KERALA URBAN WATER SUPPLY IMPROVEMENT PROJECT




KOCHI CORPORATION WATER SUPPLY SYSTEM

KOCHI ESTIMATES

VOLUME - II

PREPARED FOR KERALA WATER AUTHORITY

KERALA, INDIA

NOVEMBER 2022

VERSION 13

CONTENTS

ANNEXURE 1 - KOCHI FINANCIAL SUMMARY

Data											
One USD$	INR	81.63	**ADB November 2022**								
Physical contingencies	%	0%									
Price inflation	%	0%									
Network length	Km	706									
Maintenance cost for WTW rehab	%	3%									
GST	%	18%									
COC Project Cost Financial Plan	Total	1	2	3	4	5	6	7	8	9	10
Inflation rate		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Inflation index		1	1	1	1	1	1	1	1	1	1
CW1 - Expenditure profile	100%	10%	20.0%	20.0%	25.0%	25.0%					
CW1 - Production Capex	82.67	8.27	16.53	16.53	20.67	20.67					
CW1 - Maintenance Cost	16.49		0.25	0.74	1.24	1.86	2.48	2.48	2.48	2.48	2.48
GST @18%	17.87	1.49	3.02	3.11	3.94	4.06	0.45	0.45	0.45	0.45	0.45
CW1 - Subtotal	**117.03**	**9.76**	**19.8**	**20.38**	**25.85**	**26.59**	**2.93**	**2.93**	**2.93**	**2.93**	**2.93**
CW2 - Expenditure Profile	**100%**	10%	10.0%	20%	20%	20%	10%	10%			
CW2 - Distribution Capex	603.63	60.36	60.36	120.73	120.73	120.73	60.36	60.36			
CW2 - Maintenance Cost	122.5		13.24	12.76	12.14	11.51	14.89	14.72	14.56	14.41	14.27
CW2 - Operator Fee	236.04	34.36	29.93	21.79	21.79	21.79	21.25	21.25	21.29	21.29	21.29
GST @18%		17.05	18.64	27.95	27.84	27.73	17.37	17.34	6.45	6.43	6.40
CW2 - Subtotal	**1135.37**	**111.77**	**122.17**	**183.23**	**182.50**	**181.76**	**113.87**	**113.67**	**42.30**	**42.13**	**41.96**
Total COC Packages Cost	1252.40	121.53	141.97	203.61	208.35	208.35	116.80	116.60	45.23	45.06	44.89
	INR Cr	USD$m									
COC Package cost for Yr1- Yr7	1117.21	137									
COC Package cost for Yr8 - 10	135.19	17									
COC total package cost	**1252.40**	**153**									

ANNEXURE 2 - KOCHI CAPITAL COST

Abstract - Water Supply Improvements for Kochi

Sl. No.	Package	Project Area	Description	Estimated cost (Rs Cr)	Estimated cost USD $ millions
1	**CW1**	**Kochi**	**Water Treatment plants and Pump stations**		
			Pumping stations	6.3	0.8
			Water treatment plant (i) Civil & Mechanical Works (ii) Pumps & Motors (iii) Valves	65.9	8.1
			SCADA for plant operations	0.5	0.1
			Instrumentation	10.0	1.2
			Total Package CW1	**82.7**	**10.1**
2	**CW2**	**Kochi**	**Networks, Property service connections, Customer meters**		
			Networks	310.3	38.0
			Booster pumping stations	8.7	1.1
			Tanks Rehabilitation	0.9	0.1
			Property service connections & Customer meters	276.4	33.9
			Set up Costs	6.8	0.8
			SCADA system for network flow and pressure monitoring	0.5	0.1
			Total Package CW2	**603.6**	**73.9**
			Total Cost CW1 + CW2	**686.3**	**84.1**

