	144.00				
	Add for staircase					5.00			
						982.76	888 sqm	8,72,691	
6B	Form work 3m to 4m high from bottom								
	Side wall inside		4	38	1	152.00			
	Side wall outside		4	38.5	1	154.00			
	25 Columns all four sides	25	2.4	0.85	51.00				
	25 Drop panels all four sides	25	14	0.15	52.50				
	Add for staircase					2.00			
						411.50	916 sqm	3,76,934	
6C	Form work 4m to 5m high from bottom								
	Side wall inside		4	38	0.1	15.20			
	Side wall outside		4	38.5	0.1	15.40			
	Drop panels all four sides	25	14	0.1	35.00				
	Roof slab & drop panels bottom	1	38	38	1,444.00				
	Roof slab outside	4	38.5	0.25	38.50				
	Parapet wall over roof slab to retain earth (L = 4*38.25)	2	153	0.3	91.80				
	Add for staircase					1.00			
	Deductions								
	Columns bottom	-25	0.6	0.6	-9.00				
	M.H cover 2 no 600mm x 600mm	-2	0.6	0.6	-0.72				
	Vent Pipe, 4 no 300mm dia	-4	0.785	0.09	-0.28				
						1,630.90	944 sqm	15,39,567	

Sl. No.	Description	No.	A	B	D	Qty.	Rate without Taxes Rs	Per Amount without tax Rs
7	Screeeding concrete 1:1.5:3 of 50mm thick for tank floor portion							
	Floor slab	38	38	0.05	72.20			
	Deductions							
	Columns bottom	-25	0.36	0.05	-0.45			
					71.75	5599 cum	4,01,728	
8	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 pouring concrete etc. complete :							
	Serrated with central bulb (225 mm wide, 8-11 mm thick)	3	153	1	459.00	467 m	2,14,353	
	Side wall at 3 positions							
9	Providing RCC ladder of M 20 grade concrete of size 0.1 x 0.15x4.15 m (Typical)	4	4	1	16.00	762 m	12,192	
10	Providing and fixing L.S. cover and frame of size 60 x 60cm including necessary masonry work and plastering, etc., complete	2	1	1	2.00	2950 no	5,900	
11	Supplying and fixing of 300mm dia CI ventilating pipe of 1.5m height with cowl arrangement	4	1	1	4.00	10477 no	41,908	
12A	Painting one coat (priming coat) with approved cement paint over cement plastered wall surface, ceiling including cleaning preparing the surface and curing, etc., complete for outside above GL							
	Side wall outside	4	38.8	2.5	388.00	43 sqm	16,684	
12B	Painting two coats with approved cement paint over cement plastered wall surface, ceiling and other new surfaces including cleaning preparing the surface and curing, etc., complete							
	Side wall outside	4	38.8	2.5	388.00	88 sqm	34,144	
13	Supplying and filling with earth on the top of the Tank (Refilling with excavated soil)							
	Over roof slab	38	38	0.3	433.20			
	Deductions							
	M.H cover 2 no 600mm x 600mm	-2	0.36	0.3	-0.22			
	Vent Pipe, 4 no 300mm dia	-4	0.07065	0.3	-0.08			
					432.90	21.5 cum	9,307	

Sl. No.	Description	No.	Q L Exca vated Earth work qty	M S A C E x cav at ed ear th w o r k q t y	D et er m e n t a m o u n t [D] [m]	Qty. [m]	Rate without Taxes Rs	Per Rate without tax Rs	Amount without tax Rs
14	Refilling with excavated earth								
	Earthwork qty						4,542.82		
	Deduct								
	Sand filling quantity						-237.61		
	PCC 1:3:6 quantity						-475.21		
	Bottom slab portion						-950.42		
	UG Tank portion below FGL								
			-38.9	38.9	1.55	-2,345.48			
							534.11	21.5 cum	11,483
15	Disposing of surplus earth								
	Earthwork qty						4,542.82		
	Deduct								
	Earth filling over roof slab quantity						-432.90		
	Refilling earth quantity						-534.11		
	Total Amount						3,575.82	287.6 cum	10,28,405
									2,74,26,333

Executive Engineer (Desal)
Executive Engineer (Water Supply &
Chennai Metropolitan Water Supply Board
Sewerage Board
Chennai - 600 002.

Sl. No.	Description	No.	L	B	D	Qty.	Rate without Taxes Rs	Per	Amount without tax Rs
4c) Reinforcement of storage capacity by ESRs									
1 Construction of 49.32 ML - 16 Nos , New Service Reservoir including Pipe connections									
	Core City						In Litres	In ML	
1	Kilpauk						2.54	25,40,000	16 Litre
2	Anna Poonga						2.61	26,10,000	16 Litre
3	Kannapar Thidal						4.80	48,00,000	16 Litre
4	Triplicane						0.62	6,20,000	16 Litre
5	KK Nagar						3.73	37,30,000	16 Litre
6	Velachery						3.20	32,00,000	16 Litre
7	Velachery New						0.50	5,00,000	16 Litre
8	Ekkadu Thangal						0.61	6,10,000	16 Litre
9	Choolai Medu						9.25	92,50,000	16 Litre
10	Kolathur						3.34	33,40,000	16 Litre
11	Vysarpadi						6.28	62,80,000	16 Litre
12	Patel Nagar						3.36	33,60,000	16 Litre
13	Pallipattu						1.08	10,80,000	16 Litre
14	Thiruvanmiyur						1.69	16,90,000	16 Litre
15	Nandamam						1.93	19,30,000	16 Litre
16	Mylapore						3.79	37,90,000	16 Litre
17	Valluvar Kottam						0.00	0	0 Litre
18	Southern Headworks						0.00	0	0 Litre
							49.33	4,93,30,000	
2 Supply, Delivery and Installation of Ultrasonic Level Indicators, Control Valves and Electromagnetic Flow Meter of size 300mm with necessary transmitters, digital meters for instantaneous and cumulative flow indications compatible to upward integration to SCADA and Telemetry including all taxes, without excise duty and with handling charges, suitable for clear water pipe line size as per IS specifications etc complete as directed by the clients. With necessary Special and Dismantling joints Supply etc at OHT site									
a	At Existing & Proposed Service Reservoir Locations	16		1			16.00	220672.65	35,30,762
3	Provision for Lightning Arrestor Arrangements								
a	At existing and proposed Service Reservoir location	16		1			16.00	23148.00	3,70,368


Executive Engineer (Desal)
Chennai Metropolitan Water Supply &
Sewerage Board
Chennai - 600 002.

Sl. No.	Description	No.	L	B	D	Qty.	Rate without Taxes Rs	Per	Amount without tax Rs
2 Construction of Pump house and Electrical bulding (Civil works) at each and every following locations									
Core City									
	Pump house size typical size (12m x 9m)								
1	Kilpauk	1					1		
2	Anna Poonga	1					1		
3	Kannapar Thidal	1					1		
4	Triplicane	1					1		
5	KK Nagar	1					1		
6	Velachery	1					1		
7	Velachery New	1					1		
8	Ekkadu Thangal	1					1		
9	Choolai Medu	1					1		
10	Kolathur	1					1		
11	Vysarpadi	1					1		
12	Patel Nagar	1					1		
13	Pallipattu	1					1		
14	Thiruvanmiyur	1					1		
15	Nardanam	1					1		
16	Mylapore	1					1		
17	Valluvar Kottam								
18	Southern Headworks								
3 Construction of Pump house and Electrical bulding (Mechanical, Piping, Electrical and Instrumentation works) at each and every following locations									
Core City									
	This rate is taken as 50% of the OHT cost								
1	Kilpauk						1		
2	Anna Poonga						1		
3	Kannapar Thidal						1		
4	Triplicane						1		
5	KK Nagar						1		
6	Velachery						1		
7	Velachery New						1		
8	Ekkadu Thangal						1		
9	Choolai Medu						1		
10	Kolathur						1		
11	Vysarpadi						1		
12	Patel Nagar						1		
13	Pallipattu						1		
14	Thiruvanmiyur						1		

Sl. No.	Description	No.	L	B	D	Qty.	Rate without Taxes Rs	Per	Amount without tax Rs
15	Nandanam	1							
16	Mylapore	1							
17	Valluvar Koitam								
18	Southern Headworks								
a	Supply, delivery, erection & commissioning of electrically driven horizontally split case water supply pumpsets with allied electrical works	16				16	86,03,200	No	13,76,51,200
b	Pipe line and allied works	16				16	62,57,225	No	10,01,15,600
4	Provision for TANGEDCO / TNEB power connection at 16 locations at the rate of 2.5% of the Electrical estimate cost	16				16	215080	E	34,41,280
5	Providing SCADA System in the new and existing system	18				18	1,00,00,000	No.	18,00,00,000
6	Disinfection System	16				16	1,90,477	No.	30,47,632
7	Providing BT roads of 5m width including, excavation, soling for 200mm, water bound macadam of , tack coat, hotmix BT of 50mm thick and kerbs etc., Complete.	16	50			800	4,330	m	34,64,000
8	Landscape and green belt								
9	Environmental Management Plan	16				16	47,620	No.	7,61,920
	Total Amount					16	4,762	No.	76,192
									1,25,67,62,954

Sl. No.	Description	Excluding Excise Duty	No.	L	B	D	Qty.	Rate without Taxes Rs	Per Amount without tax Rs
4d) Replacement of existing pipes in the Chennai corporation (Core city) of CMWSSB									
	1 Supplying and delivery of the following sizes of DI S/S pipes of class K7 conforming to IS:8329:2000, as specified in Technical specifications in standard lengths including labour charges for loading, unloading and stacking at site etc. complete as per standard specifications and as directed by the Departmental Engineer.								
i	100 mm dia pipes	1	268240	1	1	268240	830.00	m	22,26,39,200
ii	150 mm dia pipes	1	49420	1	1	49420	1222.00	m	6,03,91,240
iii	200 mm dia pipes	1	29435	1	1	29435	1552.00	m	4,56,83,120
iv	250 mm dia pipes	1	6178	1	1	6178	2046.00	m	1,26,40,188
v	300 mm dia pipes	1	18640	1	1	18640	2597.00	m	4,84,08,080
vi	350 mm dia pipes	1	2037	1	1	2037	3114.00	m	63,43,218
vii	400 mm dia pipes	1	390	1	1	390	3738.00	m	14,57,820
viii	450 mm dia pipes	1	660	1	1	660	4400.00	m	29,04,000
			375000						
	2 Supply of Sluice Valve for isolation including labour charges for loading, unloading and stacking at site etc. complete as per standard specifications and as directed by the Departmental Engineer.								
i	100 mm dia valves	77	1	1	1	77	5939.00	E	4,57,303
ii	150 mm dia valves	15	1	1	1	15	8954.00	E	1,34,310
iii	200 mm dia valves	9	1	1	1	9	15632.00	E	1,40,688
iv	250 mm dia pipes	2	1	1	1	2	24771.00	E	49,542
v	300 mm dia pipes	6	1	1	1	6	31078.00	E	1,86,468
vi	350 mm dia pipes	1	1	1	1	1	47919.00	E	47,919
vii	400 mm dia pipes	1	1	1	1	1	61034.00	E	61,034
viii	450 mm dia pipes	1	1	1	1	1	77155.00	E	77,155
		112							
	3 Supply of Scour valve i.e Sluice Valve for scouring including labour charges for loading, unloading and stacking at site etc. complete as per standard specifications and as directed by the Departmental Engineer.								
i	100 mm dia valves	18	1	1	1	18	5939.00	E	1,06,902
ii	150 mm dia valves	4	1	1	1	4	8954.00	E	35,816
iii	200 mm dia valves	2	1	1	1	2	15632.00	E	31,264
iv	250 mm dia pipes	1	1	1	1	1	24771.00	E	24,771
v	300 mm dia pipes	2	1	1	1	2	31078.00	E	62,156
vi	350 mm dia pipes	1	1	1	1	1	47919.00	E	47,919

Executive Engineer (Design)
Water Supply & Sewerage Board

Sl. No.	Description	No. of Pcs	L	B	D	Qty.	Rate without Taxes Rs	Per with tax Rs	Amount without tax Rs
vii	400 mm dia pipes	1	1	1	1	1	61034.00	E	61,034
viii	450 mm dia pipes	1	1	1	1	1	77155.00	E	77,155
4	Supply & Delivery of DI plunger type Flow Control cum Pressure reducing valve PN 16 to the required Specifications with necessary Socket/Spigot Tail pieces, MU Collar with rubber insertion or any equivalent to the required specifications with MS bolts and nuts etc. complete	30							
ii	150 mm dia valves	10	1	1	1	10	630152.33	E	63,01,523
iii	200 mm dia valves	6	1	1	1	6	724181.70	E	43,45,090
5	Supply of Double air valve including labour charges for loading, unloading and stacking at site etc. complete as per standard specifications and as directed by the Departmental Engineer.	16							
i	80 mm dia valves (provided in the 200mm to 450mm pipes)	20	1	1	1	20	7169.00	E	1,43,380
6	Supply and delivery of DI specials of conforming to IS 9523/2000 specifications at site of work including all taxes, duties, loading, transportation, unloading, insurance etc., complete and as directed by Engineer incharge.								
a	Bends								
i	100mm dia								
	22.5 deg	3577	9.00	1	1	32193	109.00 Kg		35,09,037
	45 deg	1789	10.00	1	1	17890	109.00 Kg		19,50,010
	90 deg	1342	11.00	1	1	14762	109.00 Kg		16,09,058
ii	150mm dia								
	22.5 deg	659	14.00	1	1	9226	109.00 Kg		10,05,634
	45 deg	330	16.00	1	1	5280	109.00 Kg		5,75,520
	90 deg	248	20.00	1	1	4960	109.00 Kg		5,40,640
iii	200mm dia								
	22.5 deg	393	22.00	1	1	8646	109.00 Kg		9,42,414
	45 deg	197	26.00	1	1	5122	109.00 Kg		5,58,298
	90 deg	148	32.00	1	1	4736	109.00 Kg		5,16,224
iv	250mm dia								
	22.5 deg	83	31.00	1	1	2573	109.00 Kg		2,80,457
	45 deg	42	36.00	1	1	1512	109.00 Kg		1,64,808
v	300mm dia								
	90 deg	31	46.00	1	1	1426	109.00 Kg		1,55,434

Executive Engineer (Desai)

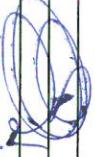
Chennai Metropolitan Water Supply &
Sewerage Board
Chennai - 600 002.

Chennai - 600 005
Sewerage Board
Chennai Metropolitan

Sl. No.	Description	No.	L	B	D	Qty.	Rate without Taxes Rs	Per without tax Rs	Amount without tax Rs	
	22.5 deg			249	41.00	1	1	10209	109.00 Kg	11,12,781


Executive Engineer (Desal)
Executive Engineer Water Supply &
Chennai Metropolitan Board
Sewerage Board
Chennai - 600 002.

Sl. No.	Description	No.	L	B	D	Qty.	Rate without Taxes Rs	Per with tax Rs	Amount without tax Rs
45 deg		125	49.00	1	1	6125	109.00 Kg	6,67,625	
90 deg		94	65.00	1	1	6110	109.00 Kg	6,65,990	
vi 350mm dia									
22.5 deg		28	52.00	1	1	1456	109.00 Kg	1,58,704	
45 deg		14	65.00	1	1	910	109.00 Kg	99,190	
90 deg		11	87.00	1	1	957	109.00 Kg	1,04,313	
vii 400mm dia									
22.5 deg		6	67.00	1	1	402	109.00 Kg	43,818	
45 deg		3	82.00	1	1	246	109.00 Kg	26,814	
90 deg		2	113.00	1	1	226	109.00 Kg	24,634	
viii 450mm dia									
22.5 deg		9	85.00	1	1	765	109.00 Kg	83,385	
45 deg		5	107.00	1	1	535	109.00 Kg	58,315	
90 deg		4	147.00	1	1	588	109.00 Kg	64.092	
b Specials for End cap of all sizes									
100mm dia		448	6.00	1	1	2688	109.00 Kg	2,92,992	
150mm dia		83	10.00	1	1	830	109.00 Kg	90,470	
200mm dia		50	17.00	1	1	850	109.00 Kg	92,650	
250mm dia		11	23.00	1	1	253	109.00 Kg	27,577	
300mm dia		32	35.00	1	1	1120	109.00 Kg	1,22,080	
350mm dia		4	49.00	1	1	196	109.00 Kg	21,364	
400mm dia		1	63.00	1	1	63	109.00 Kg	6,867	
450mm dia		2	81.00	1	1	162	109.00 Kg	17,658	
c Flanged Socket Specials for Sluice valve									
100mm dia		150	77.00	1	1	693	113.00 Kg	78,309	
150mm dia		15	14.00	1	1	210	113.00 Kg	23,730	
200mm dia		9	21.00	1	1	189	113.00 Kg	21,357	
250mm dia		2	28.00	1	1	56	113.00 Kg	6,328	
300mm dia		6	37.00	1	1	222	113.00 Kg	25,086	
350mm dia		1	48.00	1	1	48	113.00 Kg	5,424	
400mm dia		1	61.00	1	1	61	113.00 Kg	6,893	
450mm dia		1	76.00	1	1	76	113.00 Kg	8,588	
d Flanged Spigot Specials for Sluice valve									
100mm dia		77	10.00	1	1	770	113.00 Kg	87,010	
150mm dia		15	16.00	1	1	240	113.00 Kg	27,120	
200mm dia		9	23.00	1	1	207	113.00 Kg	23,391	
250mm dia		2	32.00	1	1	64	113.00 Kg	7,232	
300mm dia		6	42.00	1	1	252	113.00 Kg	28,476	
350mm dia		1	56.00	1	1	56	113.00 Kg	6,328	
400mm dia		70.00	1	1	70	113.00 Kg	7,910		
450mm dia	Executive Engineer (Design)	88.00	1	1	88	113.00 Kg	9,944		


Executive Engineer (Design)
 Water Supply
 Sewerage Board
 Chennai - 600 002.

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Sl. No.	Description	No.	L	B	D	Qty.	Rate without Taxes Rs	Per	Amount without tax Rs
e Flanged Socket Specials for Scour valve		18	9.00	1	1	162	113.00 Kg	18,306	
100mm dia		4	14.00	1	1	56	113.00 Kg	6,328	
150mm dia		2	21.00	1	1	42	113.00 Kg	4,746	
200mm dia		1	28.00	1	1	28	113.00 Kg	3,164	
250mm dia		2	37.00	1	1	74	113.00 Kg	8,362	
300mm dia		1	48.00	1	1	48	113.00 Kg	5,424	
350mm dia		1	61.00	1	1	61	113.00 Kg	6,893	
400mm dia		1	76.00	1	1	76	113.00 Kg	8,588	
450mm dia		18	10.00	1	1	180	113.00 Kg	20,340	
100mm dia		4	16.00	1	1	64	113.00 Kg	7,232	
150mm dia		2	23.00	1	1	46	113.00 Kg	5,198	
200mm dia		1	32.00	1	1	32	113.00 Kg	3,616	
250mm dia		2	42.00	1	1	84	113.00 Kg	9,492	
300mm dia		1	56.00	1	1	56	113.00 Kg	6,328	
350mm dia		1	70.00	1	1	70	113.00 Kg	7,910	
400mm dia		1	88.00	1	1	88	113.00 Kg	9,944	
g Flanged Socket Specials for Air valve		9	21.00	1	1	189	113.00 Kg	21,357	
200mm dia		2	28.00	1	1	56	113.00 Kg	6,328	
250mm dia		6	37.00	1	1	222	113.00 Kg	25,086	
300mm dia		1	48.00	1	1	48	113.00 Kg	5,424	
350mm dia		1	61.00	1	1	61	113.00 Kg	6,893	
400mm dia		1	76.00	1	1	76	113.00 Kg	8,588	
h Flanged Spigot Specials for Air valve		9	23.00	1	1	207	113.00 Kg	23,391	
200mm dia		2	32.00	1	1	64	113.00 Kg	7,232	
250mm dia		6	42.00	1	1	252	113.00 Kg	28,476	
300mm dia		1	56.00	1	1	56	113.00 Kg	6,328	
350mm dia		1	70.00	1	1	70	113.00 Kg	7,910	
400mm dia		1	88.00	1	1	88	113.00 Kg	9,944	
i All Flanged TEE for Air valve		9	39.00	1	1	351	113.00 Kg	39,663	
200mm x 80mm		2	45.00	1	1	90	113.00 Kg	10,170	
250mm x 80mm		6	58.00	1	1	348	113.00 Kg	39,324	
300mm x 80mm		1	76.00	1	1	76	113.00 Kg	8,588	
350mm x 80mm		1	95.00	1	1	95	113.00 Kg	10,735	
400mm x 80mm		1	176.00	1	1	176	113.00 Kg	19,886	

Executive Engineer (Design)
Water Supply &

Chennai Metropolitan Board
Water Supply & Sewerage Board
Chennai - 600 022.

Sl. No.	Description	No.	L	B	D	Qty.	Rate without Taxes Rs	Per Amount without tax Rs
j All socket Tees								
100mm x 100mm		90	15.00	1	1	1350	109.00 Kg	1,47,150
150mm x 100mm		9	21.00	1	1	189	109.00 Kg	20,601
150mm x 150mm		9	24.00	1	1	216	109.00 Kg	23,544
200mm x 100mm		4	30.00	1	1	120	109.00 Kg	13,080
200mm x 150mm		4	34.00	1	1	136	109.00 Kg	14,824
200mm x 200mm		4	40.00	1	1	160	109.00 Kg	17,440
250mm x 200mm		2	49.00	1	1	98	109.00 Kg	10,682
250mm x 250mm		2	55.00	1	1	110	109.00 Kg	11,990
300mm x 300mm		7	77.00	1	1	539	109.00 Kg	58,751
350mm x 350mm		1	100.00	1	1	100	109.00 Kg	10,900
400mm x 400mm		1	128.00	1	1	128	109.00 Kg	13,952
450mm x 450mm		1	165.00	1	1	165	109.00 Kg	17,985
k Double socket Reducer								
150mm x 100mm		20	13.00	1	1	260	109.00 Kg	28,340
200mm x 100mm		15	20.00	1	1	300	109.00 Kg	32,700
200mm x 150mm		10	19.00	1	1	190	109.00 Kg	20,710
250mm x 200mm		8	27.00	1	1	216	109.00 Kg	23,544
300mm x 250mm		7	35.00	1	1	245	109.00 Kg	26,705
350mm x 300mm		6	45.00	1	1	270	109.00 Kg	29,430
400mm x 350mm		5	55.00	1	1	275	109.00 Kg	29,975
450mm x 400mm		4	69.00	1	1	276	109.00 Kg	30,084
l Mechanical Joint Collar								
100mm dia		20	17.00	1	1	340	109.00 Kg	37,060
150mm dia		15	25.00	1	1	375	109.00 Kg	40,875
200mm dia		10	33.00	1	1	330	109.00 Kg	35,970
250mm dia		8	50.00	1	1	400	109.00 Kg	43,600
300mm dia		7	59.00	1	1	413	109.00 Kg	45,017
350mm dia		6	80.00	1	1	480	109.00 Kg	52,320
400mm dia		5	98.00	1	1	490	109.00 Kg	53,410
450mm dia		4	113.00	1	1	452	109.00 Kg	49,268
m Dismantling joint								
100mm dia		20	19.00	1	1	380	109.00 Kg	41,420
150mm dia		15	30.00	1	1	450	109.00 Kg	49,050
200mm dia		10	40.00	1	1	400	109.00 Kg	43,600
250mm dia		8	58.00	1	1	464	109.00 Kg	50,576
300mm dia		7	71.00	1	1	497	109.00 Kg	54,173
350mm dia		6	91.00	1	1	546	109.00 Kg	59,514
400mm dia		5	116.00	1	1	580	109.00 Kg	63,220
450mm dia		4	135.00	1	1	540	109.00 Kg	58,860

Executive Engineer (Desai)

Chennai Metropolitan Water Supply & Sewerage Board
Chennai - 600 002.

Sl. No.	Description	No.	L	B	D	Qty.	Rate without Taxes Rs	Per without tax Rs	Amount Rs
n	Double Flanged pipes of 3m length for Scour valve								
	100mm dia	18	58.20	1	1	1047.6	113.00 Kg	1,18,379	
	150mm dia	4	87.80	1	1	351.2	113.00 Kg	39,686	
	200mm dia	2	118.00	1	1	236	113.00 Kg	26,668	
	250mm dia	1	155.40	1	1	155.4	113.00 Kg	17,560	
	300mm dia	2	196.90	1	1	393.8	113.00 Kg	44,499	
	350mm dia	1	254.70	1	1	254.7	113.00 Kg	28,781	
	400mm dia	1	301.10	1	1	301.1	113.00 Kg	34,024	
	450mm dia	1	354.50	1	1	354.5	113.00 Kg	40,059	
o	Double Flanged Duckfoot bend 90deg for Scour valve								
	100mm dia	18	16.00	1	1	288	113.00 Kg	32,544	
	150mm dia	4	27.00	1	1	108	113.00 Kg	12,204	
	200mm dia	2	45.00	1	1	90	113.00 Kg	10,170	
	250mm dia	1	69.00	1	1	69	113.00 Kg	7,797	
	300mm dia	2	99.00	1	1	198	113.00 Kg	22,374	
	350mm dia	1	136.00	1	1	136	113.00 Kg	15,368	
	400mm dia	1	179.00	1	1	179	113.00 Kg	20,227	
	450mm dia	1	231.00	1	1	231	113.00 Kg	26,103	
p	Double Flanged 90 deg bend for Scour valve								
	100mm dia	18	12.00	1	1	216	113.00 Kg	24,408	
	150mm dia	4	21.00	1	1	84	113.00 Kg	9,492	
	200mm dia	2	31.00	1	1	62	113.00 Kg	7,006	
	250mm dia	1	50.00	1	1	50	113.00 Kg	5,650	
	300mm dia	2	70.00	1	1	140	113.00 Kg	15,820	
	350mm dia	1	97.00	1	1	97	113.00 Kg	10,961	
	400mm dia	1	128.00	1	1	128	113.00 Kg	14,464	
	450mm dia	1	165.00	1	1	165	113.00 Kg	18,645	
7	Laying D.I. pipes including earthwork excavation for trenches in hard stiff clay, blackcotton, hard red earth, shales, murams, gravel, stoney earth and earth mixed with small size boulders and hard gravelly soil depositing the earth on banks with initial lead of 10 m and initial lift of 2m carting the pipes from any of the Board's Stores to the site of work lowering into the trenches, aligning, refilling the trenches with excavated soil, watering and ramming to consolidation, etc., complete for the pipes of following diamettes.								
i	100 mm dia pipes	1	268240	1	1	268240	263.00 m	7,05,47,120	
ii	150 mm dia pipes	1	49420	1	1	49420	303.00 m	1,49,74,260	
iii	200 mm dia pipes	1	29435	1	1	29435	361.00 m	1,06,26,035	
iv	250 mm dia pipes	1	6178	1		377.00 m		23,29,106	

Executive Engineer (Name) : 6163848
Executive Engineer (Name) : 6163848

Sl. No.	Description	No.	L	B	D	Qty.	Rate without Taxes Rs	Per m	Amount without tax Rs
v	300 mm dia pipes	1	18640	1	1	18640	417.00	m	77,72,880
vi	350 mm dia pipes	1	2037	1	1	2037	466.00	m	9,49,242
vii	400 mm dia pipes	1	390	1	1	390	513.00	m	2,00,070
viii	450 mm dia pipes	1	660	1	1	660	562.00	m	3,70,920
		375000							
8	Jointing the DI S/S pipes and specials with rubber gaskets (tyton joint) including cost of lubricants, cost of jointing materials and testing to the required pressure with water etc., complete as per standard specifications and as directed by the Departmental Engineer.								
i	100 mm dia pipes	44707	1	1	1	44707	94.00	E	42,02,458
ii	150 mm dia pipes	8237	1	1	1	8237	132.00	E	10,87,284
iii	200 mm dia pipes	4906	1	1	1	4906	177.00	E	8,68,362
iv	250 mm dia pipes	1030	1	1	1	1030	242.00	E	2,49,260
v	300 mm dia pipes	3107	1	1	1	3107	279.00	E	8,66,853
vi	350 mm dia pipes	340	1	1	1	340	324.00	E	1,10,160
vii	400 mm dia pipes	65	1	1	1	65	373.00	E	24,245
viii	450 mm dia pipes	110	1	1	1	110	422.00	E	46,420
9	Conveying and fixing specials like "C.I.Tee" Branches, Bends and tapers including earthwork excavation as per schedule No. 1.1 of CMWSSB. at any depth								
i	Specials for 100 mm dia pipes	7286	1	1	1	7286	301.00	E	21,93,086
ii	Specials for 150 mm dia pipes	1388	1	1	1	1388	348.00	E	4,83,024
iii	Specials for 200 mm dia pipes	845	1	1	1	845	441.00	E	3,72,645
iv	Specials for 250 mm dia pipes	195	1	1	1	195	549.00	E	1,07,055
v	Specials for 300 mm dia pipes	528	1	1	1	528	617.00	E	3,25,776
vi	Specials for 350 mm dia pipes	76	1	1	1	76	706.00	E	53,656
vii	Specials for 400 mm dia pipes	28	1	1	1	28	797.00	E	22,316
viii	Specials for 450 mm dia pipes	33	1	1	1	33	915.00	E	30,195
10	Jointing the DI S/S pipes and specials with rubber gaskets (tyton joint) including cost of lubricants, cost of jointing materials and testing to the required pressure with water etc., complete as per standard specifications and as directed by the Departmental Engineer.								
i	Specials for 100 mm dia pipes	7286	1	1	1	7286	94.00	E	6,84,884
ii	Specials for 150 mm dia pipes	1388	1	1	1	1388	132.00	E	1,83,216
iii	Specials for 200 mm dia pipes	845	1	1	1	845	177.00	E	1,49,565
iv	Specials for 250 mm dia pipes	195	1	1	1	195	242.00	E	47,190
v	Specials for 300 mm dia pipes	528	1	1	1	528	279.00	E	1,47,312
vi	Specials for 350 mm dia pipes	76	1	1	1	76	324.00	E	24,624
vii	Specials for 400 mm dia pipes	28	1	1	1	28	373.00	E	10,444

Executive Engineer (Desai)
Chennai Metropolitan Water Supply &

Sewerage Board
Chennai - 600 002.

**Chennai - 600 002
Chennai Metropolitan Water Supply & Sewerage Board
Executive Engineer (P.T.O.)**

Sl. No.	Description	No.	L	B	D	Qty.	Rate without Taxes Rs	Per unit without tax Rs	Amount Rs
viii	Specials for 450 mm dia pipes	33	1	1	1	33	422.00	E	13,926
11	Testing of M.S./C.I./P.V.C./D.I. pipes with hydraulic testing equipment by filling with water(including cost of water @ Rs 60/KL) and testing to recommended pressure in convenient stretches and attending the bursts if any occurred during the test, excluding the cost of pipes, including other incidental and operational charges, etc., complete for the following diametres of pipes.								
i	100 mm dia pipes	1	268240	1	1	268240	46.00	m	1,23,39,040
ii	150 mm dia pipes	1	49420	1	1	49420	62.00	m	30,64,040
iii	200 mm dia pipes	1	29435	1	1	29435	75.00	m	22,07,625
iv	250 mm dia pipes	1	6178	1	1	6178	93.00	m	5,74,554
v	300 mm dia pipes	1	18640	1	1	18640	113.00	m	21,06,320
vi	350 mm dia pipes	1	2037	1	1	2037	133.00	m	2,70,921
vii	400 mm dia pipes	1	390	1	1	390	153.00	m	59,670
viii	450 mm dia pipes	1	660	1	1	660	176.00	m	1,16,160
			375000						
12	Disjointing and removing C.I./ G.I. existing old pipes to stores including other incidental and operational charges, etc., complete for the following diametres of pipes.								
i	100 mm dia pipes	1	268240	1	1	268240	257.00	m	6,89,37,680
ii	150 mm dia pipes	1	49420	1	1	49420	319.00	m	1,57,64,980
iii	200 mm dia pipes	1	29435	1	1	29435	409.00	m	1,20,38,915
iv	250 mm dia pipes	1	6178	1	1	6178	545.00	m	33,67,010
v	300 mm dia pipes	1	18640	1	1	18640	617.00	m	1,15,00,880
vi	350 mm dia pipes	1	2037	1	1	2037	688.00	m	14,01,456
vii	400 mm dia pipes	1	390	1	1	390	759.00	m	2,96,010
viii	450 mm dia pipes	1	660	1	1	660	836.00	m	5,51,760
			375000						
13	Disjointing and returning to stores old specials such as tee branches, tapers and bends								
i	Specials for 100 mm dia pipes	7286	1	1	1	7286	135.00	E	9,83,610
ii	Specials for 150 mm dia pipes	1388	1	1	1	1388	182.00	E	2,52,616
iii	Specials for 200 mm dia pipes	845	1	1	1	845	261.00	E	2,20,545
iv	Specials for 250 mm dia pipes	195	1	1	1	195	382.00	E	74,490
v	Specials for 300 mm dia pipes	528	1	1	1	528	454.00	E	2,39,712
vi	Specials for 350 mm dia pipes	76	1	1	1	76	530.00	E	40,280
vii	Specials for 400 mm dia pipes	28	1	1	1	28	616.00	E	17,248
viii	Specials for 450 mm dia pipes	33	1	1	1	33	707.00	E	23,331
			10379						

Executive Engineer (P.T.O.)
Chennai Metropolitan Water Supply & Sewerage Board
Chennai - 600 002.

Sl. No.	Description	Executive Engineer (D.E.S)	No.	Amt(Rs)	L	B	D	Qty.	Rate without Taxes Rs	Per with out tax Rs	Amount Rs
14	Connection work to existing main including cutting existing pipe, fixing branches, collars, lead jointing and bailing out water, etc., complete										
i	100 mm dia pipes		1	2683	1	1	2683	2,904.00	E	77,91,432	
ii	150 mm dia pipes		1	495	1	1	495	2,904.00	E	14,37,480	
iii	200 mm dia pipes		1	295	1	1	295	5,721.00	E	16,87,695	
iv	250 mm dia pipes		1	62	1	1	62	5,721.00	E	3,54,702	
v	300 mm dia pipes		1	187	1	1	187	10,077.00	E	18,84,399	
vi	350 mm dia pipes		1	21	1	1	21	10,077.00	E	2,11,617	
vii	400 mm dia pipes		1	4	1	1	4	10,077.00	E	40,308	
viii	450 mm dia pipes		1	7	1	1	7	10,077.00	E	70,539	
				3754							
15	Cutting the DI Pipes true to axis and filing smoothly and finishing the ends complete										
i	100 mm dia pipes		1	6706	1	1	6706	116.00	E	7,77,896	
ii	150 mm dia pipes		1	1236	1	1	1236	155.00	E	1,91,580	
iii	200 mm dia pipes		1	736	1	1	736	208.00	E	1,53,088	
iv	250 mm dia pipes		1	155	1	1	155	268.00	E	41,540	
v	300 mm dia pipes		1	466	1	1	466	307.00	E	1,43,062	
vi	350 mm dia pipes		1	51	1	1	51	345.00	E	17,595	
vii	400 mm dia pipes		1	10	1	1	10	384.00	E	3,840	
viii	450 mm dia pipes		1	17	1	1	17	423.00	E	7,191	
16	Conveying and fixing sluice valves with tail pieces including fixing the surface boxes/valves, covers										
i	100 mm dia valves		77	1	1	1	77	706.00	E	54,362	
ii	150 mm dia valves		15	1	1	1	15	823.00	E	12,345	
iii	200 mm dia valves		9	1	1	1	9	988.00	E	8,892	
iv	250 mm dia pipes		2	1	1	1	2	1235.00	E	2,470	
v	300 mm dia pipes		6	1	1	1	6	1646.00	E	9,876	
vi	350 mm dia pipes		1	1	1	1	1	2470.00	E	2,470	
vii	400 mm dia pipes		1	1	1	1	1	3087.00	E	3,087	
viii	450 mm dia pipes		1	1	1	1	1	4116.00	E	4,116	
17	Conveying and fixing scour valves with tail pieces including fixing all the required specials			112							
i	100 mm dia valves		18	1	1	1	18	706.00	E	12,708	
ii	150 mm dia valves		4	1	1	1	4	823.00	E	3,292	
iii	200 mm dia valves		2	1	1	1	2	988.00	E	1,976	
iv	250 mm dia pipes	(D.E.S)	1	1	1	1	1	1235.00	E	1,235	
v	300 mm dia pipes		1	1	2	1	2	1646.00	E	3,292	

Executive Engineer (D.E.S)
Chennai Metropolitan Water Supply
Chennai - 600 002.

Sl. No.	Description	Excluding Excise Duty	No.	L	B	D	Qty.	Rate without Taxes Rs	Per	Amount without tax Rs
vi	350 mm dia pipes		1	1	1	1	1	2470.00	E	2,470
vii	400 mm dia pipes		1	1	1	1	1	3087.00	E	3,087
viii	450 mm dia pipes		1	1	1	1	1	4116.00	E	4,116
18	Conveying and fixing Double air valves with tail pieces including fixing all the required specials	30								
i	80 mm dia valves (provided in the 200mm to 450mm pipes)	20	1	1	1	1	20	603.00	E	12,060
19	Conveying and Fixing of DI plunger type Flow Control cum Pressure reducing valve PN 16 to the required Specifications with necessary Socket/Spigot Tail pieces, MJ Collar with rubber insertion or any equivalent to the required specifications with MS bolts and nuts etc. complete									
	150 mm dia pipes	10	1	1	1	1	10	63015	E	6,30,152
	200 mm dia pipes	6	1	1	1	1	6	72418	E	4,34,509
20	Construction of thrust blocks using Cement Concrete 1:3:6 ,40mm B.G.jelly for Plain Cement Concrete	16					16			
i	Specials for 100 mm dia pipes	7286	1	1	1	1	7286	5563.00	E	4,05,32,018
ii	Specials for 150 mm dia pipes	1388	1	1	1	1	1388	5563.00	E	77,21,444
iii	Specials for 200 mm dia pipes	845	1	1	1	1	845	6177.00	E	52,19,565
iv	Specials for 250 mm dia pipes	195	1	1	1	1	195	6628.00	E	12,92,460
v	Specials for 300 mm dia pipes	528	1	1	1	1	528	7313.00	E	38,61,264
vi	Specials for 350 mm dia pipes	76	1	1	1	1	76	7709.00	E	5,85,884
vii	Specials for 400 mm dia pipes	28	1	1	1	1	28	8295.00	E	2,32,260
viii	Specials for 450 mm dia pipes	33	1	1	1	1	33	8797.00	E	2,90,301
21	Construction of Chambers for housing Isolation valves, scour valves and air valves as per type design and as per specification etc. complete	10379								
i	For housing Valves 100 mm to 250 mm dia valves	153	1	1	1	1	153	33709.00	E	51,57,477
ii	For housing Valves 300 mm to 400 mm dia valves	18	1	1	1	1	18	41135.00	E	7,40,430
iii	For housing Air Valves	20	1	1	1	1	20	9848.00	E	1,96,960
22	Cutting asphaltic & concrete Roads									
	For laying 100 mm dia DI pipe	1	268240	0.60	1		160944			
	For laying 150 mm dia DI pipe	1	49420	0.60	1		29652			
	For laying 200 mm dia DI pipe	1	29435	0.80	1		23548			
	For laying 250 mm dia DI pipe	1	6128500 ¹⁸⁶⁴⁰	0.80	1		4942.4			
	For laying 300 mm dia DI pipe	1	6128500 ¹⁸⁶⁴⁰	0.80	1		14912			

[Signature]
Executive Engineer
Chennai Metropolitan Board
Sewerage
Chennai - 600 002.

Sl. No.	Description	No. of Meters	L ength in Metres (Cubic metres)	B	D	Qty.	Rate without Taxes Rs	Per withot tax Rs	Amount Rs
	For laying 350 mm dia DI pipe	1	2037	0.90	1	1	1833.3		
	For laying 400 mm dia DI pipe	1	390	0.90	1	351			
	For laying 450 mm dia DI pipe	1	660	1.00	1	660			
		375000					236843		
	Bus route Road at 30% total quantity						71053	171.00 sqm	1,21,50,031
	Non Bus route Road at 70% total quantity						165790	85.00 sqm	1,40,92,141
23	Supply and Lowering the RCC Non Pressure pipes NP 4 class into the trench for crossing NH/SH and other roads (For encasing of pipes)								
	200 mm dia	1	5365	1.00	1	5365	723.90 m	38.83,724	
	300 mm dia	1	989	1.00	1	989	1080.15 m	10.68,268	
	400 mm dia	1	589	1.00	1	589	1953.20 m	11,50,435	
	500 mm dia	1	124	1.00	1	124	2789.20 m	3,45,861	
	600 mm dia	1	373	1.00	1	373	3214.80 m	11,99,120	
	700 mm dia	1	41	1.00	1	41	4553.35 m	1,86,687	
	800 mm dia	1	8	1.00	1	8	5678.15 m	45,425	
	900 mm dia	1	14	1.00	1	14	6564.50 m	91,903	
		7503							
24	Providing iron barricading of size 6' (1.83 m) width and 3.5'(1.07 m) height using 1.5" (38 mm) dia MS Sq.Tubular pipe for outer frame supports, 0.75" (20 mm) size small MS tubular square pipe for inner frame supports and 3' x 2' (0.9 x 0.6 m) size MS Sheet for name Board (as per drawing) including cutting, welding, fabrication charges and one coat of primer and 2 coats of enamel paint of approved quality with fixing of indication sticker and necessary interlocking arrangements with adjoining units and placing barricading units including watching during night fixing danger flags/reflectors units as directed at site etc. complete.	2	375000	1.00	1	750000	53.00 m	3,97,50,000	
25	Road restoration charges to be paid to Greater Chennai Corporation								
	For laying 100 mm dia DI pipe	1	268240	0.6	1	160944			
	For laying 150 mm dia DI pipe	1	49420	0.6	1	29652			
	For laying 200 mm dia DI pipe	1	29435	0.8	1	23548			
	For laying 250 mm dia DI pipe	1	6178	0.8	1	4942			
	For laying 300 mm dia DI pipe	1	18640	0.8	1	14912			
	For laying 350 mm dia DI pipe	1	2037	0.9	1	1833			
	For laying 400 mm dia DI pipe	1	390	0.9	1	351			

Executive Engineer (Desal)
 Chennai Metropolitan Water Supply &
 Sewerage Board
 Chennai - 600 002.

Sl. No.	Description	No. Excluding GST	Labour Only Excluding GST (Days)	B	C	D	Qty.	Rate without Taxes Rs	Per without tax Rs	Amount without tax Rs
	For laying 450 mm dia DI pipe	1	660	1	1	660				
	Bus route Road						Total	236843		
	Non Bus route Roads							71053	4005.00	28,45,66,504
26	House Service Connections							165790	2745.00	45,50,93,248
A										
1	HSC to be replaced from existing line to proposed line and for New line (Domestic).	1	4829	1.00	1	4829		1950.00	E	94,16,550
2	HSC to be replaced from existing line to proposed line and for New line (Non-Domestic).	1	537	1.00	1	537		2505.00	E	13,45,185
B	FCV									
1	FCV for Domestic Connections	1	4829	1.00	1	4829		281.00	E	13,56,949
2	FCV for Non Domestic Connections	1	537	1.00	1	537		332.00	E	1,78,284
C	Water Meter									
1	Water for Domestic Connections	1	4829	1.00	1	4829		1800.00	E	86,92,200
2	Water Meter for Non Domestic Connections	1	537	1.00	1	537		4500.00	E	24,16,500
	Total Amount									
	Total say (with GST @ 18%)									1,60,66,02,678

**Executive Engineer (Desal)
Chennai Metropolitan Water Supply
Sewerage Board
Chennai - 600 002.**

Sl. No.	Description	No.	L	B	D	Qty.	Rate without Taxes Rs	Per Amount without tax Rs
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4e) Installation of supplementary pipes in the core City of CMMWSSB

1	Supplying and delivery of the following sizes of DI S/S pipes of class K7 conforming to IS:8329/2000, as specified in Technical specifications in standard lengths including labour charges for loading, unloading and stacking at site etc. complete as per standard specifications and as directed by the Departmental Engineer.							
i	100 mm dia pipes	1	83285	83285	830.00	m	6,91,26,550	
ii	150 mm dia pipes	1	9292	9292	1222.00	m	1,13,54,824	
iii	200 mm dia pipes	1	15797	15797	1552.00	m	2,45,16,944	
iv	250 mm dia pipes	1	3511	3511	2046.00	m	71,83,506	
v	300 mm dia pipes	1	1300	1300	2597.00	m	33,76,100	
			113185					
2	Supply of Sluice Valve for isolation including labour charges for loading, unloading and stacking at site etc. complete as per standard specifications and as directed by the Departmental Engineer.							
i	100 mm dia valves	24	1	24	5939.00	E	1,42,536	
ii	150 mm dia valves	3	1	3	8954.00	E	26,862	
iii	200 mm dia valves	5	1	5	15632.00	E	78,160	
iv	250 mm dia pipes	2	1	2	24771.00	E	49,542	
v	300 mm dia pipes	1	1	1	31078.00	E	31,078	
		35						
3	Supply of Scour valve i.e Sluice Valve for scouring including labour charges for loading, unloading and stacking at site etc. complete as per standard specifications and as directed by the Departmental Engineer.							
i	100 mm dia valves	6	1	6	5939.00	E	35,634	
ii	150 mm dia valves	1	1	1	8954.00	E	8,954	
iii	200 mm dia valves	2	1	2	15632.00	E	31,264	
iv	250 mm dia valves	1	1	1	24771.00	E	24,771	
v	300 mm dia valves	1	1	1	31078.00	E	31,078	
		11						


Executive Engineer (Desai)
 Executive Engineer Water Supply &
 Chennai Metropolitan Board
 Sewerage Board
 Chennai - 600 002.

Sl. No.	Description	No.	L	B	D	Qty.	Rate without Taxes Rs	Per	Amount without tax Rs
4	Supply & Delivery of DI Plunger type Flow Control cum Pressure reducing valve to the required Specifications with necessary Socket/Spigot Tail pieces, MJ Collar with rubber insertion or any equivalent to the required specifications with MS bolts and nuts etc. complete								
ii	150 mm dia valves	6	1			6	630152.33	E	37,80,914
iii	200 mm dia valves	4	1			4	724181.70	E	28,96,727
5	Supply of Double air valve including labour charges for loading, unloading and stacking at site etc. complete as per standard specifications and as directed by the Departmental Engineer.	10							
i	80 mm dia valves (provided in the 200mm to 450mm pipes)	4	1			4	7169.00	E	28,676
5	Supply and delivery of DI specials of conforming to IS 9523/2000 specifications at site of work including all taxes, duties, loading, transportation, unloading, insurance etc., complete and as directed by Engineer incharge.								
a	Bends								
i	100mm dia								
22.5 deg		1111	9.00			9999	109.00	Kg	10,89,891
45 deg		556	10.00			5560	109.00	Kg	6,06,040
90 deg		417	11.00			4587	109.00	Kg	4,99,983
ii	150mm dia								
22.5 deg		124	14.00			1736	109.00	Kg	1,89,224
45 deg		62	16.00			992	109.00	Kg	1,08,128
90 deg		47	20.00			940	109.00	Kg	1,02,460
iii	200mm dia								
22.5 deg		211	22.00			4642	109.00	Kg	5,05,978
45 deg		106	26.00			2756	109.00	Kg	3,00,404
90 deg		79	32.00			2528	109.00	Kg	2,75,552
iv	250mm dia								
22.5 deg		47	31.00			1457	109.00	Kg	1,58,813
45 deg		24	36.00			864	109.00	Kg	94,176
90 deg		18	46.00			828	109.00	Kg	90,252
v	300mm dia								
22.5 deg		18	41.00			738	109.00	Kg	80,442
45 deg		9	49.00			441	109.00	Kg	48,069
90 deg		7	65.00			455	109.00	Kg	49,595


Executive Engineer (Desai)

Chennai Metropolitan Water Supply &
Sewerage Board
Chennai - 600 002.