USD$ 1 = INR 81.63 as on 24th November 2022

ANNEXURE 3- COST ESTIMATE – WATER TREATMENT PLANT

Sl No	Description of work	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
1	**Civil and Mechanical Works**				
1.1	**Housekeeping and backlog maintenance**				
i	Housekeeping and cleaning the plant area	m^2	46,375	12	5,72,183
ii	Storage building/workshop for repairable equipment	Job	4	6,16,909	24,67,638
iii	Landscaping the yards	m^2	53,707	123	66,26,470
iv	Painting all civil structures	m^2	30,033	185	55,58,242
v	Colour code painting and marking of all process pipes	Job	4	12,33,819	49,35,275
vi	Pasivating and painting all mechanical items of work	Job	4	3,08,455	12,33,819
vii	Structural repairs and grouting	Job	4	6,16,909	24,67,638
viii	Repair and retrofitting doors and windows, fly screens	m^2	1,320	4,648	61,37,869
ix	Repair and retrofitting all floors	m^2	7,272	1,328	96,58,606
x	Improving internal roads	m^2	2,447	1,234	30,19,278
xi	New toilet blocks	Nos.	8	61,691	4,93,528
xii	Repair/retrofitting walkways	m	2,390	3,701	88,48,274
xii	CC TV security system with 20 view stations	Nos.	75	92,536	69,40,231
1.2	**Construction of raw water oxidation/balance tank at plant inlet**	Job	4	6,16,909	24,67,638
1.3	**Replacement of Paddles, gears, motor and panels in Flash mixers**	Job	4	1,35,720	5,42,880
1.4	**Chemical House**				
i	Replacement of paddles, gears, motor and panels	Job	4	1,60,396	6,41,586
ii	Coagulant mixing and solution tanks	Nos.	8	2,46,764	19,74,110
iii	Lime mixing and solution tanks	Nos.	8	2,46,764	19,74,110
iv	New Coagulant dosing system	Job	4	2,46,764	9,87,055
v	New Lime dosing system	Job	4	2,46,764	9,87,055
vi	New Coagulant Aid Polymer dosing system	Job	4	6,90,939	27,63,754
vii	New Filtration Aid Polymer dosing system	Job	4	6,90,939	27,63,754
viii	New corrosion inhibitor dosing system	Job	4	12,33,819	49,35,275
ix	New pH correction dosing system with pH control loop	Job	4	2,46,764	9,87,055
x	Weighing machine for chemicals	Nos.	4	49,353	1,97,411
1.5	**Flocculator**				
i	Replacement of paddles, gears, motor and panels	Job	10	9,87,055	98,70,550
1.6	**Clarifier**				
i	Lamella plates/Tube settler equipment	m^3	6,630	11,104	7,36,25,514

Sl No	Description of work	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
ii	Support structure for lamella plates/Tube settlers (by assuming 0.3 m thickness of structure)	m^3	1,989	8,637	1,71,79,287
ii	Replacement of scraper bridge with new sludge scraper bridge and sludge suction system	MLD	325	39,482	1,28,31,715
1.7	**Rapid Gravity Filters**				
i	Replacement of filter media with dual media (2 layers of sand and 1 layer GAC)	Sub estimate	1	14,21,914	14,21,914
ii	Replacement of underdrainage system with Apollo screens	Sub estimate	1	7,14,69,101	7,14,69,101
iii	Installation charges for underdrainage system	Sub estimate	1	44,41,748	44,41,748
1.8	**Air Blower**				
i	Capable of discharging 4815 m3/hr at a total head of 5m WC for clear water (48 MLD)	Nos.	2	7,40,291	14,80,583
ii	Capable of discharging 4954 m3/hr at a total head of 5m WC for clear water (72 MLD)	Nos.	2	7,40,291	14,80,583
iii	Capable of discharging 3240 m3/hr at a total head of 5m WC for clear water (70 MLD)	Nos.	2	6,47,755	12,95,510
iv	Capable of discharging 3600 m3/hr at a total head of 5m WC for clear water (35 MLD)	Nos.	2	6,78,600	13,57,201
v	Capable of discharging 4018 m3/hr at a total head of 5m WC for clear water (100 MLD)	Nos.	2	7,40,291	14,80,583
1.9	**Backwash water recovery tank**				
i	Construction of backwash water recovery plant (conical tank, with sludge draw off at the centre of the tank, scraper, polymer dosing, sludge well and sludge pumps & supernatant pumps (duty and stand-by), tank level sensor interlocked with the sludge and supernatant pumps to start the pumps when the level exceeds the set level). Supernatant pumps discharge connected to the supernatant return line to the balance tank.)	Job	5	6,16,909	30,84,547
ii	Construction of backwash water recovery tank supernatant return line to the WTP inlet main	Job	5	1,23,382	6,16,909

Sl No	Description of work	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
iii	Construction of sludge dewatering system (depending on land availability can be lagoon system or dewatering screw press	Job	5	1,23,382	6,16,909
1.10	**Chlorination**				
ii	Supply and installation of chlorine safety equipment	Job	4	12,338	49,353
iii	Construction of chlorine contact tank	Job	5	6,16,909	30,84,547
1.11	**Mixers**				
i	Balance Tank Mixers	Job	9	12,33,819	1,11,04,369
ii	Rapid Mix Tank Mixer	Job	9	12,33,819	1,11,04,369
iii	Washwater Tank Submersible Mixers	Job	8	12,33,819	98,70,550
1.12	**Supplier Packages**				
i	Liquid Coagulant Truck Fill Station/ Local Panel (loading control panel)	Job	4	49,35,275	1,97,41,100
ii	Lime Silo (Complete System -Hopper, Feeders, Dust Extraction, Screw Conveyor, Batch Tank and Mixer and Local control Panel)	Job	4	49,35,275	1,97,41,100
iii	Lime Unloader System	Job	4	49,35,275	1,97,41,100
iv	Polymer(Dry) Storage, Handling, and Batching System (Complete System - Hopper, Feeders, Filters, Heater, Batch Tanks and Mixers and Local control Panel)	Job	4	49,35,275	1,97,41,100
v	Filter Aid Polymer Batching System with all equipment + instruments included in supplier package+ local control panel with proprietary PLC; ASSUME DRY CONTACTS FOR INPUTS/OUTPUTS SUCH AS: * ENABLE-RUN * GENERAL FAULT * BATCH SYSTEM UNAVAILABLE	item	4	49,35,275	1,97,41,100
1.13	**Laboratory and Office**				
i	Testing equipment and apparatus as per list	Job	4	30,84,547	1,23,38,188
ii	Furniture for lab and operator offices	Job	4	1,23,382	4,93,528
iii	Washing & drying machine 10kg capacity	Job	4	61,691	2,46,764
1.14	**Electrical**				
i	Replacement of electrical transformer	kVA			
ii	Substation replacement & upgradation (Aluva 1, 2)	Job	2	1,85,07,282	3,70,14,563
iii	Air conditioned electrical switchboards room	Nos.	4	1,23,382	4,93,528
iv	Yard lighting improvements	Job	4	61,691	2,46,764
v	Installation of cable trays and new cabling	Job	4	61,69,094	2,46,76,375
1.15	**SCADA**				
i	PLC, HMI Screens and cables	Job	4	92,53,641	3,70,14,563
2	**Pumps**				

Sl No	Description of work	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
2.1	Design, Supply at Site, Installation, Construction, Commissioning, Testing & Trial Run of best efficient approved make Centrifugal Pumping Sets with combined efficiency levels of at least 80 % for Clear Water Pumping Station conforming to the latest relevent IS Codes including cost of motor, pump, control panel, VFD drives (if required), all civil, mechanical, electrical and instrumentation works etc all complete as per Specification for the discharge and head ratings shown below:				
2.1 (a)	**Lime Transfer Pump (Centrifugal pump)**				
i	Capable of discharging 55149 L/hr at a total head of 5m	Nos.	2	75,747	1,51,494
ii	Capable of discharging 82723 L/hr at a total head of 5m	Nos.	2	1,51,494	3,02,988
iii	Capable of discharging 80426 L/hr at a total head of 5m	Nos.	2	1,51,494	3,02,988
iv	Capable of discharging 40213 L/hr at a total head of 5m	Nos.	2	75,747	1,51,494
v	Capable of discharging 114894 L/hr at a total head of 5m	Nos.	2	1,51,494	3,02,988
2.1 (b)	**Permanganate Transfer Pump**				
i	Capable of discharging 22060 L/hr at a total head of 5m	Nos.	1	75,747	75,747
ii	Capable of discharging 33089 L/hr at a total head of 5m	Nos.	1	75,747	75,747
iii	Capable of discharging 32170 L/hr at a total head of 5m	Nos.	1	75,747	75,747
iv	Capable of discharging 16085 L/hr at a total head of 5m	Nos.	1	75,747	75,747
v	Capable of discharging 45957 L/hr at a total head of 5m	Nos.	1	75,747	75,747
2.1 (c)	**Treated Water Sample Pump**				
i	Capable of discharging 1494 L/hr at a total head of 5m	Nos.	10	15,149	1,51,494
2.2	Design, Supply at Site, Installation, Construction, Commissioning, Testing & Trial Run of best efficient approved make Submerssible Centrifugal Pumping Sets with combined efficiency levels of at least 80 % for Clear Water Pumping Station conforming to the latest relevent IS Codes including cost of motor, pump, control panel, VFD drives (if required), all civil, mechanical, electrical and instrumentation works etc all complete as per Specification				