Sl. No.	Description	Excluding Excise Tax (Rs.)	No. of pieces	L	B	D	Qty.	Rate without Taxes Rs	Per	Amount without tax Rs
b	Specials for End cap of all sizes									
	100mm dia	139	6.00				834	109.00 Kg		90,906
	150mm dia	16	10.00				160	109.00 Kg		17,440
	200mm dia	27	17.00				459	109.00 Kg		50,031
	250mm dia	6	23.00				138	109.00 Kg		15,042
	300mm dia	3	35.00				105	109.00 Kg		11,445
c	Flanged Socket Specials for Sluice valve									
	100mm dia	24	9.00				216	113.00 Kg		24,408
	150mm dia	3	14.00				42	113.00 Kg		4,746
	200mm dia	5	21.00				105	113.00 Kg		11,865
	250mm dia	2	28.00				56	113.00 Kg		6,328
	300mm dia	1	37.00				37	113.00 Kg		4,181
d	Flanged Spigot Specials for Sluice valve									
	100mm dia	24	10.00				240	113.00 Kg		27,120
	150mm dia	3	16.00				48	113.00 Kg		5,424
	200mm dia	5	23.00				115	113.00 Kg		12,995
	250mm dia	2	32.00				64	113.00 Kg		7,232
	300mm dia	1	42.00				42	113.00 Kg		4,746
e	Flanged Socket Specials for Scour valve									
	100mm dia	6	9.00				54	113.00 Kg		6,102
	150mm dia	1	14.00				14	113.00 Kg		1,582
	200mm dia	2	21.00				42	113.00 Kg		4,746
	250mm dia	1	28.00				28	113.00 Kg		3,164
	300mm dia	1	37.00				37	113.00 Kg		4,181
f	Flanged Spigot Specials for Scour valve									
	100mm dia	6	10.00				60	113.00 Kg		6,780
	150mm dia	1	16.00				16	113.00 Kg		1,808
	200mm dia	2	23.00				46	113.00 Kg		5,198
	250mm dia	1	32.00				32	113.00 Kg		3,616
	300mm dia	1	42.00				42	113.00 Kg		4,746
g	Flanged Socket Specials for Air valve									
	200mm dia	4	21.00				84	113.00 Kg		9,492
	250mm dia	1	28.00				28	113.00 Kg		3,164
	300mm dia	1	37.00				37	113.00 Kg		4,181
h	Flanged Spigot Specials for Air valve									
	200mm dia	4	23.00				92	113.00 Kg		10,396
	250mm dia	1	32.00				32	113.00 Kg		3,616
	300mm dia	1	42.00				42	113.00 Kg		4,746
i	All Flanged TEE for Air valve									
	200mm x 80mm	4	39.00				156	113.00 Kg		17,628
	250mm x 80mm	45	45.00				45	113.00 Kg		5,085

Chennai - 600 005
General Body
Chennai Metropolitan Board

Sl. No.	Description	No.	L	B	D	Qty.	Rate without Taxes Rs	Per withouth tax Rs	Amount without tax Rs
	300mm x 80mm	1	58.00			58	113.00 Kg	6,554	
j All socket Tees									
	100mm x 100mm	28	15.00			420	109.00 Kg	45,780	
	150mm x 100mm	4	21.00			84	109.00 Kg	9,156	
	150mm x 150mm	2	24.00			48	109.00 Kg	5,232	
	200mm x 100mm	6	30.00			180	109.00 Kg	19,620	
	200mm x 150mm	3	34.00			102	109.00 Kg	11,118	
	200mm x 200mm	2	40.00			80	109.00 Kg	8,720	
	250mm x 200mm	2	49.00			98	109.00 Kg	10,682	
	250mm x 250mm	1	55.00			55	109.00 Kg	5,995	
	300mm x 300mm	1	77.00			77	109.00 Kg	8,393	
k Double socket Reducer									
	150mm x 100mm	20	13.00			260	109.00 Kg	28,340	
	200mm x 100mm	2	20.00			40	109.00 Kg	4,360	
	200mm x 150mm	2	19.00			38	109.00 Kg	4,142	
	250mm x 200mm	4	27.00			108	109.00 Kg	11,772	
	300mm x 250mm	1	35.00			35	109.00 Kg	3,815	
l Mechanical Joint Collar									
	100mm dia	20	17.00			340	109.00 Kg	37,060	
	150mm dia	2	25.00			50	109.00 Kg	5,450	
	200mm dia	2	33.00			66	109.00 Kg	7,194	
	250mm dia	4	50.00			200	109.00 Kg	21,800	
	300mm dia	1	59.00			59	109.00 Kg	6,431	
m Dismantling joint									
	100mm dia	20	19.00			380	109.00 Kg	41,420	
	150mm dia	2	30.00			60	109.00 Kg	6,540	
	200mm dia	2	40.00			80	109.00 Kg	8,720	
	250mm dia	4	58.00			232	109.00 Kg	25,288	
	300mm dia	1	71.00			71	109.00 Kg	7,739	
n Double Flanged pipes of 3m length for Scour valve									
	100mm dia	18	58.20			1047.6	113.00 Kg	118,379	
	150mm dia	3	87.80			263.4	113.00 Kg	29,764	
	200mm dia	6	118.00			708	113.00 Kg	80,004	
	250mm dia	3	155.40			466.2	113.00 Kg	52,681	
	300mm dia	3	196.90			590.7	113.00 Kg	66,749	
o Double Flanged Duckfoot bend 90deg for Scour valve									
	100mm dia	6	16.00			96	113.00 Kg	10,848	
	150mm dia	1	27.00			27	113.00 Kg	3,051	
	200mm dia								
	250mm dia								
	300mm dia								
<i>Executive Engineer (Prestige Supply & Services)</i> <i>Chennai Metropolitan Water Supply & Sewerage Board</i>		99	99.00	113.00	Kg	7,797			
									11,187

Sl. No.	Description	Excl. (A) Rs.	No. (B)	Excl. (C) Rs.	L	B	D	Qty.	Rate without Taxes Rs	Per	Amount without tax Rs
p Double Flanged 90 deg bend for Scour valve											
100mm dia		6	12.00		72				113.00 Kg		8,136
150mm dia		1	21.00		21				113.00 Kg		2,373
200mm dia		2	31.00		62				113.00 Kg		7,006
250mm dia		1	50.00		50				113.00 Kg		5,650
300mm dia		1	70.00		70				113.00 Kg		7,910
6 Laying D.I. pipes including earthwork excavation for trenches in hard stiff clay, blackcotton, hard red earth, shales, murams, gravel, stoney earth and earth mixed with small size boulders and hard gravelly soil depositing the earth on banks with initial lead of 10 m and initial lift of 2m carting the pipes from any of the Board's Stores to the site of work lowering into the trenches, aligning, refilling the trenches with excavated soil, watering and ramming to consolidation, etc., complete for the pipes of following diametres.											
i 100 mm dia pipes		1	83285		83285				2,19,03,955		
ii 150 mm dia pipes		1	9292		9292				28,15,476		
iii 200 mm dia pipes		1	15797		15797				57,02,717		
iv 250 mm dia pipes		1	3511		3511				13,23,647		
v 300 mm dia pipes		1	1300		1300				417.00 m		5,42,100
7 Jointing the DI S/S pipes and specials with rubber gaskets (tyton joint) including cost of lubricants, cost of jointing materials and testing to the required pressure with water etc., complete as per standard specifications and as directed by the Departmental Engineer.		113185									
i 100 mm dia pipes		13881	1	13881					13,04,814		
ii 150 mm dia pipes		1549	1	1549					2,04,468		
iii 200 mm dia pipes		2633	1	2633					4,66,041		
iv 250 mm dia pipes		586	1	586					1,41,812		
v 300 mm dia pipes		217	1	217					60,543		
8 Conveying and fixing specials like "C.I.Tee" Branches, Bends and tapers including earthwork excavation as per schedule No.1.1 of CMWSSB, at any depth											
i Specials for 100 mm dia pipes		2291	1	2291					6,89,591		
ii Specials for 150 mm dia pipes		279	1	279					97,092		
iii Specials for 200 mm dia pipes		442	1	442					1,94,922		
iv Specials for 250 mm dia pipes		110	1	110					60,390		
v Specials for 300 mm dia pipes		41	1	41					25,297		

Sl. No.	Description	No.	L	B	D	Qty.	Rate without Taxes Rs	Per withouth tax Rs	Amount without tax Rs
9	Jointing the DI S/S pipes and specials with rubber gaskets (tyton joint) including cost of lubricants, cost of jointing materials and testing to the required pressure with water etc., complete as per standard specifications and as directed by the Departmental Engineer.								
i	Specials for 100 mm dia pipes	2291	1			2291	94.00	E	2,15,354
ii	Specials for 150 mm dia pipes	279	1			279	132.00	E	36,828
iii	Specials for 200 mm dia pipes	442	1			442	177.00	E	78,234
iv	Specials for 250 mm dia pipes	110	1			110	242.00	E	26,620
v	Specials for 300 mm dia pipes	41	1			41	279.00	E	11,439
10	Testing of M.S./C.I./P.V.C./D.I. pipes with hydraulic testing equipment by filling with water(including cost of water @ Rs.60/KL) and testing to recommended pressure in convenient stretches and attending the bursts if any occurred during the test, excluding the cost of pipes, including other incidental and operational charges, etc., complete for the following diametres of pipes.								
i	100 mm dia pipes	1	83285			83285	46.00	m	38,31,110
ii	150 mm dia pipes	1	9292			9292	62.00	m	5,76,104
iii	200 mm dia pipes	1	15797			15797	75.00	m	11,84,775
iv	250 mm dia pipes	1	3511			3511	93.00	m	3,26,523
v	300 mm dia pipes	1	1300			1300	113.00	m	1,46,900
			113185						
11	Connection work to existing main including cutting existing pipe, fixing branches, collars, lead jointing and bailing out water, etc., complete								
i	100 mm dia pipes	1	417			417	2,904.00	E	12,10,968
ii	150 mm dia pipes	1	47			47	2,904.00	E	1,36,488
iii	200 mm dia pipes	1	79			79	5,721.00	E	4,51,959
iv	250 mm dia pipes	1	18			18	5,721.00	E	1,02,978
v	300 mm dia pipes	1	7			7	10,077.00	E	70,539
			568						
12	Cutting the DI Pipes true to axis and filing smoothly and finishing the ends complete								
i	100 mm dia pipes	1	2083			2083	116.00	E	2,41,628
ii	150 mm dia pipes	1	233			233	155.00	E	36,115
iii	200 mm dia pipes	1	395			395	208.00	E	82,160
iv	250 mm dia pipes	1	88			88	268.00	E	23,584
v	300 mm dia pipes	1	33			33	307.00	E	10,131
13	Conveying and fixing sluice valves with tail pieces including fixing the surface boxes/valves, covers	24	1						
i	100 mm dia valves								16,944


Executive Engineer (Desai)

Chennai Metropolitan Water Supply & Sewerage Board
Sewerage Board
Chennai - 600 002.

Sl. No.	Description	No.	L	B	D	Qty.	Rate without Taxes Rs	Per	Amount without tax Rs
ii	150 mm dia valves	3	1			3	823.00	E	2,469
iii	200 mm dia valves	5	1			5	988.00	E	4,940
iv	250 mm dia pipes	2	1			2	1235.00	E	2,470
v	300 mm dia pipes	1	1			1	1646.00	E	1,646
		35							
14	Conveying and fixing scour valves with tail pieces including fixing all the required specials								
i	100 mm dia valves	6	1			6	706.00	E	4,236
ii	150 mm dia valves	1	1			1	823.00	E	823
iii	200 mm dia valves	2	1			2	988.00	E	1,976
iv	250 mm dia pipes	1	1			1	1235.00	E	1,235
v	300 mm dia pipes	1	1			1	1646.00	E	1,646
		11							
15	Conveying and fixing Double air valves with tail pieces including fixing all the required specials								
i	80 mm dia valves (provided in the 200mm to 450mm pipes)	4	1			4	603.00	E	2,412
16	Conveying and Fixing of DI plunger type Flow Control cum Pressure reducing valve to the required Specifications with necessary Socket/Spigot Tail pieces, MJ Collar with rubber insertion or any equivalent to the required specifications with MS bolts and nuts etc. complete								
150 mm dia pipes		6				6	63015		3,78,091
200 mm dia pipes		4				4	72418		2,89,673
		10				10			
17	Construction of thrust blocks using Cement Concrete 1:3:6, 40mm B.G.jelly for Plain Cement Concrete								
i	Specials for 100 mm dia pipes	2291	1			2291	5563.00	E	1,27,44,833
ii	Specials for 150 mm dia pipes	279	1			279	5563.00	E	15,52,077
iii	Specials for 200 mm dia pipes	442	1			442	6177.00	E	27,30,234
iv	Specials for 250 mm dia pipes	110	1			110	6628.00	E	7,29,080
v	Specials for 300 mm dia pipes	41	1			41	7313.00	E	2,99,833
		3163							
18	Construction of Chambers for housing Isolation valves, scour valves and air valves as per type design and as per specification etc. complete								
i	For housing Valves 100 mm to 250 mm dia valves	54				54	33709.00	E	18,20,286
ii	For housing Valves 300 mm to 400 mm dia valves	3				3	41135.00	E	1,23,405
iii	For housing Air Valves	4				4	9848.00	E	39,392

Sl. No.	Description	No.	L	B	D	Qty.	Rate without Taxes Rs	Per m	Amount without tax Rs
19	Cutting asphaltic & concrete Roads								
	For laying 100 mm dia DI pipe	1	83285	0.60	1	49971.00			
	For laying 150 mm dia DI pipe	1	9292	0.60	1	5575.20			
	For laying 200 mm dia DI pipe	1	15797	0.80	1	12637.60			
	For laying 250 mm dia DI pipe	1	3511	0.80	1	2808.80			
	For laying 300 mm dia DI pipe	1	1300	0.80	1	1040.00			
	Bus route Road at 30% total quantity								
	Non Bus route Road at 70% total quantity								
20	Supply and Lowering the RCC Non Pressure pipes NP 4 class into the trench for crossing NH/SH and other roads (For encasing of pipes)								
	200 mm dia	1	316			316	723.90	m	2,28,752
	300 mm dia	1	71			71	1080.15	m	76,691
	400 mm dia	1	26			26	1953.20	m	50,783
21	Providing iron barricading of size 6' (1.83 m) width and 3.5'(1.07 m) height using 1.5" (38 mm) dia MS Sq. Tubular pipe for outer frame supports, 0.75" (20 mm) size small MS tubular square pipe for inner frame supports and 3' x 2' (0.9 x 0.6 m) size MS Sheet for name Board (as per drawing) including cutting, welding, fabrication charges and one coat of primer and 2 coats of enamel paint of approved quality with fixing of indication sticker and necessary interlocking arrangements with adjoining units and placing barricading units including watching during night fixing danger flags/reflectors units as directed at site etc. complete.	2	113185			226370	53.00	m	1,19,97,610


 Executive Engineer (Desai)
 Chennai Metropolitan Water Supply &
 Sewerage Board
 Chennai - 600 002.

**Executive Engineer (Desai)
Chennai Metropolitan Water Supply &
Sewerage Board
Chennai - 600 002.**

Orion - 600 000 Geometrische Modelle

Sl. No.	Description	No.	L	B	D	Qty.	Rate without Taxes Rs	Per Amount without tax Rs
4f) Setup of DMAs								
1	Supply, delivery, fixing testing and commissioning of best efficient Orifice Type Electronic Water meter using differential pressure sensing element with flange insertable orifice plate suitable for D,D/2 tapping as per BS1042 specification.the meter should be suitable to be connected to converter to give a remote indication of totalisation and flow rate with a option for computer connectivity including sensor and totaliser including all taxes, duties and handling charges.							
i	100 mm dia	1	20	1	1	20	177620.00 E	35,52,400
ii	150 mm dia	1	33	1	1	33	182620.00 E	60,26,460
iii	200 mm dia	1	28	1	1	28	222792.00 E	62,38,176
iv	250 mm dia	1	17	1	1	17	267727.00 E	45,51,359
v	300 mm dia	1	12	1	1	12	311454.00 E	37,37,448
vi	350 mm dia	1	9	1	1	9	365137.00 E	32,86,233
vii	400 mm dia	1	10	1	1	10	431267.00 E	43,12,670
viii	450 mm dia	1	10	1	1	10	512953.00 E	51,29,530
ix	500 mm dia	1	20	1	1	20	614087.00 E	1,22,81,740
x	600 mm dia	1	15	1	1	15	739529.00 E	1,10,92,935
			174					
2	Supply of Sluice Valve for isolation including labour charges for loading, unloading and stacking at site etc. complete as per standard specifications and as directed by the Departmental Engineer.							
i	100 mm dia valves	28	1	1	1	28	5924.00 E	1,65,872
ii	150 mm dia valves	56	1	1	1	56	8954.00 E	5,01,424
iii	200 mm dia valves	50	1	1	1	50	15632.00 E	7,81,600
iv	250 mm dia pipes	27	1	1	1	27	24771.00 E	6,68,817
v	300 mm dia pipes	18	1	1	1	18	31078.00 E	5,59,404
vi	350 mm dia pipes	14	1	1	1	14	47919.00 E	6,70,866
vii	400 mm dia pipes	16	1	1	1	16	61034.00 E	9,76,544
viii	450 mm dia pipes	17	1	1	1	17	77155.00 E	13,11,635
ix	500 mm dia pipes	38	1	1	1	38	96951.00 E	36,84,138
x	600 mm dia pipes	26	1	1	1	26	142533.00 E	37,05,858
		290						

4f) Setup of DMASS



Sl. No.	Description	No.	L Eas on S u s p ro ce ss	B E qu al (Des ign)	D is si gn in g	Qty.	Rate without Taxes Rs	Per with out tax Rs	Amount Rs
3	Supply and delivery of DI specials of conforming to IS 9523/2000 specifications at site of work including all taxes, duties, loading, transportation, unloading, insurance etc., complete and as directed by Engineer incharge.								
Weight of DI specials taken from Standard data from Preetam Pipes Syndicate									
a Flanged Socket Specials for Meter									
100mm dia		20	9.00	1	1	180	108.90 Kg		19,602
150mm dia		33	14.00	1	1	462	108.90 Kg		50,312
200mm dia		28	21.00	1	1	588	108.90 Kg		64,033
250mm dia		17	28.00	1	1	476	108.90 Kg		51,836
300mm dia		12	37.00	1	1	444	108.90 Kg		48,352
350mm dia		9	48.00	1	1	432	108.90 Kg		47,045
400mm dia		10	61.00	1	1	610	108.90 Kg		66,429
450mm dia		10	76.00	1	1	760	108.90 Kg		82,764
500mm dia		20	96.00	1	1	1920	108.90 Kg	2,09,088	
600mm dia		15	132.00	1	1	1980	108.90 Kg		2,15,622
						174			
b Flanged Spigot Specials for Meter									
100mm dia		20	10.00	1	1	200	108.90 Kg		21,780
150mm dia		33	16.00	1	1	528	108.90 Kg		57,499
200mm dia		28	23.00	1	1	644	108.90 Kg		70,132
250mm dia		17	32.00	1	1	544	108.90 Kg		59,242
300mm dia		12	42.00	1	1	504	108.90 Kg		54,886
350mm dia		9	56.00	1	1	504	108.90 Kg		54,886
400mm dia		10	70.00	1	1	700	108.90 Kg		76,230
450mm dia		10	88.00	1	1	880	108.90 Kg		95,832
500mm dia		20	110.00	1	1	2200	108.90 Kg	2,39,580	
600mm dia		15	159.00	1	1	2385	108.90 Kg		2,59,727
						174			
c Flanged Socket Specials for Sluice valve									
100mm dia		28	9.00	1	1	252	108.90 Kg		27,443
150mm dia		56	14.00	1	1	784	108.90 Kg		85,378
200mm dia		50	21.00	1	1	1050	108.90 Kg		1,14,345
250mm dia		27	28.00	1	1	756	108.90 Kg		82,328
300mm dia		18	37.00	1	1	666	108.90 Kg		72,527
350mm dia		14	48.00	1	1	672	108.90 Kg		73,181
400mm dia		16	61.00	1	1	976	108.90 Kg		1,06,286
450mm dia		17	76.00	1	1	1292	108.90 Kg	1,40,699	
500mm dia		38	96.00	1	1	3648	108.90 Kg	3,97,267	
600mm dia		26	132.00	1	1	3432	108.90 Kg	3,73,745	

Chennai - 600 002
Chennai Desalination Project
Executive Engineer (Desal)

Sl. No.	Description	No.	A	B	C	D	Qty.	Rate without Taxes Rs	Per	Amount without tax Rs
							290			

Executive Engineer (Desal)
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Chennai - 600 002.