Sl No	Description of work	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
	for the discharge and head ratings shown below:				
2.2 (a)	**Process Drainage Pit pump**				
i	Capable of discharging 147 m3/hr at a total head of 5m	Nos.	2	2,27,241	4,54,482
ii	Capable of discharging 221 m3/hr at a total head of 5m	Nos.	2	3,02,988	6,05,976
iii	Capable of discharging 214 m3/hr at a total head of 5m	Nos.	2	3,02,988	6,05,976
iv	Capable of discharging 107 m3/hr at a total head of 5m	Nos.	2	2,27,241	4,54,482
v	Capable of discharging 306 m3/hr at a total head of 5m	Nos.	2	3,78,735	7,57,470
2.2 (b)	**Washwater Transfer pump**				
i	Capable of discharging 640 m3/hr at a total head of 5m	Nos.	2	4,54,482	9,08,964
ii	Capable of discharging 960 m3/hr at a total head of 5m	Nos.	2	7,57,470	15,14,940
iii	Capable of discharging 933 m3/hr at a total head of 5m	Nos.	2	7,57,470	15,14,940
iv	Capable of discharging 466 m3/hr at a total head of 5m	Nos.	2	4,54,482	9,08,964
v	Capable of discharging 1333 m3/hr at a total head of 5m	Nos.	2	7,57,470	15,14,940
2.2 (c)	**Subnatant pump**				
i	Capable of discharging 154 m3/hr at a total head of 5m	Nos.	2	3,02,988	6,05,976
ii	Capable of discharging 232 m3/hr at a total head of 5m	Nos.	2	3,78,735	7,57,470
iii	Capable of discharging 225 m3/hr at a total head of 5m	Nos.	2	3,78,735	7,57,470
iv	Capable of discharging 113 m3/hr at a total head of 5m	Nos.	2	2,27,241	4,54,482
v	Capable of discharging 322 m3/hr at a total head of 5m	Nos.	2	3,78,735	7,57,470
2.2 (d)	**Supernatant return pump**				
i	Capable of discharging 756 m3/hr at a total head of 5m	Nos.	2	4,54,482	9,08,964
ii	Capable of discharging 960 m3/hr at a total head of 5m	Nos.	2	6,05,976	12,11,952
iii	Capable of discharging 1094 m3/hr at a total head of 5m	Nos.	2	7,57,470	15,14,940
iv	Capable of discharging 547 m3/hr at a total head of 5m	Nos.	2	4,54,482	9,08,964
v	Capable of discharging 1563 m3/hr at a total head of 5m	Nos.	2	9,08,964	18,17,927
2.2 (e)	**Emergency overflow pump**				

Sl No	Description of work	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
i	Capable of discharging 551 m3/hr at a total head of 5m	Nos.	2	4,54,482	9,08,964
ii	Capable of discharging 827 m3/hr at a total head of 5m	Nos.	2	6,05,976	12,11,952
iii	Capable of discharging 804 m3/hr at a total head of 5m	Nos.	2	6,05,976	12,11,952
iv	Capable of discharging 402 m3/hr at a total head of 5m	Nos.	2	4,54,482	9,08,964
v	Capable of discharging 1149 m3/hr at a total head of 5m	Nos.	2	7,57,470	15,14,940
2.2 (f)	**Treated water service pump**				
i	Capable of discharging 10 m3/hr at a total head of 5m	Nos.	15	37,873	5,68,102
2.3	Design, Supply at Site, Installation, Construction, Commissioning, Testing & Trial Run of best efficient approved make Diaphragm pump Sets with combined efficiency levels of at least 80 % for Clear Water Pumping Station conforming to the latest relevent IS Codes including cost of motor, pump, control panel, VFD drives (if required), all civil, mechanical, electrical and instrumentation works etc all complete as per Specification for the discharge and head ratings shown below:				
2.3 (a)	**Alum Coagulant Dosing Pump**				
i	Capable of discharging 417 L/hr at a total head of 5m	Nos.	4	2,27,241	9,08,964
ii	Capable of discharging 625 L/hr at a total head of 5m	Nos.	5	2,65,114	13,25,572
iii	Capable of discharging 608 L/hr at a total head of 5m	Nos.	5	2,65,114	13,25,572
iv	Capable of discharging 456 L/hr at a total head of 5m	Nos.	4	2,27,241	9,08,964
v	Capable of discharging 651 L/hr at a total head of 5m	Nos.	6	2,65,114	15,90,687
2.3 (b)	**Filter Aid Polymer Dosing Pump**				
i	Capable of discharging 40 L/hr at a total head of 5m	Nos.	2	1,51,494	3,02,988
ii	Capable of discharging 60 L/hr at a total head of 5m	Nos.	2	1,51,494	3,02,988
iii	Capable of discharging 58 L/hr at a total head of 5m	Nos.	2	1,51,494	3,02,988
iv	Capable of discharging 29 L/hr at a total head of 5m	Nos.	2	75,747	1,51,494
v	Capable of discharging 83 L/hr at a total head of 5m	Nos.	2	1,51,494	3,02,988
2.3 (c)	**Corrosion Inhibitor Dosing Pump**				