Sl. No.	Description	No.	L	B	D	Qty.	Rate without Taxes Rs	Per with tax Rs	Amount without tax Rs
d	Flanged Spigot Specials for Sluice valve								
	100mm dia	28	10.00	1	1	280	108.90 Kg		30,492
	150mm dia	56	16.00	1	1	896	108.90 Kg		97,574
	200mm dia	50	23.00	1	1	1150	108.90 Kg		1,25,235
	250mm dia	27	32.00	1	1	864	108.90 Kg		94,090
	300mm dia	18	42.00	1	1	756	108.90 Kg		82,328
	350mm dia	14	56.00	1	1	784	108.90 Kg		85,378
	400mm dia	16	70.00	1	1	1120	108.90 Kg		1,21,968
	450mm dia	17	88.00	1	1	1496	108.90 Kg		1,62,914
	500mm dia	38	110.00	1	1	4180	108.90 Kg		4,55,202
	600mm dia	26	159.00	1	1	4134	108.90 Kg		4,50,193
4	Conveying and fixing specials like "C.I.Tee" Branches, Bends and tapers including earthwork excavation as per schedule No.5 of CMWSSB, at any depth	290							
i	Specials for 100 mm dia pipes	40	1	1	1	40	301.00 E		12,040
ii	Specials for 150 mm dia pipes	66	1	1	1	66	348.00 E		22,968
iii	Specials for 200 mm dia pipes	56	1	1	1	56	441.00 E		24,696
iv	Specials for 250 mm dia pipes	34	1	1	1	34	549.00 E		18,666
v	Specials for 300 mm dia pipes	24	1	1	1	24	617.00 E		14,808
vi	Specials for 350 mm dia pipes	18	1	1	1	18	706.00 E		12,708
vii	Specials for 400 mm dia pipes	20	1	1	1	20	797.00 E		15,940
viii	Specials for 450 mm dia pipes	20	1	1	1	20	915.00 E		18,300
ix	Specials for 500 mm dia pipes	40	1	1	1	40	1189.00 E		47,560
x	Specials for 600 mm dia pipes	30	1	1	1	30	1700.00 E		51,000
5	Jointing the DI S/S pipes and specials with rubber gaskets (tyton joint) including cost of lubricants, cost of jointing materials and testing to the required pressure with water etc., complete as per standard specifications and as directed by the Departmental Engineer.	348							
i	Specials for 100 mm dia pipes	40	1	1	1	40	94.00 E		3,760
ii	Specials for 150 mm dia pipes	66	1	1	1	66	132.00 E		8,712
iii	Specials for 200 mm dia pipes	56	1	1	1	56	177.00 E		9,912
iv	Specials for 250 mm dia pipes	34	1	1	1	34	242.00 E		8,228
v	Specials for 300 mm dia pipes	24	1	1	1	24	279.00 E		6,696
vi	Specials for 350 mm dia pipes	18	1	1	1	18	324.00 E		5,832
vii	Specials for 400 mm dia pipes	20	1	1	1	20	373.00 E		7,460
viii	Specials for 450 mm dia pipes	20	1	1	1	20	422.00 E		8,440
ix	Specials for 500 mm dia pipes	40	1	1	1	40	471.00 E		18,840
x	Specials for 600 mm dia pipes	30	1	1	1	30	520.00 E		15,600


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Sl. No.	Description	No.	A	B	C	D	Qty.	Rate without Taxes Rs	Per cent without tax Rs
		348							
6	Disjoining and removing C.I./ G.I. existing old pipes to stores including other incidental and operational charges, etc., complete for the following diametres of pipes.								
i	100 mm dia pipes	48	1.5	1	1	72	257.00	m	18,504
ii	150 mm dia pipes	89	1.5	1	1	133.5	319.00	m	42,587
iii	200 mm dia pipes	78	1.5	1	1	117	409.00	m	47,853
iv	250 mm dia pipes	44	1.5	1	1	66	545.00	m	35,970
v	300 mm dia pipes	30	1.5	1	1	45	617.00	m	27,765
vi	350 mm dia pipes	23	1.5	1	1	34.5	688.00	m	23,736
vii	400 mm dia pipes	26	1.5	1	1	39	759.00	m	29,601
viii	450 mm dia pipes	27	1.5	1	1	40.5	836.00	m	33,858
ix	500 mm dia pipes	58	1.5	1	1	87	913.00	m	79,431
x	600 mm dia pipes	41	1.5	1	1	61.5	990.00	m	60,885
7	Cutting the C/I/DI Pipes true to axis and filing smoothly and finishing the ends complete	464							
i	100mm dia pipes	48	2	1	1	96	116.00	E	11,136
ii	150mm dia pipes	89	2	1	1	178	155.00	E	27,590
iii	200mm dia pipes	78	2	1	1	156	208.00	E	32,448
iv	250mm dia pipes	44	2	1	1	88	268.00	E	23,584
v	300mm dia pipes	30	2	1	1	60	307.00	E	18,420
vi	350mm dia pipes	23	2	1	1	46	345.00	E	15,870
vii	400mm dia pipes	26	2	1	1	52	384.00	E	19,968
viii	450mm dia pipes	27	2	1	1	54	423.00	E	22,842
ix	500mm dia pipes	58	2	1	1	116	578.00	E	67,048
x	600mm dia pipes	41	2	1	1	82	675.00	E	55,350
8	Conveying and fixing sluice valves with tail pieces including fixing the surface boxes/valves, covers	464							
i	100 mm dia valves	28	1	1	1	28	706.00	E	19,768
ii	150 mm dia valves	56	1	1	1	56	823.00	E	46,088
iii	200 mm dia valves	50	1	1	1	50	988.00	E	49,400
iv	250 mm dia valves	27	1	1	1	27	1235.00	E	33,345
v	300 mm dia valves	18	1	1	1	18	1646.00	E	29,628
vi	350 mm dia valves	14	1	1	1	14	2470.00	E	34,580
vii	400 mm dia valves	16	1	1	1	16	3087.00	E	49,392
viii	450 mm dia valves	17	1	1	1	17	4116.00	E	69,972
ix	500 mm dia valves	38	1	1	1	38	9494.00	E	3,60,772
x	600 mm dia valves	26					13938.00	E	3,62,388

Executive Engineer (Desal) 18
Water Supply

Chennai Metro-
Sewerage Board
Chennai - 600 002

Sl. No.	Description	No.	Length m	B mm	D mm	Qty.	Rate without Taxes Rs	Per with tax Rs	Amount without tax Rs
		290							
9	Construction of Chambers for housing Isolation valves, scour valves and air valves as per type design and as per specification etc. complete								
i	For housing Valves 100 mm to 250 mm dia valves	161	1	1	1	161	36405.00	E	58,61,205
ii	For housing Valves 300 mm to 600 mm dia valves	129	1	1	1	129	44425.00	E	57,30,825
		290							
10	Cutting asphaltic & concrete Roads								
i	100 mm dia pipes	48	2	0.60	1	57.60			
ii	150 mm dia pipes	89	2	0.60	1	106.80			
iii	200 mm dia pipes	78	2	0.80	1	124.80			
iv	250 mm dia pipes	44	2	0.80	1	70.40			
v	300 mm dia pipes	30	2	0.80	1	48.00			
vi	350 mm dia pipes	23	2	0.90	1	41.40			
vii	400 mm dia pipes	26	2	0.90	1	46.80			
viii	450 mm dia pipes	27	2	1.10	1	59.40			
ix	500 mm dia pipes	58	2	1.20	1	139.20			
x	600 mm dia pipes	41	2	1.30	1	106.60			
						801.00			
	Bus route Road at 30% total quantity					240	171.00	sqm	41,091
	Non Bus route Road at 70% total quantity					561	85.00	sqm	47,660
11	Providing iron barricading of size 6' (1.83 m) width and 3.5'(1.07 m) height using 1.5" (38 mm) dia MS Sq. Tubular pipe for outer frame supports, 0.75" (20 mm) size small MS tubular square pipe for inner frame supports and 3' x 2' (0.9 x 0.6 m) size MS Sheet for name Board (as per drawing) including cutting, welding, fabrication charges and one coat of primer and 2 coats of enamel paint of approved quality with fixing of indication sticker and necessary interlocking arrangements with adjoining units and placing barricading units including watching during night fixing danger flags/reflectors units as directed at site etc. complete.								
i	100 mm dia pipes	48	9	1.00	1	432			
ii	150 mm dia pipes	89	9	1.00	1	801			
iii	200 mm dia pipes	78	9	1.00	1	702			
iv	250 mm dia pipes	44	9	1.00	1	396			
v	300 mm dia pipes	30	11	1.00	1	330			
vi	350 mm dia pipes	23	11	1.00	1	253			

Sl. No.	Description	No.	L	B	D	Qty.	Rate without Taxes Rs	Per m	Amount without tax Rs
vii	400 mm dia pipes	26	11	1.00	1	286			
viii	450 mm dia pipes	27	11	1.00	1	297			
ix	500 mm dia pipes	58	11	1.00	1	638			
x	600 mm dia pipes	41	11	1.00	1	451			
12	Road restoration charges to be paid to Greater Chennai Corporation	4586				53.00	m		2,43,058
i	100 mm dia pipes	48	2	0.60	1	57.6			
ii	150 mm dia pipes	89	2	0.60	1	106.8			
iii	200 mm dia pipes	78	2	0.80	1	124.8			
iv	250 mm dia pipes	44	2	0.80	1	70.4			
v	300 mm dia pipes	30	2	0.80	1	48			
vi	350 mm dia pipes	23	2	0.90	1	41.4			
vii	400 mm dia pipes	26	2	0.90	1	46.8			
viii	450 mm dia pipes	27	2	1.10	1	59.4			
ix	500 mm dia pipes	58	2	1.20	1	139.2			
x	600 mm dia pipes	41	2	1.30	1	106.6			
	Bus route Road					Total	801		
	Non Bus route Roads						240	4005.00	sqm
	Total Amount						561	2745.00	sqm
								15,39,122	
								9,47,65,863	



 Executive Engineer (Desai)
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 Sewerage Board
 Chennai - 600 002.

Sl. No.	Description	No.	L	B	D	Qty.	Rate without Taxes Rs	Per	Amount without tax Rs
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4g) Replacement and new installation of service connections including water meters in the core City of CMWSSB

1A House Service Connections									
1 HSC to be replaced from existing line to proposed line and for New line (Domestic).	185496	1				166946.40	1950.00	E	32,55,45,480
2 HSC to be replaced from existing line to proposed line and for New line (Non -Domestic).		1				18549.60	2505.00	E	4,64,66,748
B FCV									
1 FCV for Domestic Connections		1				166946.40	281.00	E	4,69,11,933
2 FCV for Non Domestic Connections		1				18549.60	332.00	E	61,58,467
C Water Meter									
1 Water for Domestic Connections		1				166946.40	1800.00	E	30,05,03,520
2 Water Meter for Non Domestic Connections		1				18549.60	4500.00	E	8,34,73,200
D Road restoration charges to be paid to Greater Chennai Corporation									
Domestic connection		1							
Non domestic connection		1							
Bus route Road at 30% total quantity		1	166946	1	0.6	100167.84			
Non Bus route Road at 70% total quantity		1	18549.6	1	0.6	11129.76			
Total Amount						33389.28	4005.00	sqm	13,37,24,066
						77908.32	2745.00	sqm	21,38,58,338
									1,15,66,41,758



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Chennai Metropolitan Water Supply & Sewerage Board
 Chennai - 600 002.



1249

CHENNAI METROPOLITAN WATER SUPPLY AND SEWERAGE BOARD
No.1, Pumping Station Road, Chintadripet, Chennai - 600 002.
MANAGING DIRECTOR

Lr.No. CMWSSB /SE(Desal)/400 MLD Desal Plant/Spl/2017 dt: 10.05.2017

To
The Secretary to Government,
Ministry of Urban Development,
Government of India,
Nirman Bhawan,
New Delhi – 110108

Sir,

Sub: Sub: CMWSSB – CE(O&M)-II- Setting up of 400 MLD SWRO Desalination Plant at Perur, Chennai –Detailed Project Report (DPR) prepared and appraised by CPHEEO, MoUD, GoI – Financial assistance tied up with JICA through MoUD/ DEA, MoF, GoI – JICA furnished Aide Memoire with revised Project cost prepared through its Study Team- GoTN accepted the revised cost and communicated to GoI – MoUD directed to furnish the revised DPR for concurrence and its recommendations to DEA, MoF, GoI- Revised DPR prepared and submitted to MoUD seeking approval of MoUD for the appraisal of revised DPR and its recommendations to DEA, MoF, GoI –Additional details furnished-Reg

Ref: i) This Office letter No. CMWSSB /SE(Desal)/400 MLD Desal Plant/Spl/2017 dt:28.04.2017

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Kind attention is invited to the letter cited wherein the revised Detailed Project Report (DPR) for this Project i.e. 400 MLD SWRO Desalination Plant at Perur, Chennai prepared at a cost of Rs. 5312.47 crore was submitted to MoUD requesting its early appraisal of revised DPR and its recommendations to DEA, MoF, GoI to take further action, at the earliest.

In this regard, the additional details/ Report regarding the Financial Viability of the Board on account of implementation of this Project has been prepared and enclosed herewith for kind perusal.

The gist of the report is as follows:

At present the Board proposes to generate annually Rs. 1044.50 Crs of revenue after considering tariff revision to meet out the Operation & maintenance expenditure of Rs. 866.66 Crs (excl depreciation & interest – refer annexure I) leaving a operating surplus of Rs. 177.84 Crs. After considering the 150 MLD and 400 MLD plant, the Board is in a position to earn an operating surplus of Rs. 203.76 Crs. It is assumed that the Board will revise the tariff as and when necessary in order to recover any increase in O&M cost over the years.

There is overall operating surplus of Rs. 203.76 Crs. For setting up the Desalination plants, financial viability need not alone be considered, connected Social Benefits are also to be taken into account. Financials of the Board will not be negatively impacted by the proposed plants and these plants will reduce the water woes of the Chennai city.

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Chennai - 600 002.

499

1251

Considering the present water scarcity situation in Chennai city and to mitigate the future demand supply gap, it is once again requested that the appraisal of the revised DPR for this 400 MLD SWRO Desalination Plant at Perur, Chennai covering the additional item of improvements works in the existing water supply distribution network in the core Chennai city may kindly be completed at the earliest and to offer the recommendations of MoUD to Department of Economic Affairs, Ministry of Finance, GoI for onward transmission of its recommendations to JICA.

Your kind cooperation is very much solicited in this regard.

Ishwari 10/5/17

For MANAGING DIRECTOR

D
Executive Engineer (Desal)
Chennai Metropolitan Water Supply &
Sewerage Board
Chennai - 600 002.

Mr. S. Venkateswaran
Executive Engineer (Desal)
Chennai Metropolitan Water Supply &
Sewerage Board
Chennai - 600 002.

1235
1253

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FINANCIAL VIABILITY OF THE BOARD INCLUDING THE PROPOSED 150 MLD AND 400 MLD DESAL PLANTS

At present the Chennai City limit has expanded to 426 sq Kms with a population of 67.27 lakhs (as per 2011 census). The Board has taken various projects to provide comprehensive water supply and sewerage services to the city's newly added areas. It also provides services to other local bodies in the Chennai Metropolitan area and some Industrial and bulk consumers.

The Board supplies 830MLD of water to Chennai City during normal monsoon period from the existing sources of Puzhal, Poondi, Chembarampakkam, Veeranam lakes, Bore wells in villages around Chennai and Neyveli and is operating two Desalination plants one at Minjur and other at Nemmeli. The Board is forced to cut down and ration supplies when the monsoon is inadequate which a recurring phenomenon in Chennai.

In order to augment perennial source of Water supply the Board has proposed to set up 150 MLD Desal Plant at Nemmeli and 400 MLD Desal Plant at Perur for meeting the requirement of potable water for Chennai city. The Financial viability of both the proposed plants are discussed below.

150 MLD Desal Plant at Nemmeli:

Construction of 150 MLD Plant at Nemmeli is expected to commence in Nov' 2017 and proposed to be completed by Apr' 2020 at a project cost of Rs. 1259.38 Crs. The Capital Cost will be partially funded by loan from Kfw and the balance amount will be funded under AMRUT and GoTN Grant. However the Board has requested the entire project cost to be in form of Grant.

The operating expenditure annually (excluding depreciation and interest) of the said plant estimated at Rs 43.01/KL and maintenance of


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Chennai - 600 002.

501

pipelines is estimated at Rs 2.13/KL. The total Operating expenditure per annum will be Rs 247.14 crs for the plant and pipelines.

The quantity of water to be supplied from the plant for Domestic and industrial consumers at a ratio of 75:25, is estimated at 110 MLD and 40 MLD respectively. Around 2.25 lakh domestic households will be covered by the supply. The revenue to be generated from the operation of the plant annualy is Rs. 247.25 Crs , comprising of Rs 101.25 crores from Domestic Supply and Rs 146 crores from industrial and commercial supply, which results in operating surplus of 0.11 Crs. (Annexure II)

400 MLD Desal Plant at Perur:

Construction of 400 MLD Plant at Perur is expected to commence in Jan' 2020 and proposed to be completed by Jan' 2024 at a project cost of Rs. 5312.47 Crs. The project will be partially funded by JICA loan and the balance by a mix of GOI and GoTN Grant. However the Board has requested the entire project cost to be in form of Grant.

The operating expenditure (excluding depreciation and interest) annually of the said plant estimated at Rs 39.15/KL and maintenance of pipelines is estimated at Rs 2.19/KL. The total Operating expenditure per annum will be Rs 603.56 crs for the plant and pipelines.

The quantity of water to be supplied from the plant for Domestic and industrial consumers at a ratio of 75:25, is estimated at 300 MLD and 100 MLD respectively. Around 5.50 lakh domestic households will be covered by the supply. The improvement works will also lead to a savings of 25MLD water which is currently lost in transmission and non-revenue (NRW). On an annual basis the revenue to be generated from the operation of the plant is Rs. 629.38 Crs , comprising of Rs 247.50 crores from Domestic Supply and Rs 365 crores from industrial and commercial supply and additional revenue



Executive Engineer (Desai)
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Chennai - 600 002

1237
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due to savings of NRW is Rs 16.88 cr. The operation of the plant results in operating surplus of 25.82 Crs. (Annexure III)

Overall Financial Viability of the Board after considering 150 MLD and 400 MLD Desal Plants:

At present the Board proposes to generate annually Rs. 1044.50 Crs of revenue after considering tariff revision to meet out the Operation & maintenance expenditure of Rs. 866.66 Crs (excl depreciation & interest – refer annexure I) leaving a operating surplus of Rs. 177.84 Crs. After considering the 150 MLD and 400 MLD plant the Board is in a position to earn an operating surplus of Rs. 203.76 Crs. It is assumed that the Board will revise the tariff as and when necessary in order to recover any increase in O&M cost over the years.

There is overall operating surplus of Rs. 203.76 Crs. For setting up the plants financial viability need not alone be considered, connected Social Benefits are also to be taken into account. Financials of the Board will not be negatively impacted by the proposed plants and these plants will reduce the water woes of the Chennai city.

16/5/17

(CSEW)


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Chennai - 600 002.

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ANNEXURE I
CMWSS BOARD
DETAILS OF EXISTING AND PROPOSED REVENUE AND O&M COST

Rs in Crores

Particulars	ESTIMATES FOR CURRENT OPERATIONS	150 MLD DESAL PLANT AT NEMMELI	400 MLD DESAL PLANT AT PERUR	TOTAL
TOTAL INCOME				
Sale of Water	578.87	247.25	629.38	1455.50
Water and Sewer Tax	170.34	0.00	0.00	170.34
Grants from Government	241.45	0.00	0.00	241.45
Other Income	53.84	0.00	0.00	53.84
Total	1044.50	247.25	629.38	1921.13
O&M EXPENDITURE				
Power	209.61	0.00	0.00	209.61
Chemicals	4.93	0.00	0.00	4.93
Operation and Maintenance	177.08	0.00	0.00	177.08
Water Lorry Hire Charges	59.00	0.00	0.00	59.00
Purchase of Desal Water	197.66	0.00	0.00	197.66
Operation and Maintenance	0.00	247.14	603.56	850.71
Office and Administration Expenses	10.47	0.00	0.00	10.47
Payment and Provision to Employees	207.91	0.00	0.00	207.91
Total	866.66	247.14	603.56	1717.37
OPERATING SURPLUS	177.84	0.11	25.82	203.76

Note:

- 1.O&M expenditure does not include Depreciation and Interest Charges
- 2.Sale of water is after considering Proposed Tariff Revision which will yield an additional revenue of Rs 290 crs

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ANNEXURE II
CMWSS BOARD-SUSTAINABILITY OF 150 MLD DESAL PLANT AT CHENNAI

	PLANT	PIPELINE	(Rs in crore) TOTAL
COST ESTIMATES			
Cost of the Project (Rs crs)	1043.42	195.63	1239.05
PMC			19.83
IMC			0.5
Total	1043.42	195.63	1259.38
Estimated O&M Cost (Rs per KL)-Without Depreciation	43.01	2.13	45.14
Estimated O&M Cost (Rs per KL)-With Depreciation	51.23	3.32	54.55
Estimated cost p.a (Rs in crs)-with out depreciation	235.48	11.66	247.14
Estimated cost p.a (Rs in crs)-with depreciation	280.48	18.18	298.66
REVENUE ESTIMATES			
SUPPLY (IN MLD)	DOMESTIC	COMMERCIAL	TOTAL
No of Consumers (in lakh)	110.00	40.00	150.00
Revenue per month per consumer (Rs)	2.25		*
Revenue per annum per Consumer (Rs)	375		
Total Revenue per annum (Rs in Crs)	4500	146.00	247.25

NOTE

- 1.The product water of 150 MLD will be supplied to Domestic and Commercial in the ratio of 75:25
- 2.The proposed Tariff revision for Domestic metered is Rs300/- per month per household considering consumption of 20 KL p.m' at double the existing tariff+25% sewerage for and for Commercial @ Rs 100 per KL surcharge
- 3.The Entire funding for the project is proposed through Grant fund.
4. The project is financially viable since Revenue is greater than cost without depreciation and interest

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ANNEXURE III CMWSS BOARD-SUSTAINABILITY OF 400 MLD DESAL PLANT AT CHENNAI			
(Rs in crore)			
	PLANT	PIPELINE & OTHER IMPROVEMENT WORKS	TOTAL
COST ESTIMATES			
Cost of the Project (Rs crs)	2776.93	2375.04	5151.97
PMC			160.5
IMC			0
Total	2776.93	2375.04	5312.47
Estimated O&M Cost (Rs per KL)-Without Depreciation	39.15	2.19	41.34
Estimated O&M Cost (Rs per KL)-With Depreciation	46.63	3.38	50.01
Estimated cost p.a (Rs in crs)-with out depreciation	571.59	31.97	603.56
Estimated cost p.a (Rs in crs)-with depreciation	680.80	49.35	730.15
REVENUE ESTIMATES			
SUPPLY (IN MLD)	DOMESTIC	COMMERCIAL	TOTAL
No of Consumers (in lakh)	300.00	100.00	400.00
Revenue per month per consumer (Rs)	5.50		
Revenue per annum per Consumer (Rs)	375		
Total Revenue per annum (Rs in Crs)	4500		
	247.50	365.00	612.50
REVENUE ENHANCEMENT DUE TO SAVINGS IN IMPROVEMENT TO WATER DISTRIBUTION SYSTEM			
Quantity of Water Saved (in MLD)	25.00		
Additional No of Consumers (in lakh)	0.38		
Revenue per month per consumer (Rs)	375		
Revenue per annum per Consumer (Rs)	4500		
Total Revenue per annum (Rs in Crs)	16.88		16.88
Total Revenue per annum (Rs in Crs)			629.38
NOTE			
1.The product water of 400 MLD will be supplied to Domestic and Commercial in the ratio of 75:25			
2.The proposed Tariff revision for Domestic metered is Rs300/- per month per household considering consumption of 20 KL p.m at double the existing tariff+25% sewerage for and for Commercial @ Rs 100 per KL surcharge			
3.The Entire funding for the project is proposed through Grant fund.			
4. The project is financially viable since Revenue is greater than cost without depreciation and interest			

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Annexure-12

Service Level Benchmark



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Service Level Bench Marks

Chennai Urban Agglomeration					
Sl. No	Indicator	Unit	Benchmark	Before Implementation of the project	After Implementation the project
1	Coverage of water supply connections	%	100	65%	85% (under different projects)
2	Per Capita Supply of water	LPCD	135	90	135
3	Extent of Metering	%	100	65%	100% (under different projects)
4	Extent of Non-Revenue water	%	15	25%	20%
5	Continuity of water Supplied	Hours / day	24	0-3 hr	4-6 hrs
6	Quality of water supplied	% water sample	100	70%	100%
7	Efficiency in redressal of customer complaints	%	80	50%	80%
8	Cost recovery	%	100	50%	75%
9	Efficiency in collection of charges	%	90	50%	75%



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Annexure-13

Project Schedule



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Project Timeline Gantt Chart

The chart displays the project timeline from 2018 to 2021, showing the duration and start/finish dates for each task. The tasks are categorized into several phases:

- Design & Engineering:** Includes tasks like Design & Engineering of Intake System, Process Design & Engineering, Mechanical Design & Engineering, Civil Design & Engineering, Electrical Design & Engineering, Instrumentation Design & Engineering, Design & Engineering of Plant Piping, Structure, Design & Engineering of Fire Fighting System, Design & Engineering of Product Water Distribution Piping Network, Design & Engineering of Crain & Hoist, and Reclamation work.
- Procurement & Supply of Equipments:** Includes tasks like Supply of Pipe Jacking Machine, Procurement & Supply of Sea water Intake Pumps, Procurement & Supply of Travelling Band Screens, Procurement & Supply of Lamella Scraper Mechanism, Procurement & Supply of Filter Media, Procurement & Supply of RO Booster Pumps, Procurement & Supply of ERD Booster Pumps, Procurement & Supply of High Pressure Pumps, Procurement & Supply of RO Pressure Tubes, Procurement & Supply of RO Membrane, Procurement & Supply of RO Permeate Tank, Procurement & Supply of Cartridge filter, Procurement & Supply of RO Rack (Skid), Procurement & Supply of Energy Recovery Device (ERD), Procurement & Supply of Backwash Pumps, Procurement & Supply of Permeate Transfer Pumps, Procurement & Supply of Super Duplex High Pressure Piping, Procurement & Supply of High Pressure Valves & Fittings, Procurement & Supply of MCC, Procurement & Supply of PLC, Procurement & Supply of HT Cable, Procurement & Supply LT Motors, Procurement & Supply of HT Motors, and Procurement & Supply of Dosing Pumps.
- Construction & Operation:** Includes tasks like Soil Investigation work, Soil Improvement & Site filling work, and various civil construction phases.
- Handover & Finalization:** Includes tasks like Project Handover, Project Summary, and Baseline Summary.

Legend:

- External Tasks
- Manual Task
- Duration-only
- Finish-only
- Deadline
- Inactive Task
- Inactive Milestone
- Manual Summary Rollup
- Manual Summary
- Start-only
- Baseline
- Baseline Milestone
- Baseline Summary
- Progress Slippage

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Project: 400MLD DESALINATION
Date: Mon 03-04-17

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ID	Task Name	Duration	Start	Finish	2018			2019			2020			2021									
					D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J
85	Erection of Main Cable Route	22 days	Mon 03-06-19	Tue 07-04-20																			
86	Erection of Fire Fighting System	159 days	Mon 03-06-19	Thu 09-01-20																			
87	Erection of MCC & PLC	360 days	Mon 03-06-19	Fri 16-10-20																			
88	Erection of Motors	270 days	Mon 03-06-19	Fri 12-06-20																			
89	Erection of Dosing System	360 days	Mon 03-06-19	Fri 16-10-20																			
90	Erection of Crane & Hoist	360 days	Mon 03-06-19	Fri 16-10-20																			
91	PRE-COMMISSIONING & COMMISSIONING OF EQUIPMENTS	180 days	Tue 20-10-20	Mon 28-06-21																			
92	Pre-Commissioning & Commissioning of Sea water intake System	30 days	Tue 20-10-20	Mon 30-11-20																			
93	Pre-Commissioning & Commissioning of Lamella clarifier	30 days	Tue 20-10-20	Mon 30-11-20																			
94	Pre-Commissioning & Commissioning of DAF	30 days	Tue 20-10-20	Mon 30-11-20																			
95	Pre-Commissioning & Commissioning of Gravity Dual Media Filters	30 days	Tue 20-10-20	Mon 30-11-20																			
96	Pre-Commissioning & Commissioning of RO Booster Pumps	30 days	Tue 20-10-20	Mon 30-11-20																			
97	Pre-Commissioning & Commissioning of ERD Booster Pumps	40 days	Tue 20-10-20	Mon 14-12-20																			
98	Pre-Commissioning & Commissioning of High Pressure Pumps	40 days	Tue 20-10-20	Mon 14-12-20																			
99	Pre-Commissioning & Commissioning of RO System	60 days	Tue 20-10-20	Mon 11-01-21																			
100	Pre-Commissioning & Commissioning of Backwash Pumps	30 days	Tue 20-10-20	Mon 30-11-20																			
101	Pre-Commissioning & Commissioning of Post Treatment Clarification Units	60 days	Tue 20-10-20	Mon 11-01-21																			
102	Pre-Commissioning & Commissioning of Permeate Transfer Pumps	60 days	Tue 20-10-20	Mon 11-01-21																			
103	Pre-Commissioning & Commissioning of Product water Piping distribution Network	60 days	Tue 20-10-20	Mon 11-01-21																			
104	Pre-Commissioning & Commissioning of Fire Fighting System	30 days	Tue 20-10-20	Mon 30-11-20																			
105	Pre-Commissioning & Commissioning of Dosing System	60 days	Tue 20-10-20	Mon 11-01-21																			
106	Pre-Commissioning & Commissioning of Crane & Hoist	30 days	Tue 20-10-20	Mon 30-11-20																			
107	Over All Plant Commissioning	180 days	Tue 20-10-20	Mon 28-06-21																			

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Task	External Tasks	Manual Task	Finish-only	Progress
Split Milestone	External Milestone	Duration-only	Deadline	Shippage
Milestone Summary	Inactive Task	Manual Summary Rollup	Baseline	
Project Summary	Inactive Milestone	Manual Summary	Baseline Milestone	
	Inactive Summary	Start-only	Baseline Summary	Baseline Summary

Annexure-14

Impact & Mitigations



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1. DESCRIPTION OF ENVIRONMENT

The schematic presentation of the coastal zone proposed for seawater intake is shown in Plate 1 attached to this annexure. The morphology of this region is influenced by the 3 climatic conditions, viz., southwest monsoon (June – September), northeast monsoon (Mid October to Mid March) and fair weather period (Mid March to May). The coast is more influenced by the northeast monsoon period followed by southwest monsoon period.

Wave action prevails high during southwest monsoon and cyclonic period in northeast monsoon. The coastal currents within 5 km distance from the shore are greatly influenced by wind. The near shore remains more dynamic and turbulent due to persistent action of seasonal wind, high waves and coastal currents. The distribution of temperature and salinity indicates that the near shore water is well mixed without stratification. Presently the coastline remains with elevated dunes and wide backshore. The influence of littoral drift is significant and the annual net drift takes place in northerly direction.

Examination of water quality of this region indicated that they are homogeneous across the depth and do not differ in vertical and spatial directions. Absence of marked vertical gradients of the physical parameters indicates that the coastal waters are well mixed. Various results on the chemical and biological parameters indicate that the water is well oxygenated, nutrient rich and biologically productive at primary and secondary levels. The sub-tidal benthic fauna is moderately rich in diversity and numbers compared to the inter tidal benthic fauna.

The marine flora and fauna also indicate the existence of diverse population. The area is rich in fishery both pelagic and demersal. The study on various oceanographic parameters and the information on adjacent region indicate that the coastal water is clean and highly productive.



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2. IMPACT ASSESSMENT

2.1. Identification of impacts

The proposed project would create impact on the environment in two distinct phases:

- During the construction phase which may be regarded as temporary or short term; and
- During the operation phase which may have long term effects, but could be set off with the socio-economic benefits, the proposed project shall bring in.

The construction and functional phases of the proposed project comprises of various activities, each of which will have some impact on one or more environmental parameters. Various impacts during the functional phase of the project have been studied to estimate the impact on the environment and are discussed briefly in the subsequent sections.

The following activities related to the operational phase will have varying impacts on the environment and are considered for impact assessment:

- Air Environment;
- Noise Environment;
- Water Environment;
- Solid Waste
- Soil Environment;
- Topography and Land use;
- Biological Environment;
- Socio-economics Environment;
- seawater intake head and brine discharge

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2.2. Construction Phase

The potential environmental impacts of the development of desalination plant has been predicted based on the existing conditions and character of segments of the receiving environment that are likely to be affected by the proposed project. Future developments of the project area and its immediate environs have also been considered in the determination and mitigation of identified impacts. The potential environmental impacts have been identified at the constructional phases of the project.

The most probable impact on various components of the surrounding environment viz. air, noise, water, land, biological and socio-economic aspects due to the proposed development have been predicted and discussed in this section. The impact study in all these categories is designed to ensure that potential negative impact expected to arise from the development of the project are mitigated or minimized whilst maximizing the expected positive ones. This would ensure project sustainability and enhance environmental conditions for the benefit of the entire community and its immediate environs.

2.3. Impact on Air Quality

The main air quality issues of this project on land are the same as those for any project that involves movement of heavy vehicles to and from the site. They are concerned with the creation of airborne soil dust and release of exhaust gases from the various internal combustion engines of motor vehicles.

Fugitive dust during transportation is released at ground level and has large particle sizes which are not expected to travel long distance and can be arrested with proper management plan.

Exhaust emissions from vehicles and equipment deployed during the construction phase also result in marginal increase in the levels of SO₂, NOx, PM, CO and unburnt hydrocarbons. The impact will however, be marginal, and temporary in nature. The impact of such activities would be temporary and will be confined locally to the construction site itself.



Mitigation Measures

- Proper repair and maintenance of vehicles would greatly mitigate the impact on the air quality during the construction phase of the project;
- Any vehicle not meeting the vehicular pollution standards shall not be used for material transportation; and
- All vehicles and construction equipment with internal combustion engines in use shall be maintained for effective combustion to reduce carbon particles, CO and HC emission.
- Speed limit shall be set in project confined area to reduce blowing of dust.
- Water sprinkling by tankers to suppress dust.
- Covering of excavated material while transportation.

2.4. Impact on Noise Environment

Construction traffic for loading and unloading, fabrication and handling of equipment and construction materials are likely to cause an increase in the ambient noise levels. The excavation machinery required for drilling and boring will be a major source of noise. Particularly the workers working near this machinery will be exposed to high levels of noise. At the peak of the construction, increase in noise levels is expected to occur locally at the construction site.

The peak noise levels from continuous construction activity may be about 70-90 dB (A) and the maximum noise levels during any construction day will be limited to 1-2 hours.

Mitigation Measures

- All the workers in the close vicinity shall be wearing ear caps/ earmuffs/earplugs, protective devices and proper PPEs.
- DG sets, Compressors and other noise generating machinery used for the construction work will be kept in noise suppression enclosures.

As the project execution work will be taken up during day-time hours, overall magnitude of this impact shall remain low and restricted to construction period.

2.5. Impact on Water Environment

Key issues in the construction phase include the disturbance of the seabed (and possibly associated sediment dynamics) in the case of pipeline intakes and outfall structures. It may lead to a destruction of benthic habitats. The sediments disturbance may lead to a resuspension of material into the water column and a temporarily increased turbidity in the vicinity of the construction site.

Mitigation Measures

The overall impact on water environment during construction phase due to proposed project is likely to be short term and of low significance. The proposed intake depth is approximately 10m below chart datum. There are no environmentally sensitive habitats in the area. Natural habitats will therefore not be converted or degraded by this activity.

- During construction phase, no significant damage to the sea-floor is expected as the pipe will be laid under controlled trench.
- Project personnel shall not be allowed to wash artefacts in the water bodies.
- Untreated domestic sewage shall not be discharged in the water bodies.

2.6. Impact of Solid Waste

Activity such as excavation and backfilling activity generates solid wastes viz; construction/concrete waste, metal scrapings, packing material, plastic, welding work waste, maintenance waste such as oil and grease. If the organic waste generated from food waste, spoils and garbage at the camp site is left unattended it may attract nuisance and may make the surrounding inhospitable. The hazardous waste such as oil and grease may result in soil contamination, water pollution and degradation of ecosystem health. Untreated and unattended solid waste may attract cattle and stray animals which may create unhealthy conditions at the camp site and may have negative impacts on the animals as well.


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Mitigation Measures

- Proper storage and disposal of solid waste shall be undertaken at the camp site.
- The solid waste generated from various activities shall be segregated for proper treatment and disposal.
- Bins shall be placed at the camp site with markings according to the nature of waste and a protocol shall be followed for their processing and disposal.
- Processing of the treatable waste shall be conducted at the site to an extent possible. The remaining solid waste shall be transported to the nearest authorised disposal or dump site.
- An area shall be marked away from any sensitivity to store hazardous solid waste if the quantities generated are sizable.

2.7. Impact on Topography and Landuse

Topography of the proposed site is mostly even and relatively lower towards sea side. The existing site elevation is varying which is lower towards the sea shore and higher towards the ECR. The cutting and filling will be balanced within the plant area. No major change in topography of the site is envisaged due to proposed plant erection. The activity does not result in any changes in the terrain.

No habitation area exists in the land allocated for proposed desalination plant. Apart from the change in intensity of land use pattern within the project site, there will not be any adverse impact on the surrounding land use during the construction period.

2.8. Impact on Biological Environment

The initial construction works at the project site such as movement of vehicles, noise, air, water, soil pollution and human activity repels the fauna from the surrounding areas.

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Survey of flora and fauna has revealed that there are no endangered flora and fauna, migratory sites, protected areas, breeding grounds and sensitive habitats in the immediate surroundings of the project site and in the study area.

Sea water intake and outfall structure construction likely disturbs sediments which may affect benthic species. The surface coverage due to resuspension of sediment will lead to loss of habitat and possibilities of pelagic species disturbance. Impacts from noise and vibrations may affect the marine species behavioural changes.

Mitigation Measures

- The mitigations undertaken for noise, air emissions, solid waste and land use shall limited extent of impacts on the biodiversity in the adjacent areas.
- Green belt development shall be undertaken at different stages of construction phase. The species selected for the plantation activity will be helpful in providing shade, attract fauna and avifauna and soil conservation. These species will be native species which can blend into the surrounding habitat.

2.9. Impacts Socio-economic Environment

Major impacts associated with certain proposed actions are observed by changes in socio-economic factors in the project area and surrounding region. These changes may be beneficial or detrimental. Emphasis in this category of environment includes cultural, economic and basic human requirements. There is no agricultural land exists in the plant area. Human displacement or acquisition of agricultural land is not envisaged for the proposed project. Thus, no major negative impact due to private land acquisition is envisaged. Government land will be used for the proposed project. There will not be any resettlement and rehabilitation. Thus, there will be no adverse socio economic implications.


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3. OPERATIONAL PHASE

3.1. Impact on Noise Levels

The noise levels at the source for these units will be in the range of 70-90 dB (A). The noise dispersion from the plant units has been computed based on the mathematical model.

Input for the Model

The prediction of incremental noise levels due to the operation phase of the plant has been carried out using mathematical model. The noise sources have been defined with respect to plant. The input data pertaining to source noise levels are tabulated below in **Table-3.1**.

TABLE-3.1
SOURCE NOISE LEVELS IN THE PROPOSED EXPANSION OF PLANT

Sr. No.	Unit	Noise Level dB(A) [1m away]
1	Intake pumps	80-90
2	RO high pressure pumps	80-90
3	Energy recovery system	80-85
4	DG set	70-80

Presentation of Results

The incremental noise levels are computed at proposed project site at 200 m x 200 m grid intervals over an area of 1 km x 1 km study area. The predicted results of incremental noise levels at each grid points are used to draw noise contours. The predicted noise contours around proposed sources are shown in **Figure-4.1.**

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Proposed 400 MLD Sea Water Reverse Osmosis
Desalination Plant at Perur Along ECR, Chennai

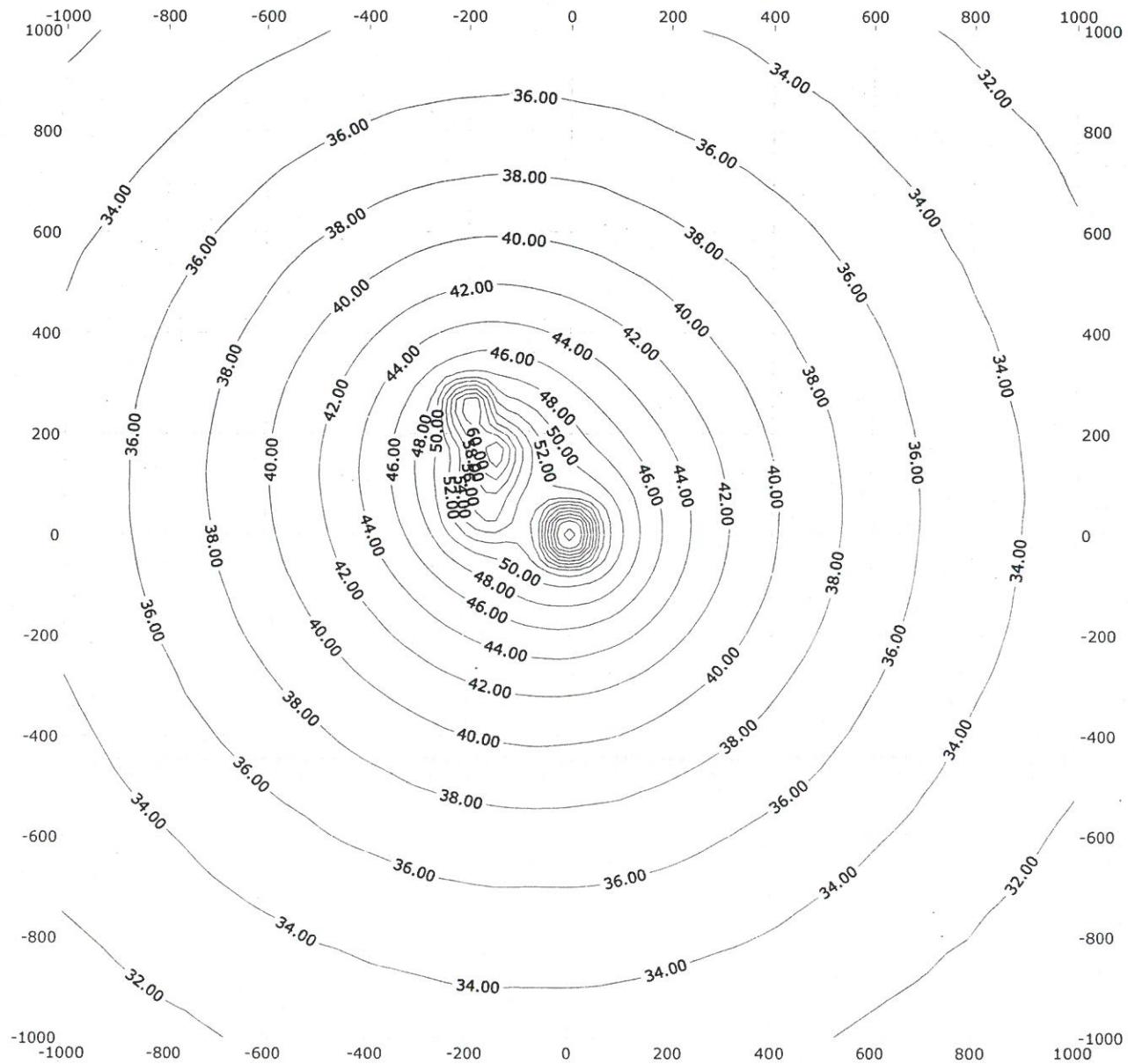


FIGURE-3.1
NOISE DISPERSION CONTOURS

The predicted noise levels at the boundary due to various plant activities will be ranging in between 40 to 44 dB (A). The noise levels after the project will be less than 45 dB (A) at all the surrounding habitations. It is seen from the simulation results that the post project noise levels will be well within the CPCB standards.

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3.2. Impact on work zone

RO high pressure pumps and energy recovery system are the high noise generating equipment in the proposed desalination plant. However, impacts on the working personnel are not expected to be significant on account of the high level of automation of the plant, which means that workers will be exposed for short duration only that too intermittently.

The noise generation during operational phase would be at source itself through different measures such as inspection, operation and maintenance at regular intervals. The occupational noise exposure to the workers in the form of 8-hourly time weighted average will be maintained well with in the prescribed OSHA standards (<90 dB (A)). Hence, the impact on occupational health of workers would be insignificant. Equipments will be provided with silencers. Workers will be provided with necessary protection devices eg. ear plugs, ear muffs etc.

3.3. Impact on Socio-economic Environment

No direct impacts are expected as resettlement and rehabilitation is not involved in the project. Instead this project having positive impact that it will produce 400 MLD of water which will reduce the deficit of CMA's future water demand. Accidental impacts due to oil spill or leakage may have negative impact on the local communities.

Provision of reliable access to safe drinking water will reduce the incidence of water-borne diarrhoeal diseases which frequently occur during the dry season due to a lack of clean water.

The construction of seawater intake head and brine discharge will have marginal magnitude of impact on:

- Seawater,
- Marine ecology,
- Land use and
- Community

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The magnitude of adverse impact appears to be minimum. Nevertheless, the proposed project would bring positive impact on land use, people, their living and the economic development of the state. The impacts due to different activities are analyzed. The construction of a seawater intake head and marine outfall for the release of brine reject into the sea will have impact on the marine environment. Pipelines for both intake and outfall will be buried in such a way that the top of the pipeline will be minimum 1.0 below the seafloor. As the intake point is located in the sea, the problem of entrapment of marine organisms and entrainment of zooplankton and fish eggs and larvae would occur. Therefore to take care for the same the intake head is designed at very low velocity of less than 0.15 m/sec as per USEPA to prevent entrapment of fishes and other marine organism. Further a fish net has been provided all over the sea intake to cover the same.

4. Prediction of impacts

While the identification of the impacts provides the status of anticipated impact on the environment, the prediction of impact will give the extent to which these conditions can alter or improve the environment. Based on the prediction, mitigation measures can be evaluated to minimize the impact on the environment. The prediction of impacts is enumerated for:

i) Pipe laying Intake and outfall

It is proposed to lay submarine pipelines for both the intake and the outfall. The intake head has been proposed to be located at 1050 m distance offshore at 10 m water depth. Similarly the outfall has also been planned at 750 m distance offshore at 8 m water depth. The outfall diffuser will be erected north of the intake in order to avoid the recirculation. The trench after laying the pipelines will be filled back with native sand. To meet the requirement of the proposed size of the trench, a moderate dredging activity along the entire stretch of the pipeline will have to be carried out. It is estimated that approximately 80,000 m³ of sediment will be dredged temporarily. The identified effects due to dredging include entrainment and removal of organisms, increased turbidity near the dredging

location, organic matter enrichment, fish injury associated with exposure to suspended sediments and decreased dissolved oxygen and fish behavioral effects due to the effects of noise.

ii) Construction of seawater intake head

Improper design of intake head may cause vortex formation on the upper surface of the sea and also cause danger for the boats moving around the vicinity. The presence of intake head may alter or distort the existing current pattern. Therefore to take care for the same the intake head is designed at very low velocity of less than 0.15 m/sec as per USEPA to prevent entrapment of fishes and other marine organism.

iii) Impact on Fisheries and Fishermen

Kancheepuram district has a coastline of 87 km and is the fourth longest in the state with 44 fishing villages. There are 2 major and 37 minor fish landing centers. The active fisher folk population in the district is 7580 of which 2287 are male and 5293 are female.

The fishing village Perur and Nemmeli is located in the vicinity of the project region. Their fishing is mostly confined to Mahabalipuram region and at offshore. The laying of submarine outfall will have limited bearing on the day to day fishing activities. Entire stretch of the intake and outfall pipelines will be buried below the seafloor. Only the outfall diffuser and seawater intake head will be sitting on the seafloor. These locations will be marked with a marker buoy with lighted beacon so that the fishermen can avoid fishing in this zone. This will not cause any significant impact to the fishing community. However all fishing is carried out 2km into sea, almost 1km more deep than the proposed intake.

In general, the dominant fishes species of the Kancheepuram region are Dussumieria acuta (Mothakendi), oil Sardines (Paichalai), lesser Sardines (Keerimeen – Chalai), Anchovies (Nethili), Silver bellies (Kare), Savalai (Lepturacanthus sp.), Calawah (Epinephelus sp.), Catfish (Keleru), Carangooides (Parah), Scomberomorus sp. (Vanjiaram), Mackerels (Kanangeluthi), Changarah,

Thullunkendai (*Nemipterus* sp.), Cuttle fish (*Sepia* sp.), Squids (*Loligo* sp.), Crab (*Portunus sanguinolentus*, *P. Pelagicus*) and Prawns (*Penaeus indicus*, *P. monodon*).

There is no seasonal fluctuation in the fish catch, so no particular trend in the fish catch is followed. The coastal waters are highly dynamic and show good mixing which minimizes any likely impact of discharges in the region. The fishery is well represented by various groups of pelagic and demersal species. The proposed intake and outfall pipeline will be buried below the seafloor with reference to the top of the pipeline. There will be trash bars and vertical screens in the intake sump to avoid the entry of fishes and fish larvae. There will be disturbance to the species during the construction stage and later on the original equilibrium will be retained.

iv) Impact on Mangroves

The survey conducted in the project area indicates that the project region is an open coastal stretch with sandy beaches and is devoid of Mangroves. Hence the construction of intake and outfall does not have the question of affecting mangroves.

v) Impact due to tsunami and storm surge

Cyclone: The occurrence of depression and cyclones are common over the project region and keeps the wave climate relatively higher. The coastal currents are greatly influenced by tides directed perpendicular to the coast. Since the pipelines are laid subsea, there will not be any impact on the marine facilities.

Tsunami: The occurrence of a Tsunami along the Indian coast is an extremely rare event with a very low frequency of less than once in 500 years. No reliable historical records of occurrence of Tsunami events and their impact along the Indian coast are available because of its exceedingly rare nature. One worst Tsunami occurred on 26.12.04 along the Tamilnadu coast and the destruction was more near the project region. The project region is located on the notified

area of Tsunami impact, as the offshore tectonic plates are alive in Andaman Island. The presence of sand dunes (> 3 m) on the coast may to some extent dissipate the strength of tsunami but cannot totally protect from tsunami run up. Further the proposed plant is proposed to be developed approx. 90 m into the land from the coast and this entire stretch shall be planted with high rise casuarina plantation, which shall act as a defense during the said.

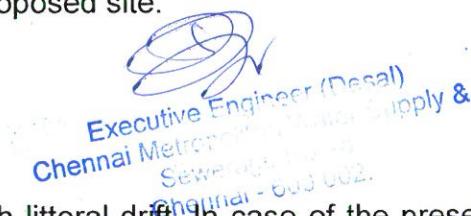
Storm surge: The project location is located wherein the cyclones would generally cross during the northeast monsoon season. The storm surge of 1.3 m height has been predicted for a cyclonic wind speed of 180 kmph for this region. Storm surge at Nemmeli has been estimated to be up to 4 metres above chart datum (ie approximately RL 3.5). The coastal current within 5 km distance from the shore is greatly influenced by wind and tides. The near shore current remains more dynamic and turbulent due to persistent action of seasonal wind, high waves and coastal currents. However the project area is elevated and the impact may not be severe.

vi) Impact on neighborhood

The nearest tourist destination is Mahabalipuram and the strip of coastal stretch between ECR and sea is more urbanized developed with tourist resorts, hotels, cottages, farm houses and intermittent pockets of fishing hamlets. The proposed location of the outfall is located in the relatively remote part of the coastline wherein only two fishing villages are located. The outfall point is located at 700-750 m from the shore hence the discharge of return water into the sea is not expected to cause any threat to the tourists as the brine reject undergoes maximum dilution within 100-125 m and is towards the northern side of the site, and the said destination is southern of the proposed site.

vii) Impact on shoreline

The project coastal front is subjected to high littoral drift. In case of the present project, the intake and outfall systems are designed by submarine pipelines which will be buried below the seabed. There will not be any projection above the


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seabed which can cause interference for the littoral drift. It will continue to allow the littoral drift to move smoothly across the surf zone. Since the littoral drift is not affected by the intake and outfall pipelines, there will not be any change in the neighboring shoreline.

5. MITIGATION

Though the proposed activities on construction of installation of seawater intake head and installation of outfall diffuser lead to certain adverse impacts initially on marine environment, there is sufficient scope for mitigations measures.

5.1. Intake and outfall pipelines

In order to minimize destruction on sub-tidal benthic community, the dredging will be carried out in controlled manner confined to only pipeline corridor. The turbidity induced during the dredging will be minimized using controlled dredging techniques and using appropriate cutter suction dredger. The net enclosures with booms may be placed around the dredging area in order to control the spread of the turbid plume. Regular monitoring on the heavy metals in the water column will be carried out during dredging in order to watch any rise in concentration due to dredging. The dredged materials will be used as back fill after laying the pipeline in the trench.

5.2. Construction of seawater intake head

The intake head has to be designed in order to avoid vortex formation. The intake head is designed in cylindrical form to avoid interference of currents. There will be clearance from the sea surface of approx. 3-3.5 m from the bottom and the intake screens may be placed well below the water line to avoid any vortex formation. The intake has appropriate screens and trash bars with small openings to minimize the entry of small marine organisms, fish larvae and fishes (entrapment and impingement). A marker buoy will be placed close to the intake head as per the norms of Directorate General of Lighthouses and Lightships. This will also help boats to avoid collision while en-route. The route of pipelines laid on the seafloor has to be furnished to Naval Hydrographic Office, Dehradun

in order to mark on the Naval Hydrographic Charts as a warning for navigation. Therefore to take care for the same the intake head is designed at very low velocity of less than 0.15 m/sec as per USEPA to prevent entrapment of fishes and other marine organism.

5.3. Construction of outfall diffuser

The outfall is designed with multiple ports, which can enhance the jet mixing of the brine with the seawater. This will ensure faster dilution of brine to ambient levels of salinity within short distance and there will not be any impact on marine organisms including fish catch in the nearby zone. The outfall diffuser is of HDPE pipes with no sharp projection and hence don't pose any risk for the boats and fishermen moving around this region. A marker buoy has to be placed close to the outfall as per the norms of Directorate General of Lighthouses and Lightships. This will also help boats to avoid collision while enroute. The route of pipelines laid on the seafloor has to be furnished to Naval Hydrographic Office, Dehradun in order to mark on the Naval Hydrographic Charts as a warning for navigation.


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5.4. Impacts and mitigations

The list of various impacts and the possible mitigations are summarized below.

Activity	Impact	Duration of Impact	Mitigation
Trenching for intake and outfall pipelines	<p>Trenching will disturb the sea bed resulting in loss of seagrass beds and associated benthic communities.</p> <p>Increased turbidity affecting the photosynthetic process of the water column.</p> <p>Suspended particles will affect the filter feeders and adult fish will migrate from the site of impact.</p> <p>Boat movements and fishing activity will be restricted.</p>	<p>Temporary</p> <p>Temporary</p> <p>Temporary</p> <p>Temporary</p>	<p>Use of good engineering tools like cutter suction dredger for trenching to be used.</p> <p>Controlled method of dredging with latest technology which will limit the plume generation.</p> <p>To minimize the spread of suspended particles, silt screens may be deployed.</p> <p>Complete the operation within shortest duration.</p>
Laying of submarine pipelines	Boat movements and fishing activity will be restricted	Temporary	<p>Laying operation may be done in shortest duration within a week.</p> <p>Barricading the water along the shoreline has to be avoided.</p> <p>Install proper marker lights indicating if any obstructions.</p>
Outfall diffuser	Increased salinity	Continuous	Faster dilution of moderately high salinity levels to ambient levels with adequate number of diffusers.

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800 m²
300 m²

Annexure-15

Letter TNEB

A handwritten signature in blue ink, appearing to read "S. Srinivasan".

Executive Engineer (Desal)
Chennai Metropolitan Water Supply &
Sewerage Board
Chennai - 600 002.

Name of Work : Estimate for providing 230kV Source to M/s.Nemilli 400MLD Desalination plant 230kV GIS substation.

Abstract Estimate

Sl.No	Description	Km	Rate/Km	Amount	Remarks
1	Erection of 230kV SC line on DC tower with Zebra conductor from Ottiyambakkam 400kV SS to LILO Point of Nemili 400MLD Desalination plant	26	104.97	2729.22	
2	Erection of 230kV SC line on DC tower with Zebra Conductor from Omega 230kV SS to LILO Point of Nemili 400MLD Desalination plant	15	104.97	1574.55	
3	Erection of 230KV DC line on DC tower from LILO point to Proposed Nemili 400MLD Desalination plant 230kV GIS Substation.	9	116.62	1049.58	
4	Add for Special type foundations for towers in Buckhimgam Cannel	LS		200.00	
5	Proposed 230kV Bay at Ottiyambakkam 400kV SS	1	276.52	276.52	
6	Proposed 230kV Bay at Omega 230kV SS	1	276.52	276.52	
				6106.39	
			Say	6107.00	Lakhs

11
B/21/12
EXECUTIVE ENGINEER
T.L.C/TAN TRANS CO
Poonamallee / Chennai - 56.

ASSISTANT EXECUTIVE ENGINEER
Transmission Line Construction
TAN TRANS CO
Maraimalai Nagar - 603 209

Executive Engineer (Desal)
Chennai Metropolitan Water Supply &
Sewerage Board
Chennai - 600 002.

DETAILED ESTIMATE FOR 230 KV BAY EXTENSION (DCW)

SI No	DESCRIPTION	UNIT	QTY	RATE	TOTAL
1	Civil works including foundation		LS	72.570	72.570
2	230 kV, SF6 Breaker	Nos	1	12.863	12.863
3	230 KV, CT	Nos	3	2.422	7.266
4	230 KV Isolator with earth blades	Nos	1	2.585	2.585
5	230 KV Isolator without earth blades	Nos	4	1.788	7.152
6	Relay panel	Nos	1	8.269	8.269
7	Structure	LS		33.940	33.940
8	Control cables	LS		7.768	7.768
9	Busbars, insulators, hardwares	LS		5.865	5.865
10	Shielding & Earthing	LS		2.933	2.933
Sub total					161.212
Contingencies 5 %					8.061
Cost of materials and equipments					169.272
Storage 3 %					5.078
Sub Total					174.350
Labour and transport 30%					52.305
Cost of materials and labour					226.655
Establishment and Supervision Charges @22%					49.864
Total					276.520

Say Rs. 276.52 Lakhs


 11
 EXECUTIVE ENGINEER
 T.L.C / TAN TRANSCO
 Puonamallee / Chennai - 56


 22
 ASSISTANT EXECUTIVE ENGINEER
 Transmission Line Construction
 TAN TRANS CO
 Maraimalai Nagar - 603 209

Executive Engineer (Desai)
 Chennai Metropolitan Water Supply &
 Sewerage Board
 Chennai - 600 002.

TAMILNADU TRANSMISSION CORPORATION LIMITED						
230 KV SC line on DC towers with Zebra conductor (DCW)						
Sl. No.	QTY	Unit	DESCRIPTION	Rate in Rs.	Per	Amount in Rs.
1			Galvanised steel tower materials with extension part wherever necessary, and bolts and nutsetc.,			
a	386.848	MT	b) MS 100%	74453.00	MT	28801994.14
b	20.372	MT	c) Ordinary Bolts & nuts	121543.00	MT	2476074.00
2	1114	No.	90 KN Disc Insulators	420.00	No.	467880.00
3	2228	No.	120 KN Disc Insulators	578.00	No.	1287784.00
			Conductor & Earth wire accessories			
4	48	Set	Single Suspension fittings for ACSR Zebra	2073.00	Set	99504.00
5	144	Set	Single Tension fittings for ACSR Zebra	2355.00	Set	339120.00
6	6	Set	Double Tension Fittings for Zebra	4200.00	Set	25200.00
7	144	Set	Vibration Damper for Ze	1079.00	Set	155376.00
8	30	Set	Mid span comp.joint for ACSL ZEBRA	835.00	Set	25050.00
9	30	Set	Repair sleeve for ACSR ZEBRA	470.00	No.	14100.00
10	54	Set	PA rod for ZEBRA	2028.00	Set	109512.00
11	18	Set	Suspension clamp for Earth wire 7/3.15mm ~	545.00	Set	9810.00
12	36	Set	Tension Clamp for Earth wire 7/3.55mm	539.00	Set	19404.00
13	6.00	Set	Mid span comp.joint for GS Earth wire 7/3.55mm	226.00	Set	1356.00
14	56	Set	Alu.earthbond	231.00	No.	12936.00
15	30.3	KM	ACSR Zebra conductors 1.0% sag	285570.00	KM	8652771.00
16	10.15	KM	GI EARTH WIRE 7/3.55mm 1.5% sag	76514.00	KM	776617.10
			Earthing materials			
17	35	No.	Pipe type earthing	4112.00	No.	143920.00
18	2	No.	Counter poise earthing (120m length)	12800.00	No.	25600.00
			Tower Accessories			
19	37	No.	Number plate	327.00	No.	12099.00
20	37	No.	Danger Board	437.00	No.	16169.00
21	37	No.	Phase plate(Set of three)	447.00	No.	16539.00
22	37	No.	Circuit plate	397.00	No.	14689.00
23			Total COST ON Materials			43503504.24
			TOWER FOUNDATIONS			
24	18	No.	G.type tower	177626.53	No.	3197277.54
			0° to 2° Suspension tower			

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25	10	No.	KS type tower	197145.12	No.	1971451.20
			2° to 30° Medium angle tower			
26	9	No.	LS type tower	431813.47	No.	3886321.23
			30° to 60° High angle & Dead end tower			
27			Tower protection works			500000.00
			TOTAL FOUNDATION COST			9555049.97
28			Total Cost of materials & Foundation			53058554.21
			(adding Item 23 & 28)			
29			Erection charges(10% on item 28) Rs.			5305855.42
30	10	KM	Tree/Crop compensation	1000000	KM	10000000.00
31			GST @ 18% on Foundation, Erection and crop compensation Charges			12305593.73
32			Labour Welfare Fund 1.0% on Foundation & Erection Charges			583644.10
33			Transportation charges (5% on Item 23)			2175175.21
34			Storage @ (3% on Item 23)			1305105.13
35			Insurance at 1% (on Item 31)			123055.94
36			Contingencies 5% (on Item 28 to 34)			4177593.93
37			Total Cost of materials & labour & contingencies but excluding taxes (on Item 28,29,30,32 & 33)			72428334.07
38			Establishment & Supervision Charges at 22.0% on item 37			15934233.49
			TOTAL COST	10	KM	104968811.16
			TOTAL COST PER 1 KM			10496881.12
			(Rounding to nearest 1000)	SAY		10497000.00
			TOTAL COST PER 1 KM IN LAKHS			104.97


 Executive Engineer (Desai)
 Chennai Metropolitan Water Supply
 Sewerage Board
 Chennai - 600 002.


 EXECUTIVE ENGINEER
 TAN TRANS CO
 Poonamallee / Chennai - 56


 ASSISTANT EXECUTIVE ENGINEER
 Transmission Line Construction
 TAN TRANS CO
 Maraimalai Nagar - 603 209

TAMILNADU TRANSMISSION CORPORATION LIMITED						
230 KV DC line on DC towers with Zebra conductor (DCW)						
Sl. No.	QTY	UNIT	DESCRIPTION	Rate in Rs.	Per	Amount in Rs.
1			Galvanised steel tower materials with extension part wherever necessary, and bolts and nutsetc.,			
a	386.85	MT	a. MS 100%	74453.00	MT	28802143.05
b	20.78	MT	b. Ordinary Bolts & nuts	121543.00	MT	2525663.54
2	1751	No.	90 KN Disc Insulators	420.00	No.	735420.00
3	4284	No.	120 KN Disc Insulators	578.00	No.	2476152.00
			Conductor & Earth wire accessories			
4	96	Set	Single Suspension fittings for ACSR Zebra	2073.00	Set	199008.00
5	36	Set	Single Suspension fitting for Jumpering	2073.00	Set	74628.00
6	288	Set	Single Tension fittings for ACSR Zebra	2355.00	Set	678240.00
7	12	Set	Double Tension Fittings for Zebra	4200.00	Set	50400.00
8	288	Set	Vibration Damper for Zebra	1079.00	Set	310752.00
9	30	Set	Mid span comp.joint for ACSR ZEBRA	835.00	Set	25050.00
10	15	Set	Repair sleeve for ACSR ZEBRA	470.00	No.	7050.00
11	96	Set	PA rod for ZEBRA	2028.00	No.	194688.00
12	16	Set	Suspension clamp for Earth wire 7/3.55mm	545.00	Set	8720.00
13	48	Set	Tension Clamp for Earth wire 7/3.55mm	539.00	Set	25872.00
14	6.00	Set	Mid span comp.joint for GS Earth wire 7/3.55mm 0.3 No. per 1 KM RL	226.00	Set	1356.00
15	64	Set	AI earth bond	231.00	No.	14784.00
16	60.6	KM	ACSR Zebra conductors 1.0% sag	285570.00	KM	17305542.00
17	10.15	KM	GI EARTH WIRE 7/3.55mm 1.50% sag	76514.00	KM	776617.10
18			Earthing materials			
19	40	No.	Pipe type earthing	4112.00	No.	164480.00
20	2	No.	Counter poise earthing (120m length)	12800.00	No.	25600.00
			Tower Accessories			
21	40	No.	Number plate	327.00	No.	13080.00
22	40	No.	Danger Board	437.00	No.	17480.00
23	48	No.	Phase plate(Set of three)	447.00	No.	21456.00
24	48	No.	Circuit plate	397.00	No.	19056.00
25			TOTAL COST ON MATERIALS			54473237.69
			TOWER FOUNDATIONS			
26	16	No.	GR type tower	177626.53	No.	2842024.48
			0° to 2° Suspension tower			
27	12	No.	KSR type tower	197145.12	No.	2365741.44
			2° to 30° Medium angle tower			

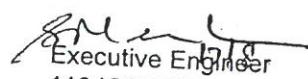

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28	12	No.	LSR type tower	431813.47	No.	5181761.64
			30° to 60° High angle & Dead end tower			
29			Tower protection works			500000.00
30			COST OF FOUNDATION WORKS			10889527.56
31			Total Cost of materials & Foundation			65362765.25
			(adding Item 25 & 30)			
32			Erection charges(10% on item 31)			6536276.53
33	10	KM	Tree/Crop compensation	1000000.00	KM	10000000.00
34			GST @ 18% on Foundation, Erection and crop compensation Charges			4936644.74
33			Labour Welfare Fund 1.0% on Foundation & Erection Charges			653627.65
34			Transportation charges (5% on Item 25)			2723661.88
35			Storage @ (3% on Item 23)			1634197.13
36			Insurance at 1% (on Item 34)			49366.45
37			Contingencies 5% (on Item 31 to 35)			4592358.66
38			Total Cost of materials & labour and contingencies but excluding taxes			91502887.10
39			Establishment & Supervision Charges at 22.0% on item 38			20130635.16
40			TOTAL COST	10	KM	116619533.45
41			TOTAL COST PER 1 KM			11661953.34
			(Rounding to nearest 1000)	SAY		11662000.00
			Total Cost per KM in LAKHS			116.62

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**Detailed Estimate for Establishment of 230 / 110 KV GIS SS at CMWSSB Nemmili in
SE / ChengalpattuEDC**

S.No.	Abstract	Amount in lakhs
1	I. Civil Works	478.14
2	II. Electrical Works	
3	Imported Items	2223.73
4	Indigenous items	1173.78
5	Erection Testing and Commissioning	3397.51
	Sub Total	4215.40
	Establishment and Supervision Charges 22%	927.39
	Total	5142.79


Executive Engineer
110 KV/UCP/South


Executive Engineer (Desai)
Chennai Metropolitan Water Supply &
Sewerage Board
Chennai - 600 002.

**Detailed Estimate for Establishment of 230 / 110 KV GIS SS at CMWSSB Nemmili in
SE /ChengalpattuEDC**

SI. No	DESCRIPTION	QUANTITY	RATE	PER	AMOUNT in Lakhs
I	CIVIL WORKS				
1	Land Cost				0.00
2	Control room building including electrification for 230 KV indoor GIS SS				291.85
3	Compound wall/Fencing				43.78
4	Generator room and burnt oil sump				21.40
5	RCC cable ducts				61.37
6	Cable dressing and clamping arrangements				5.00
7	Road formation with block topping				21.89
8	Filling and levelling of site				21.89
9	Water Supply and Drainage system improvement				10.96
	SUB - TOTAL				478.14
II	ELECTRICAL WORKS				
	<u>230 KV GIS SWITCH GEAR</u>				
1	230 KV SF6 GIS Indoor feeder bay (2+1 spare) with double bus with two nos disconnector, alongwith CT, PT & all the equipments	3 Nos	228.08	E	684.24
2	230 KV GIS transformer bay with all the equipment 2)	2 Nos.	201.94	E	403.88
4	230 KV GIS bus coupler breaker with disconnector	1 No.	147.57	E	147.57
5	230 KV bus PT	6 Nos.	10.54	Set	63.24
6	230 KV Indoor Terminations	12 Nos.	8.28	E	99.36
7	230 KV Outdoor Termination, LAS with Structure	6 Nos.	13.10		78.60
8	BusBar Earthing Switch	*2 Nos.	5.32	E	10.64
9	230 KV, 1x1200 sq.mm XLPE cable between 230 KV GIS breaker & HV of Auto tr (2 Nos), 230 KV Take off to GIS (2 feeders)	1.2 Kms	102.05	Km	122.46
10	Earthing arrangements			LS	15.00
	<u>110 KV GIS SWITCHGEAR</u>				
1	110 KV SF6 GIS Indoor feeder bay (3+1 spare) with double bus with two nos disconnector, alongwith CT, PT & all the equipments	4 Nos.	82.50	E	330.00
2	110 KV-GIS transformer bay with all the equipment (2)	2 Nos.	78.70	E	157.40
7	110 KV Outdoor Termination with Structure.	6 Nos.	4.58	E	27.48
8	110 KV LAS with Structure.	6 Nos.	5.58	E	33.48
10	110 KV, 1x630 Sq.mm, XLPE Alu. cable between 110 KV GIS bays to Auto Tranformers (0.1x3x2).	0.6 Kms	58.96	Km	35.38
11	Earthing arrangements			LS	15.00
	Sub - Total				2223.73


 Executive Engineer (Desai)
 Chennai Metropolitan Water Supply &
 Sewerage Board
 Chennai - 600 002.

**Detailed Estimate for Establishment of 230 / 110 KV GIS SS at CMWSSB Nemmili in
SE /ChengalpattuEDC**

B Indegeneous Items - Station Auxillaries

SI. No.	DESCRIPTION	QUANTITY	RATE	PER	AMOUNT in Lakhs
1	100 MVA, 230/110 KV Auto transformer with OLTC	2 Nos	413.13	E	826.26
2	Plinth for auto & pr transformers	2 Nos	4.40	E	8.80
3	230 KV Single phase link box with CCPU	12 Nos	0.44	E	5.30
4	230 KV Single phase link box w/o CCPU	12 Nos	0.35	E	4.21
5	110 KV Single phase link box with CCPU	6 Nos	0.35	E	2.11
6	110 KV Single phase link box w/o CCPU	6 Nos	0.31	E	1.83
7	Sheath bonding cable	0.5 Km	18.95	Km	9.48
8	Relay panel for 230 KV feeder with U/F	1 No	6.90	E	6.90
9	Relay panel for 230 KV feeders	1 Nos	5.94	E	5.94
10	Relay panel for Auto & Power transformers	2 Nos	4.75	E	9.50
11	230 KV Bus bar protection relay panel	1 No	11.36	E	11.36
12	Relay panel for 110 KV feeder with U/F	1 No	3.45	E	3.45
13	Relay panel for 110 KV feeders	3 No	2.92	E	8.76
14	110 KV Bus bar panel with protection	1 No	10.91	E	10.91
15	AC Panel for 230 KV SS	1 No	1.08	E	1.08
16	DC Panel	2 No	1.10	E	2.19
17	Synchronising panel	1 No.	0.44	E	0.44
18	Substation automation system	1 Set		LS	96.84
19	Earthing, Painting and Illumination for yard and control			LS	15.00
20	250 kVA, 11 KV/433 V station transformer with RMG				12.00
21	125 KVA DG set with accessories	2 No.	8.79	E	15.00
22	220 V, 300 AH Battery set	2 Nos	7.35	E	14.70
23	220 V DC, 60 A battery charger	3 Nos	1.49	E	4.47
24	Control cables of assorted size with tray arrangement				20.00
25	Fire fighting equipment	1 Set		LS	5.00
26	P & T Phone	4 No.	0.10	E	0.40
27	Scientific Instruments			LS	10.00
28	T & P and Furniture			LS	3.00
31	EOT crane arrangements			LS	15.00
32	Air Conditioning System and Air Handling system for GIS			LS	15.00
<u>Communication Equipments</u>					
33	OLTEs	2 Nos.	5.26	E	10.52
34	Multiplexers and Cross connectors	1 Nos.	8.80	E	8.80
35	Digital protection coupler	3 Nos.	2.07	E	6.20
36	48 V/ 250 AH Battery	1 Nos.	1.26	E	1.26
37	48 V/ 40 A Battery chager	2 Nos.	0.54	E	1.07
38	EPAX - 8S/8T			LS	1.00
	Sub Total				1173.78



Executive Engineer (Desai)
 Chennai Metropolitan Water Supply &
 Sewerage Board
 Chennai - 600 002.



Annexure-16

PROJECT				
CLIENT				
CONTRACTOR				
LOCATION				
				Remarks
Pipe Material	=	MS		
Design Code	=	AWWA/IS 3589		
Material Grade	=	FE410		
Pressure Rating for specials and valve	=	PN16		
	=	1.6	Mpa	
	=	232.060	psi	
	=	1.600	N/mm ²	
Pipe Nominal/ Outer Diameter, D	=	1626	mm	
	=	64.02	inch	
Selected Pipe Thickness	=	14.2	mm	As per IS: 3589
	=	0.56	inch	
Pipe Internal Diameter, d	=	1597.6	mm	
	=	62.90	inch	
Ultimate Tensile Strength	=	410	MPa	as per IS 3589
	=	59465.475	psi	
	=	410	N/mm ²	
Yield Strength	=	235	MPa	as per IS 3589
	=	34083.870	psi	
	=	235.000	N/mm ²	
Factor of Safety for Tensile Stress	=	2.00		
Factor of Safety for Compressive Stress	=	2.50		
Maximum Allowable Tensile stress, s =		117.5	MPa	
	=	17041.935	psi	
	=	117.500	N/mm ²	
Maximum Allowable Compressive Stress	=	94	MPa	as per AWWA
	=	13633.548	psi	
	=	94.000	N/mm ²	
Maximum Allowable deflection	=	81.3	mm	5% as per AWWA for flexible lining and coating
	=	3.20	inch	
Internal working pressure in pipeline, p	=	78	m	
		7.80	Kg/cm ²	
		0.78	N/mm ²	
		110.94	psi	
Internal design pressure considered, P	=	117	m	1.5 times of working pressure
		11.70	Kg/cm ²	
		1.17	N/mm ²	
		166.41	psi	
Weld joint efficiency, e	=	0.85		spot radiograph of test welding
	=	0.7		No radio Graph test of welding
Check for Thin/ Thick walled Cylinder:				
Internal radius of the pipe, r	=	31.45	inch	
Ratio of Radius and Thickness	=	56.25	r:t > 10, Hence thin walled pipe	
Check for maximum internal pressure at Steady-state condition:				
Maximum internal pressure at Steady-state condition, p ₁ =		117.00	mwc	Assumed
	=	166.41	psi	
For thin walled pipes:				
Minimum thickness required for internal pressure at Steady-state condition, t ₁ = (P*d)/(2s), as per AWWA M11				
	=	0.31	in	
	=	7.80	mm	Hence OK
Minimum thickness required for internal pressure at Steady-state condition, t ₁ = (P*D)/(2se + P), as per IS 5822				
	=	0.45	in	
	=	11.48	mm	Hence OK
Check for External Load For pipe buried in a ditch.	$\alpha = \frac{12}{\sqrt{\frac{W}{g} \left(\frac{1}{k} + \frac{E}{dt} \right)}}$			
Width of the ditch, W	=	Pipe OD + 2*300	mm	minimum trench width with 300 mm clearance on both sides
	=	2226	mm	Ditch width is within two times of the pipe width
For Ditch width is within two times of the pipe width:				
<i>Executive Engineer (Desal) Chennai Metropolitan Water Supply & Sewerage Board Chennai - 600 002.</i>				

PROJECT			
CLIENT			
CONTRACTOR			
LOCATION			
	$W_c = C_d w B_d^2 \left(\frac{B_c}{B_d} \right)$		
Where,			
W_c = Dead load on the conduit (lb/ linear ft of pipe)	2349.1	lb/ linear ft of pipe	
C_d = load coefficient based on H_c/B_d =	0.449		
H_c is the height of fill above conduit (ft) =	3.281	ft	assuming clear cover on pressure pipe = 1 m
w = unit weight of fill (lb/cu ft) =	134.2201	lb/cu. Ft	Soil density as 2150 kg/ cum assumed
B_d = width of trench at top of pipe (ft) =	7.303	ft	
B_c = diameter of pipe (ft)	5.335	ft	External dia
For pipes buried in an embankment or wide trench:			
	$W_c = C_e w B_c^2$		
C_e = coefficient for embankment conditions, a function of soil properties.			
For flexible pipes, the settlement ratio may be assumed to be zero, in which case:			
	$W_c = w H_c B_c$		for flexible pipes
Hence, W_c	= 2349.1	lb/ linear ft of pipe	
Determination of Superimposed Loads:			
Concentrated Loads:			
	$W_{sc} = C_s \left(\frac{PF}{L} \right)$		
Where,			
W_{sc} = Load on the conduit in kg/m			
P = Concentrated load in kg acting on the surface =	6250.000	kg	(Class AA IRC loading)
F = Impact factor (1.0 for air field runways, 1.5 for highway traffic and air field taxi ways, 1.75 for railway traffic)			
C_s = Load coefficient			
H = Height of the top of the conduit to ground surface =	1.000	m	
B_c = Outside width of conduit =	1.626	m	
L = Effective length of the conduit to which the load is transmitted in m =	1.000		
$Hence, B_c/2H$	= 0.813		
and, $L/2H$	= 0.500		
C_s	= 0.441		Table 3.21, CPHEEO Manual
F	= 1.500		for highway traffic
$Hence, W_{sc}$	= 4134.375	kg/m	
	= 2778.172	lb/ ft	
Distributed Loads:			
	$W_{sd} = C_s PFB_c$		
Where,			
W_{sd} = Load on the conduit in kg/m	= 9485	kg/m	
	= 6373.6	lb/ ft	
P = Intensity of the distributed load in kg/m ² =	138889	kg/m ²	(Class AA IRC loading of 6250 kg over an area of 300mm x 150 mm)
Area on which the distributed load acts, DXL			
D	= 0.150	m	
L	= 0.300	m	
$D/2H$	= 0.075		
$L/2H$	= 0.150		
C_s	= 0.028		Table 3.21, CPHEEO Manual
Railway Loads:			
	$W = 4C_s UB_c$	$U = \frac{PF}{4AB} + \frac{W_c}{2A}$	
Where,			
P = Axle load in tonnes =	22.500	Tonnes	for Broad gauge
F = Impact factor for railroad =	1.750		
$2A$ = Length of the sleeper in m =	2.700	Executive Engineer (Desai)	for Broad gauge
$2B$ = Distance between the two axles=	1.840	Chennai Metropolitan Water Supply &	for Broad gauge

PROJECT			
CLIENT			
CONTRACTOR			
LOCATION			
W_t = Weight of the track structure in tonnes/m=	0.300	Tonnes/ m	for Broad gauge
C_s = Load coefficient which depends on the height of the top of sleeper from the top of the conduit			
Height of top of sleeper from the top of conduit, H =	2.000	m	assumed
L =	2.700	m	assumed, for broad gauge sleeper length
B_c = Width of the conduit in m	=	1.626	m
$B_c/2H$	=	0.407	
$L/2H$	=	0.675	
Hence, C_s	=	0.349	Table 3.21, CPHEO Manual
U= Uniformly distributed load in tonnes / m ² from the surface directly over the conduit			
	=	8.04	tonnes / m ²
	=	8036.836	kg/m ²
Load on conduit below railway tracks, W =		18242.781	kg/m
	=	12258.6	lb/ ft
Load Cases (for external loading):			
Dead load on Conduit	=	2349.108	lb/ ft
Superimposed loads;			
Concentrated load - Truck load	=	2778.172	lb/ ft
Distributed Load - Truck Load	=	6373.626	lb/ ft
Distributed Load - Railway Load	=	12258.583	lb/ ft
Load Case -1: DL+Conc. TL	=	5127.279	lb/ ft
Load Case -2: DL+Dist. TL	=	8722.733	lb/ ft
Load Case-3: DL+Dist. RL	=	14607.691	lb/ ft
Load Case-4: Only DL	=	2349.108	lb/ ft
Checking for deflection:			
$\Delta x = D_l \left(\frac{K W r^3}{EI + 0.06IE'r^3} \right)$			
Where,			
Δx = horizontal deflection of pipe (inch)			
D_l = Deflection lag factor (1.0 to 1.5)	=	1.000	
K = Bedding constant	=	0.100	
r = radius (inch)	=	32.008	in
EI = Pipe wall stiffness (in. lb)	=	582429	in. lb
E = modulus of elasticity (psi)	=	40000000	psi
I = transverse moment of inertia per unit length of pipe wall			for MS with cement mortar
	=	0.014561	inch ³
E' = modulus of soil reaction (lb/ inch ²) =		1000	psi
	Load Case -1: DL+Conc. TL	Load Case -2: DL+Dist. TL	Load Case-3: DL+Dist. RL
W = load per unit of pipe length (lb/ inch)	427.3	726.9	1217.3
Δx = horizontal deflection of pipe (inch)	2.29	3.90	6.53
Allowable deflection (inch)	3.20	3.20	3.20
	Hence OK	Deflection is higher	Deflection is higher
Remedy/Rem ark:	Safe without encasing at road crossings	Safe without encasing under road	Safe without encasing at rail crossings
			Safe without encasing under earth
Checking for Buckling:			
$q_a = \left(\frac{1}{FS} \right) \left(32 R_w B' E' \frac{EI}{D^3} \right)^{1/2}$			
where,			
q_a = Allowable buckling pressure (psi) =		68.763	Executive Engineer (Desal) Chennai Metropolitan Water Supply & Sewerage Board Chennai - 600 002.
FS = design factor =		3.0000	
R_w = Raw water buoyancy factor = $(1-0.33(h_w/h))$ =		0.670	Chennai - 600 002.

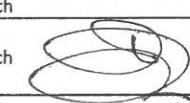
PROJECT			
CLIENT			
CONTRACTOR			
LOCATION			
h = height of soil above top of pipe =	39.370	inch	
h_w = height of water surface above top of pipe (in) =	39.370	inch	(ground water table considered at Ground level for conservative case)
B' = empirical coefficient of elastic support =	0.894		
			$B' = \frac{1}{1 + e^{-0.65H}}$
H = height of fill above pipe (ft) =	3.281	ft	
External loads on normal pipe installations:			
γ_w = specific weight of water =	0.0361	lb/cu. Inch	
W_c = vertical soil load on pipe per unit length =	195.759	lb/in	
P_v = internal vacuum pressure (psi) = (atmospheric pressure - absolute pressure inside pipe)			
	0.000	psi	(considering the system has been provided with adequate surge protection system to avoid any negative pressure)
Hence, $\gamma_w h_w + R_w \frac{W_c}{D} + P_v =$	3.470	psi	<Allowable Buckling Pressure, Hence OK under Soil load
Live load on the conduit, WL (lb/in):			
Concentrated load - Truck load =	231.514	lb/in	
Hence, $\gamma_w h_w + R_w \frac{W_c}{D} + \frac{W_L}{D} =$	7.087	psi	<Allowable Buckling Pressure, Hence OK under Soil load and Concentrated truck load
Distributed Load - Truck Load =	531.135	lb/in	
Hence, $\gamma_w h_w + R_w \frac{W_c}{D} + \frac{W_L}{D} =$	11.767	psi	<Allowable Buckling Pressure, Hence OK under Soil load and distributed truck load
Distributed Load - Railway Load =	1021.549	lb/in	
Hence, $\gamma_w h_w + R_w \frac{W_c}{D} + \frac{W_L}{D} =$	19.428	psi	<Allowable Buckling Pressure, Hence OK under Soil load and distributed railway load

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Chennai - 600 002.

PROJECT				
CLIENT				
CONTRACTOR				
LOCATION				
				Remarks
Pipe Material	=	MS		
Design Code	=	AWWA/IS 3589		
Material Grade	=	FE410		
Pressure Rating for specials and valve	=	PN16		
	=	1.6	Mpa	
	=	232.060	psi	
	=	1.600	N/mm ²	
Pipe Nominal/ Outer Diameter, D	=	1829	mm	
	=	72.01	inch	
Selected Pipe Thickness	=	16	mm	As per IS: 3589
	=	0.63	inch	
Pipe Internal Diameter, d	=	1797	mm	
	=	70.75	inch	
Ultimate Tensile Strength	=	410	MPa	as per IS 3589
	=	59465.475	psi	
	=	410	N/mm ²	
Yield Strength	=	235	MPa	as per IS 3589
	=	34083.870	psi	
	=	235.000	N/mm ²	
Factor of Safety for Tensile Stress	=	2.00		
Factor of Safety for Compressive Stress	=	2.50		
Maximum Allowable Tensile stress, s =	=	117.5	MPa	
	=	17041.935	psi	
	=	117.500	N/mm ²	
Maximum Allowable Compressive Stress	=	94	MPa	as per AWWA
	=	13633.548	psi	
	=	94.000	N/mm ²	
Maximum Allowable deflection	=	91.45	mm	5% as per AWWA for flexible lining and coating
	=	3.60	inch	
Internal working pressure in pipeline, p	=	78	m	
		7.80	Kg/cm ²	
		0.78	N/mm ²	
		110.94	psi	
Internal design pressure considered, P	=	117	m	1.5 times of working pressure
		11.70	Kg/cm ²	
		1.17	N/mm ²	
		166.41	psi	
Weld joint efficiency, e	=	0.85		spot radiograph of test welding
	=	0.7		No radio Graph test of welding
Check for Thin/ Thick walled Cylinder:				
Internal radius of the pipe, r	=	35.37	inch	
Ratio of Radius and Thickness	=	56.16	r:t > 10, Hence thin walled pipe	
Check for maximum internal pressure at Steady-state condition:				
Maximum internal pressure at Steady-state condition, p ₁ =	=	117.00	mwc	Assumed
	=	166.41	psi	
For thin walled pipes:				
$\text{Che}_p = \frac{\alpha \times p \times V}{g \times 2.3}$ External Load $a = \frac{12}{\sqrt{\frac{W}{g} \left(\frac{1}{k} + \frac{E}{dt} \right)}}$				
For p ₁ pressure in a ditch.				
Width of the ditch, W	=	Pipe OD + 2*300	mm	minimum trench width with 300 mm clearance on both sides
	=	2429	mm	Ditch width is within two times of the pipe width
For Ditch width is within two times of the pipe width:				
$W_c = C_d w B_d^2 \left(\frac{B_c}{B_d} \right)$				
Where,				
W_c = Dead load on the conduit (lb/ linear ft of pipe)	=	2642.4	lb/ linear ft of pipe	
C_d = load coefficient based on H_c / B_d =	=	0.412	Executive Engineer (Desai) Chennai Metropolitan Water Supply & Sewerage Board	
H_c is the height of fill above conduit (ft) =	=	3.281	assuming clear cover on pressure pipe = 1 m	

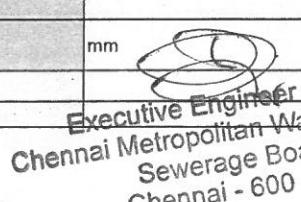
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CLIENT			
CONTRACTOR			
LOCATION			
w = unit weight of fill (lb/cu ft) =	134.2201	lb/cu. Ft	Soil density as 2150 kg/ cum assumed
B_d = width of trench at top of pipe (ft) =	7.969	ft	
B_c = diameter of pipe (ft)	6.001	ft	External dia
For pipes buried in an embankment or wide trench:			
$W_c = C_c w B_c^2$			
C_c = coefficient for embankment conditions, a function of soil properties.			
For flexible pipes, the settlement ratio may be assumed to be zero, in which case:			
$W_c = w H_c B_c$			for flexible pipes
Hence, W_c =	2642.4	lb/ linear ft of pipe	
Determination of Superimposed Loads:			
Concentrated Loads:			
$W_{sc} = C_s \left(\frac{PF}{L} \right)$			
Where,			
W_sc = Load on the conduit in kg/m			
P = Concentrated load in kg acting on the surface =	6250.000	kg	(Class AA IRC loading)
F = Impact factor (1.0 for air field runways, 1.5 for highway traffic and air field taxi ways, 1.75 for railway traffic)			
C_s = Load coefficient			
H = Height of the top of the conduit to ground surface =	1.000	m	
B_c = Outside width of conduit =	1.829	m	
L = Effective length of the conduit to which the load is transmitted in m =	1.000		
Hence, B_c/2H	= 0.915		
and, L/2H	= 0.500		
C_s	= 0.463		Table 3.21, CPHEEO Manual
F	= 1.500		for highway traffic
Hence, W_sc	= 4340.625	kg/m	
	= 2916.765	lb/ ft	
Distributed Loads:			
$W_{sd} = C_s PFB_c$			
Where,			
W_sd = Load on the conduit in kg/m =	10669	kg/m	
	= 7169.3	lb/ ft	
P = Intensity of the distributed load in kg/m ² =	138889	kg/m ²	(Class AA IRC loading of 6250 kg over an area of 300mm x 150 mm)
Area on which the distributed load acts, DXL			
D	= 0.150	m	
L	= 0.300	m	
D/2H	= 0.075		
L/2H	= 0.150		
C_s	= 0.028		Table 3.21, CPHEEO Manual
Railway Loads:			
$W = 4C_s UB_c$	$U = \frac{PF}{4AB} + \frac{W_t}{2A}$		
Where,			
P = Axle load in tonnes =	22.500	Tonnes	for Broad gauge
F = Impact factor for railroad =	1.750		
2A = Length of the sleeper in m =	2.700	m	for Broad gauge
2B = Distance between the two axles=	1.840	m	for Broad gauge
W_t = Weight of the track structure in tonnes/m=	0.300	Tonnes/ m	for Broad gauge
C_s = Load coefficient which depends on the height of the top of sleeper from the top of the conduit			
Height of top of sleeper from the top of conduit, H =	2.000	m	assumed
L =	2.700	m	assumed, for broad gauge sleeper length
B_c = Width of the conduit in m	1.829	m	Chennai Metropolitan Water Supply &
B_c/2H	0.457		Sewerage Board
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PROJECT				
CLIENT				
CONTRACTOR				
LOCATION				
L/2H	=	0.675		
Hence, C _s	=	0.414		Table 3.21, CPHEO Manual
U= Uniformly distributed load in tonnes / m ² from the surface directly over the conduit				
	=	8.04	tonnes / m ²	
	=	8036.836	kg/m ²	
Load on conduit below railway tracks, W =		24342.161	kg/m	
	=	16357.2	lb/ft	
Load Cases (for external loading):				
Dead load on Conduit	=	2642.385	lb/ft	
Superimposed loads;				
Concentrated load - Truck load	=	2916.765	lb/ft	
Distributed Load - Truck Load	=	7169.349	lb/ft	
Distributed Load - Railway Load	=	16357.177	lb/ft	
Load Case -1: DL+Conc. TL	=	5559.150	lb/ft	
Load Case -2: DL+Dist. TL	=	9811.734	lb/ft	
Load Case-3: DL+Dist. RL	=	18999.562	lb/ft	
Load Case-4: Only DL	=	2642.385	lb/ft	
Checking for deflection:				
$\Delta x = D_l \left(\frac{KWr^3}{EI + 0.06IE^l r^3} \right)$				
Where,				
Δx = horizontal deflection of pipe (inch)				
D _l = Deflection lag factor (1.0 to 1.5)		1.000		
K = Bedding constant	=	0.100		
r = radius (inch)		36.004	in	
EI = Pipe wall stiffness (in. lb)	=	833178	in. lb	
E = modulus of elasticity (psi)	=	40000000	psi	for MS with cement mortar
I = transverse moment of inertia per unit length of pipe wall				
	=	0.020829	inch ³	$I = t^3/12$
E' = modulus of soil reaction (lb/ inch ²) =		1000	psi	as per Table 6-1, AWWA M-11, based on soil condition
	Load Case -1: DL+Conc. TL	Load Case -2: DL+Dist. TL	Load Case-3: DL+Dist. RL	Load Case-4: Only DL
W = load per unit of pipe length (lb/inch)	463.3	817.6	1583.3	220.2
Δx = horizontal deflection of pipe (inch)	2.43	4.28	8.29	1.15
Allowable deflection (inch)	3.60	3.60	3.60	3.60
	Hence OK	Deflection is higher	Deflection is higher	Hence OK
Remedy/Remark:	Safe without encasing at road crossings	Safe without encasing under road	Safe without encasing at rail crossings	Safe without encasing under earth
Checking for Buckling:				
$q_a = \left(\frac{1}{FS} \right) \left(32R_w B' E' \frac{EI}{D^3} \right)^{1/2}$				
where,				
q _a = Allowable buckling pressure (psi) =		68.939	psi	
FS = design factor =		3.0000		
R _w = Raw water buoyancy factor = (1-0.33(h _w /h)) =		0.670		
h = height of soil above top of pipe =		39.370	inch	
h _w = height of water surface above top of pipe (in) =		39.370	inch	(ground water table considered at Ground level for conservative case)
B' = empirical coefficient of elastic support =		0.894		


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 B' = $\frac{1}{1 + e^{-0.65H}}$
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LOCATION			
H = height of fill above pipe (ft) =	3.281	ft	
External loads on normal pipe installations:			
γ_w = specific weight of water =	0.0361	lb/cu. Inch	
W_c = vertical soil load on pipe per unit length =	220.199	lb/in	
P_v = internal vacuum pressure (psi) = (atmospheric pressure - absolute pressure inside pipe)			
	=	0.000	psi
			(considering the system has been provided with adequate surge protection system to avoid any negative pressure)
Hence, $\gamma_w h_w + R_w \frac{W_c}{D} + P_v =$	3.470	psi	<Allowable Buckling Pressure, Hence OK under Soil load
Live load on the conduit, WL (lb/in):			
Concentrated load - Truck load =	243.064	lb/in	
Hence, $\gamma_w h_w + R_w \frac{W_c}{D} + \frac{W_L}{D} =$	6.846	psi	<Allowable Buckling Pressure, Hence OK under Soil load and Concentrated truck load
Distributed Load - Truck Load =	597.446	lb/in	
Hence, $\gamma_w h_w + R_w \frac{W_c}{D} + \frac{W_L}{D} =$	11.767	psi	<Allowable Buckling Pressure, Hence OK under Soil load and distributed truck load
Distributed Load - Railway Load =	1363.098	lb/in	
Hence, $\gamma_w h_w + R_w \frac{W_c}{D} + \frac{W_L}{D} =$	22.400	psi	<Allowable Buckling Pressure, Hence OK under Soil load and distributed railway load

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Chennai - 600 002.

PROJECT				
CLIENT				
CONTRACTOR				
LOCATION				
				Remarks
Pipe Material	=	MS		
Design Code	=	AWWA/IS 3589		
Material Grade	=	FE410		
Pressure Rating for specials and valves	=	PN16		
	=	1.6	Mpa	
	=	232.060	psi	
	=	1.600	N/mm ²	
Pipe Nominal/ Outer Diameter, D	=	2032	mm	
	=	80.00	inch	
Selected Pipe Thickness	=	17.5	mm	As per IS: 3589
	=	0.69	inch	
Pipe Internal Diameter, d	=	1997	mm	
	=	78.62	inch	
Ultimate Tensile Strength	=	410	MPa	as per IS 3589
	=	59465.475	psi	
	=	410	N/mm ²	
Yield Strength	=	235	MPa	as per IS 3589
	=	34083.870	psi	
	=	235.000	N/mm ²	
Factor of Safety for Tensile Stress	=	2.00		
Factor of Safety for Compressive Stress	=	2.50		
Maximum Allowable Tensile stress, s =	=	117.5	MPa	
	=	17041.935	psi	
	=	117.500	N/mm ²	
Maximum Allowable Compressive Stress	=	94	MPa	as per AWWA
	=	13633.548	psi	
	=	94.000	N/mm ²	
Maximum Allowable deflection	=	101.6	mm	5% as per AWWA for flexible lining and coating
	=	4.00	inch	
Internal working pressure in pipeline, p	=	78	m	
		7.80	Kg/cm ²	
		0.78	N/mm ²	
		110.94	psi	
Internal design pressure considered, P	=	117	m	1.5 times of working pressure
		11.70	Kg/cm ²	
		1.17	N/mm ²	
		166.41	psi	
Weld joint efficiency, e	=	0.85		spot radiograph of test welding
	=	0.7		No radio Graph test of welding
Check for Thin/ Thick walled Cylinder:				
Internal radius of the pipe, r	=	39.31	inch	
Ratio of Radius and Thickness	=	57.06	r:t > 10, Hence thin walled pipe	
Check for maximum internal pressure at Steady-state condition:				
Maximum internal pressure at Steady-state condition, p ₁ =	=	117.00	mwc	Assumed
	=	166.41	psi	
For thin walled pipes:				
Minimum thickness required for internal pressure at Steady-state condition, t ₁ = (P*d)/2s, as per AWWA M11				
	=	0.38	in	
	=	9.75	mm	Hence OK
Minimum thickness required for internal pressure at Steady-state condition, t ₁ = (P*D)/(2se + P), as per IS 5822				
	=	0.56	in	
	=	14.35	mm	Hence OK
Check External Load For pipes buried in a ditch.	$a = \frac{12}{\sqrt{\frac{W}{g} \left(\frac{1}{k} + \frac{E}{dt} \right)}}$			
Width of the ditch, W	=	Pipe OD + 2*300	mm	minimum trench width with 300 mm clearance on both sides
	=	2632	mm	Ditch width is within two times of the pipe width
For Ditch width is within two times of the pipe width:				
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PROJECT			
CLIENT			
CONTRACTOR			
LOCATION			
	$W_c = C_d w B_d^2 \left(\frac{B_c}{B_d} \right)$		
Where,			
W_c = Dead load on the conduit (lb/ linear ft of pipe)	2935.7	lb/ linear ft of pipe	
C_d = load coefficient based on H_c / B_d =	0.380		
H_c is the height of fill above conduit (ft) =	3.281	ft	assuming clear cover on pressure pipe = 1 m
w = unit weight of fill (lb/cu ft) =	134.2201	lb/cu. Ft	Soil density as 2150 kg/ cum assumed
B_d = width of trench at top of pipe (ft) =	8.635	ft	
B_c = diameter of pipe (ft)	6.667	ft	External dia
For pipes buried in an embankment or wide trench:			
	$W_c = C_e w B_c^2$		
C_e = coefficient for embankment conditions, a function of soil properties.			
For flexible pipes, the settlement ratio may be assumed to be zero, in which case:			
	$W_c = w H_c B_c$		for flexible pipes
Hence, W_c	=	2935.7	lb/ linear ft of pipe
Determination of Superimposed Loads:			
Concentrated Loads:			
	$W_{sc} = C_s \left(\frac{PF}{L} \right)$		
Where,			
W_{sc} = Load on the conduit in kg/m			
P = Concentrated load in kg acting on the surface =	6250.000	kg	(Class AA IRC loading)
F = Impact factor (1.0 for air field runways, 1.5 for highway traffic and air field taxi ways, 1.75 for railway traffic)			
C_s = Load coefficient			
H = Height of the top of the conduit to ground surface =	1.000	m	
B_c = Outside width of conduit =	2.032	m	
L = Effective length of the conduit to which the load is transmitted in m =	1.000		
Hence, $B_c / 2H$	=	1.016	
and, $L / 2H$	=	0.500	
C_s	=	0.481	Table 3.21, CPHEEO Manual
F	=	1.500	for highway traffic
Hence, W_{sc}	=	4509.375	kg/m
	=	3030.160	lb/ ft
Distributed Loads:			
	$W_{sd} = C_s PFB_c$		
Where,			
W_{sd} = Load on the conduit in kg/m	=	11853	kg/m
	=	7965.1	lb/ ft
P = Intensity of the distributed load in kg/m ² =	138889	kg/m ²	(Class AA IRC loading of 6250 kg over an area of 300mm x 150 mm)
Area on which the distributed load acts, DXL			
D	=	0.150	m
L	=	0.300	m
$D / 2H$	=	0.075	
$L / 2H$	=	0.150	
C_s	=	0.028	Table 3.21, CPHEEO Manual
Railway Loads:			
	$W = 4C_s UB_c$	$U = \frac{PF}{4AB} + \frac{w}{C_s}$	Executive Engineer (Desai) Chennai Metropolitan Water Supply & Sewerage Board Chennai - 600 002
Where,			
P = Axle load in tonnes =	22.500	Tonnes	for Broad gauge
F = Impact factor for railroad =	1.750		
$2A$ = Length of the sleeper in m =	2.700	m	for Broad gauge
$2B$ = Distance between the two axles=	1.840	m	for Broad gauge

PROJECT				
CLIENT				
CONTRACTOR				
LOCATION				
W_t = Weight of the track structure in tonnes/m=	0.300	Tonnes/ m	for Broad gauge	
C_s = Load coefficient which depends on the height of the top of sleeper from the top of the conduit				
Height of top of sleeper from the top of conduit, H =	2.000	m	assumed	
L =	2.700	m	assumed, for broad gauge sleeper length	
B_c = Width of the conduit in m =	2.032	m		
$B_c/2H$ =	0.508			
$L/2H$ =	0.675			
Hence, C_s =	0.414		Table 3.21, CPHEO Manual	
U= Uniformly distributed load in tonnes / m ² from the surface directly over the conduit				
	= 8.04	tonnes / m ²		
	= 8036.836	kg/m ²		
Load on conduit below railway tracks, W =	27043.888	kg/m		
	= 18172.7	lb/ ft		
Load Cases (for external loading):				
Dead load on Conduit	= 2935.662	lb/ ft		
Superimposed loads;				
Concentrated load - Truck load	= 3030.160	lb/ ft		
Distributed Load - Truck Load	= 7965.072	lb/ ft		
Distributed Load - Railway Load	= 18172.654	lb/ ft		
Load Case -1: DL+Conc. TL	= 5965.822	lb/ ft		
Load Case -2: DL+Dist. TL	= 10900.734	lb/ ft		
Load Case-3: DL+Dist. RL	= 21108.316	lb/ ft		
Load Case-4: Only DL	= 2935.662	lb/ ft		
Checking for deflection:				
$\Delta x = D_l \left(\frac{KWr^3}{EI + 0.06IE'r^3} \right)$				
Where,				
Δx = horizontal deflection of pipe (inch)				
D_l = Deflection lag factor (1.0 to 1.5)	= 1.000			
K = Bedding constant	= 0.100	*		
r = radius (inch)	= 40.000	in		
EI = Pipe wall stiffness (in. lb)	= 1090164	in. lb		
E = modulus of elasticity (psi)	= 40000000	psi	for MS with cement mortar	
I = transverse moment of inertia per unit length of pipe wall				
	= 0.027254	inch ³	$I = t^3/12$	
E' = modulus of soil reaction (lb/ inch ²) =	1000	psi	as per Table 6-1, AWWA M-11, based on soil condition	
	Load Case -1: DL+Conc. TL	Load Case -2: DL+Dist. TL	Load Case-3: DL+Dist. RL	Load Case-4: Only DL
W = load per unit of pipe length (lb/ inch)	497.2	908.4	1759.0	244.6
Δx = horizontal deflection of pipe (inch)	2.66	4.87	9.42	1.31
Allowable deflection (inch)	4.00	4.00	4.00	4.00
	Hence OK	Deflection is higher	Deflection is higher	Hence OK
Remedy/Rem ark:	Safe without encasing at road crossings	Safe without encasing under road	Safe without encasing at rail crossings	Safe without encasing under earth
Checking for Buckling:				
	$q_a = \left(\frac{1}{FS} \right) \left(32R_w B' E' \frac{EI}{D^3} \right)^{1/2}$			
where,				
q_a = Allowable buckling pressure (psi) =	67.341	psi	Executive Engineer (Desai) Chennai Metropolitan Water Supply & Sewerage Board Chennai - 600 002	
FS = design factor =	3.0000			
R_w = Raw water buoyancy factor = $(1-0.33(h_w/h))$ =	0.670			

PROJECT			
CLIENT			
CONTRACTOR			
LOCATION			
h = height of soil above top of pipe =	39.370	inch	
h_w = height of water surface above top of pipe (in) =	39.370	inch	(ground water table considered at Ground level for conservative case)
B' = empirical coefficient of elastic support =	0.894		
			$B' = \frac{1}{1 + e^{-0.65H}}$
H = height of fill above pipe (ft) =	3.281	ft	
External loads on normal pipe installations:			
γ_w = specific weight of water =	0.0361	lb/cu. Inch	
W_c = vertical soil load on pipe per unit length =	244.639	lb/in	
P_v = internal vacuum pressure (psi) = (atmospheric pressure - absolute pressure inside pipe)			
	=	0.000	psi
			(considering the system has been provided with adequate surge protection system to avoid any negative pressure)
Hence,	$\gamma_w h_w + R_w \frac{W_c}{D} + P_v =$	3.470	psi
			<Allowable Buckling Pressure, Hence OK under Soil load
Live load on the conduit, WL (lb/in):			
Concentrated load - Truck load	=	252.513	lb/in
Hence,	$\gamma_w h_w + R_w \frac{W_c}{D} + \frac{W_L}{D} =$	6.627	psi
Distributed Load - Truck Load	=	663.756	lb/in
Hence,	$\gamma_w h_w + R_w \frac{W_c}{D} + \frac{W_L}{D} =$	11.767	psi
Distributed Load - Railway Load	=	1514.388	lb/in
Hence,	$\gamma_w h_w + R_w \frac{W_c}{D} + \frac{W_L}{D} =$	22.400	psi
			<Allowable Buckling Pressure, Hence OK under Soil load and distributed truck load
			<Allowable Buckling Pressure, Hence OK under Soil load and distributed railway load



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Chennai - 600 002.

Design of Water Main
to be suitably filled

Guidance Note: the data in yellow cell to be suitably filled
1) Water requirement:

	A. Initial	B. Intermediate	C. Ultimate	Year	Peak Discharge	From:	Pipe Dia in mm	To:	Material	Class	HWC	Rate Rs/m
1) Pumping main				2018	400.00 mld		1600		MS	140	37620	
2) Static head for pump				2033	400.00 mld		1700		MS	140	40870	
3) Combined eff. of pump set				2048	400.00 mld		1800		MS	140	44769	
4) Design period	LENGTH			34000 M			1900		MS	140	49889	
5) Cost of pumping unit	ST.HEAD			18.00 M			2000		MS	140	54993	
6) Interest rate	YEAR			30 yr.								
7) Life of electric motor & pump set	EFF. %			80 %								
8) Energy charges per kWh	Rs./kW			25000 Rs								
9) Pumping hours for discharge at the end of 15 years	INTEREST			12.00 %								
10) Pumping hours for discharge at the end of 15 years	P.Yrs			15 yr.								
	P/KWH			635 paisa								
	hours			23 hrs								

CALCULATIONS:

1) Discharge at Start OF PERIOD		400.00 mld		400.00 mld
2) Discharge at the end of 15 yrs		400.00 mld		400.00 mld
3) Average Flow		4831 lps		4831 lps
4) Average Discharge		400.00 mld		400.00 mld
5) Avg.pumping hours during the period		23.00 hrs		23.00 hrs
6) KW required at combined efficiency of pumping set		61.78 * H1		61.78 * H2
7) annual charges for energy Rs.		2465100 * KW1		3295450 * KW2

Modified Hazen William's Formula

$$V = \frac{Q}{h^{1.852}}$$

$$143.534CR^{0.6575} S^{0.5525} \\ [L(Q/CR)^{1.81}]^{[994.62D4.81]}$$

Friction Head Loss (First 15 years)

Dia. in mm	L	Q	CR	Q/CR	(Q/CR)1.81	994.62 D	D4.81	h(First 15 yrs)
1600	1,000	4.831	0.95	5.085	18.985	994.620	0.450	0.021
1700	1,000	4.831	0.95	5.085	18.985	994.620	0.500	0.036
1800	1,000	4.831	0.95	5.085	18.985	994.620	0.600	0.086
1900	1,000	4.831	0.95	5.085	18.985	994.620	0.700	0.180
2000	1,000	4.831	0.95	5.085	18.985	994.620	0.750	0.251

Velocity

Dia. in mm	143.534	CR	$r = A/P = D/4$	$r = 0.6575$	S	V	S0.5525	V
1600	143.534	0.95	0.400	0.547	0.889	0.937		69.944
1700	143.534	0.95	0.425	0.570	0.535	0.708		55.012
1800	143.534	0.95	0.450	0.592	0.223	0.436		35.185
1900	143.534	0.95	0.475	0.613	0.106	0.290		24.204
2000	143.534	0.95	0.500	0.634	0.076	0.241		20.840

Friction Head Loss (Second 15 years)

Dia. in mm	L	Q	CR	Q/CR	(Q/CR)1.81	994.62 D	D4.81	h(Second 15 yrs)
1600	1,000	4.831	0.85	5.683	23.219	994.620	0.450	1,087.016
1700	1,000	4.831	0.85	5.683	23.219	994.620	0.500	654.851
1800	1,000	4.831	0.85	5.683	23.219	994.620	0.600	272.446
1900	1,000	4.831	0.85	5.683	23.219	994.620	0.700	129.798

TABLE 1 - VELOCITY AND HEADLOSSES FOR DIFFERENT PIPE SIZES

S No	Pipe Size in mm	friction head loss per 1000 m	Velocity in m/sec		Friction head loss	other losses at 10%	total losses (H1) including static head	Friction head loss in total pipe length	other losses at 10%	total losses (H2) including static head
			1st stage flow	2nd stage flow						
1	1600	888.80	1087.02	69.94	69.94	30219.24	30219.2	33241.16	36958.55	40672.41
2	1700	535.44	654.85	55.01	55.01	18204.97	1820.50	20025.47	22264.93	24509.43
3	1800	222.77	272.45	35.18	35.18	7574.05	757.40	8331.45	9263.17	10207.49

TABLE 2 - KILOWATTS & COST OF PUMP SETS REQUIRED FOR DIFFERENT PIPE SIZES AND PIPE COST

S No	Pipe Dia in mm	class of Pipe	1st stage flow in MLD		2nd stage flow in MLD		Pump cost at Rs per KW	cost of pipe per meter	total cost of pipe in thousand Rs
			H1 total head in meters	KW reqd plus 50% stand by	H2 total head in meters	Kw required plus 50% stand by			
1	1600	33241.16	3080281	77007024	40672.41	3768895	94222377	37620	1279080
2	1700	20025.47	1855653	46391329	24509.43	2271158	56778949	40870	1389580
3	1800	8331.45	772031	19300787	10207.49	945873	23646834	44769	1522146
4	1900	3969.23	367808	9195195	4872.43	451502	11287553	49889	1696226
5	2000	2848.29	262936	6598388	3501.49	324465	8111621	54993	1869762

TABLE 3 - COMPARATIVE STATEMENT OF OVERALL COST OF PUMPING MAIN FOR DIFFERENT PIPE SIZES

S No	1st stage flow			2nd stage flow			400.00 mld			400.00 mld			Pipe Dia			Grand total cost first and second stage	
	Cost of pump set	Annual Energy Charges	Capitalized energy cost	Pump cost+capitalized energy cost	Cost of pump set	Annual Energy Charges	Capitalized energy cost	Pump cost+capitalized energy cost	Capitalized energy cost	Pump cost+capitalized energy cost	Capitalized energy cost	Pump cost+capitalized energy cost	Present cost of pump and capitalized cost of 2nd stage	Present cost of pump and capitalized cost of 2nd stage	mm	mm	
1	7,70,07,024	8,19,42,789	62,32,56,857	70,02,63,881	9,42,22,377	13,40,33,875	1,01,94,61,654	1,11,36,84,031	26,66,22,942	1,600	96,81,65,903						
2	4,63,91,329	4,93,64,781	37,54,68,524	42,18,59,853	5,67,78,949	8,07,69,588	61,43,33,487	67,11,12,436	16,06,68,527	1,700	58,39,17,959						
3	1,93,00,787	2,05,37,871	15,62,11,047	17,55,11,834	2,36,46,834	3,36,38,260	25,58,52,605	27,94,99,439	6,69,13,919	1,800	24,39,47,898						
4	91,95,195	97,84,561	7,44,21,374	8,36,16,569	1,12,87,553	1,60,56,849	12,21,28,391	13,34,15,944	3,19,40,614	1,900	11,72,53,409						
5	65,98,388	70,21,312	5,34,04,097	6,00,02,486	81,11,621	1,15,39,000	8,77,65,632	9,58,77,253	2,29,53,616	2,000	8,48,25,863						

Minimum Capitalized cost Rs	8,48,25,863	thousands
Optimum pipe size corresponds to minimum capitalized cost		

Design of Water Main

Guidance Note: the data in yellow cell to be suitably filled

1) Water requirement :

A.	Initial	2018	Year Peak Discharge	From:	To:
B. Intermediate		2033	310.00 mld	Pipe Dia in mm	HWC
C. Ultimate		2048	310.00 mld	1600	Rate Rs/m
2) Pumping main		LENGTH	7000 M	MS	140
3) Static head for pump	ST.HEAD	12.00 M		MS	37620
4) Design period	YEAR	30 yr.		MS	140
5) Combined eff. of pump set	EFF. %	80 %		MS	40870
6) Cost of pumping unit	Rs./KW	25000 Rs		MS	44769
7) Interest rate	INTEREST	12.00 %			
8) Life of electric motor & pump set	P.Yrs	15 yr.			
9) Energy charges per kWh	P/KWH	63.5 paisa			
10) Pumping hours for discharge at the end of 15 years	hours	23 hrs			

CALCULATIONS:

1) Discharge at Start OF PERIOD		1st 15 years	2nd 15 years
2) Discharge at the end of 15 yrs		310.00 mld	310.00 mld
3) Average Flow		310.00 mld	310.00 mld
4) Average Discharge		3744 lps	3744 lps
5) Avg.pumping hours during the period		310.00 mld	310.00 mld
6) KW required at combined efficiency of pumping set		23.00 hrs	23.00 hrs
7) annual charges for energy Rs.		47.88 * H1	47.88 * H2
		1910453 * KW1	2553974 * KW2

Modified Hazen William's Formula

$$V = 143.534 CR^{0.6575} S_0^{0.5525}$$

$$[L(Q/CR)^{1.81}]/[994.62 D^{4.81}]$$

V=

h=

Friction Head Loss (First 15 years)

Friction Head Loss (first 15 years)		CR		(Q/CR)1.81		994.62 D		D4.81		h(First 15 yrs)	
Dia. in mm	L	Q	CR	Q/CR	(Q/CR)1.81	994.62	D	0.450	0.021	560.326	
1600		1000	3.744	0.95	3.941	11.969	994.620	0.500	0.036	337.557	
1700		1000	3.744	0.95	3.941	11.969	994.620	0.600	0.086	140.438	
1800		1000	3.744	0.95	3.941	11.969	994.620	0.700	0.180	66.907	
0		1000	3.744	0.95	3.941	11.969	994.620	0.750	0.251	48.012	
0		1000	3.744	0.95	3.941	11.969	994.620				

Velocity

Velocity	Dia. in mm	143.534	CR	$r = A/P = D/4$	r0.6575	S	S0.5525	V
	1600	143.534	0.95	0.400	0.547	0.560	0.726	54.206
	1700	143.534	0.95	0.425	0.570	0.338	0.549	42.634
	1800	143.534	0.95	0.450	0.592	0.140	0.338	27.268

Friction Head Loss (Second 15 years)

Velocity Dia. in mm	143.534	CR	$r = A/P = D/4$	0.6575	S	0.5525	V
1600	143.534	0.85	0.400	0.547	0.685	0.812	54.206
1700	143.534	0.85	0.425	0.570	0.413	0.613	42.634
1800	143.534	0.85	0.450	0.592	0.172	0.378	27.268

TABLE I. - VELOCITY AND HEAD LOSSES FOR DIFFERENT PIPE SIZES

S No	Pipe Size in mm	friction head loss per 1000 m		Velocity in m/sec		Velocity in m/sec		Friction head loss at 10% flow		total losses (H1) including static head		Friction head loss in total pipe length 10%		other losses at 10% head		total losses (H2) including static head	
		1st stage flow	2nd stage flow	1st stage flow	2nd stage flow	1st stage flow	2nd stage flow	1st stage flow	2nd stage flow	1st stage flow	2nd stage flow	1st stage flow	2nd stage flow	1st stage flow	2nd stage flow	1st stage flow	2nd stage flow
1	1600	560.33	685.29	54.21	54.21	3922.28	3922.28	392.23	392.23	4314.51	4314.51	4797.00	4797.00	479.70	479.70	5288.71	5288.71
2	1700	337.56	412.84	42.63	42.63	2362.90	2362.90	236.29	236.29	2599.19	2599.19	2889.86	2889.86	288.99	288.99	3190.84	3190.84
3	1800	140.44	171.76	27.27	27.27	983.07	983.07	98.31	98.31	1081.37	1081.37	1202.31	1202.31	120.23	120.23	1334.54	1334.54

TABLE 2 - KU GWATTS & COST OF PUMP SETS REQUIRED FOR DIFFERENT PIPE SIZES AND PIPE COST

TABLE 2 - KILOWATTS & COST OF PUMP SEALS REQUIRED FOR DIFFERENT PIPE SIZES AND THE COST						
S No	Pipe Dia in mm	class of Pipe	1st stage flow in MLD		2nd stage flow in MLD	
			H1 total head in meters	KW reqd plus pump cost at 50% stand by Rs per Kw	H2 total head in meters	Kw required plus 50% stand by KW
1	1600	4314.51	309847	7746174	5288.71	379809
2	1700	2599.19	186661	4666526	3190.84	229151
3	1800	1081.37	77659	1941476	1334.54	95840
						310.00
						cost of pipe per meter
						total cost of pipe in thousand Rs

TABLE 3 - COMPARATIVE STATEMENT OF OVERALL COST OF PUMPING MAIN FOR DIFFERENT PIPE SIZES

S No	1st stage flow			310.00 mld			2nd stage flow			310.00 mld			Pipe Dia mm	Grand total cost first and second stage
	Cost of pump set	Annual Energy Charges	capitalized energy cost	Pump cost+capitalized energy cost	Cost of pump set	Annual Energy Charges	Annual Energy Charges	capitalized energy cost	Pump cost+capitalized energy cost	Present cost of pump and capitalized cost of 2nd stage	Thousands Rs			
1	77,46,174	82,42,665	6,26,93,710	7,04,39,884	94,95,225	1,35,07,213	1,0,27,35,866	11,22,31,091	2,68,68,827	1,600	9,75,72,051			
2	46,66,526	49,65,627	3,77,68,561	4,24,35,088	57,28,772	81,49,333	6,19,83,827	6,77,12,599	1,62,10,821	1,700	5,89,31,999			
3	19,41,476	20,65,914	1,57,13,345	1,76,54,821	23,95,997	34,08,370	2,59,24,060	2,83,20,057	67,79,999	1,800	2,47,48,203			

Minimum Capitalized cost Rs	2,47,48,203	thousands
Optimum pipe size corresponds to minimum capitalized cost		

Annexure-17

01-09-17 13:10

Setting up of 400 MLD Desal Plant at Perur



1 Annual O & M Expenditure (INR Lakhs)			
a Existing for city	2010-2011	Rs. 56422.00	
	2011-2012	Rs. 58380.00	
	2012-2013	Rs. 65445.00	
	2013-2014	Rs. 76779.00	
	2014-2015	Rs. 88098.00	
	2015-2016	Rs. 100463.00	
	2016-2017	Rs. 99928.00	
	2017-2018	Rs. 102666.00	
b Proposed for project area alone	Proposed for City Plant		
	Year 1 (2019-20)	46720.00	152200.00
	Year 2	49556.00	159810.00
	Year 3	51510.00	167800.00
	Year 4	56660.00	176190.00
	Year 5 (2023-24)	59493.00	185000.00
2 Tariff (Rs. / KL)			
a Existing			
Domestic	0-10 KL - Rs. 2.50 per KL 11-15 KL - Rs. 10.00 per KL 16-25 KL - Rs. 15.00 per KL > 25 KL - Rs. 25.00 per KL		
Commercial	Rs. 400.00 per month		
Industrial	Rs. 60 per KL		
Bulk Supply Dedicated Line (Municipal)	Rs. 30 per KL		
b Proposed			
Domestic	0-10 KL - Rs. 5.00 per KL 11-15 KL - Rs. 20.00 per KL 16-25 KL - Rs. 30.00 per KL > 25 KL - Rs. 50.00 per KL		
Commercial	Rs. 1200.00 per month		
Industrial	Rs. 120 per KL with annual increase of 10% p.a		
Bulk Supply Dedicated Line (Municipal)	Rs. 35 per KL with annual increase of 8% p.a		
3 Revenue generation (INR Lakh)			
a Existing for Chennai City	Rs. 535.87 crore (2016-17) Rs. 549.26 crore (2017-18)		
b Proposed (Year 2018)	Rs. 629.38 crores 25% supply to industry @ Rs. 120/KL = Rs. 445.60 crore per annum 75% supply to HHs (2.25 lakh) at an average of Rs. 375/month (as per proposed tariff above) = Rs. 258.05 crore per annum		

Selvaraj
1/9/17

Olday
1/9/17

FINANCE DIRECTOR IAC
FINANCE DIRECTOR
C.M.W.S.S.B.
No.1, Pumping Station Road,
Chintadripet, Chennai - 600 002.

Annexure-18