Sl No	Description of work	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
i	Capable of discharging 6 L/hr at a total head of 5m	Nos.	4	75,747	3,02,988
ii	Capable of discharging 9 L/hr at a total head of 5m	Nos.	2	75,747	1,51,494
iii	Capable of discharging 4 L/hr at a total head of 5m	Nos.	2	75,747	1,51,494
iv	Capable of discharging 13 L/hr at a total head of 5m	Nos.	2	75,747	1,51,494
2.3 (d)	**Potassium Permanganate Dosing Pump**				
i	Capable of discharging 80 L/hr at a total head of 5m	Nos.	4	1,51,494	6,05,976
ii	Capable of discharging 120 L/hr at a total head of 5m	Nos.	2	1,51,494	3,02,988
iii	Capable of discharging 117 L/hr at a total head of 5m	Nos.	2	1,51,494	3,02,988
iv	Capable of discharging 58 L/hr at a total head of 5m	Nos.	2	1,06,046	2,12,092
2.4	Design, Supply at Site, Installation, Construction, Commissioning, Testing & Trial Run of best efficient approved make Submerssible Peristaltic pump Sets with combined efficiency levels of at least 80 % for Clear Water Pumping Station conforming to the latest relevent IS Codes including cost of motor, pump, control panel, VFD drives (if required), all civil, mechanical, electrical and instrumentation works etc all complete as per Specification for the discharge and head ratings shown below:				
2.4 (a)	**Lime Dosing pumps**				
i	Capable of discharging 400 L/hr at a total head of 5m	Nos.	9	2,27,241	20,45,168
ii	Capable of discharging 600 L/hr at a total head of 5m	Nos.	9	3,02,988	27,26,891
iii	Capable of discharging 583 L/hr at a total head of 5m	Nos.	16	3,02,988	48,47,807
iv	Capable of discharging 556 L/hr at a total head of 5m	Nos.	12	3,02,988	36,35,855
3	**Valves**				
3.1	**Butterfly Valves**				
i	150 mm dia PN 16 of DI mterial	Nos.	1	37,095	37,095
ii	200 mm dia PN 16 of DI mterial	Nos.	19	44,515	8,45,777
iii	250 mm dia PN 16 of DI mterial	Nos.	3	51,934	1,55,801
iv	300 mm dia PN 16 of DI mterial	Nos.	151	59,353	89,62,265
v	350 mm dia PN 16 of DI mterial	Nos.	44	89,029	39,17,282
vi	375 mm dia PN 16 of DI mterial	Nos.	3	96,448	2,89,345
vii	400 mm dia PN 16 of DI mterial	Nos.	44	2,22,573	97,93,204

Sl No	Description of work	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
viii	450 mm dia PN 16 of DI mterial	Nos.	45	2,59,668	1,16,85,073
3.2	**Check Valves (Non-return valves)**				
i	25 mm dia PN 16 of PVC material	Nos.	8	2,968	23,741
ii	50 mm dia PN 16 of PVC material	Nos.	28	5,935	1,66,188
iii	100 mm dia PN 16 of DI material	Nos.	16	8,903	1,42,447
iv	150 mm dia PN 16 of DI mterial	Nos.	8	17,806	1,42,447
v	200 mm dia PN 16 of DI mterial	Nos.	4	22,257	89,029
vi	300 mm dia PN 16 of DI mterial	Nos.	4	29,676	1,18,706
3.3	**Air Actuated Ball Valve**				
i	25 mm dia PN 16 of 316SS material	Nos.	48	22,257	10,68,350
3.4	**Ball Valve**				
i	15 mm dia PN 16 of 316SS material	Nos.	1,046	14,838	1,55,20,744
ii	20 mm dia PN 16 of PVC material	Nos.	20	22,257	4,45,146
iii	25 mm dia PN 16 of PVC material	Nos.	245	22,257	54,53,034
iv	50 mm dia PN 16 of PVC material	Nos.	100	22,257	22,25,728
v	63 mm dia PN 16 of PVC material	Nos.	16	22,257	3,56,117
3.5	**Ball Check valve**				
i	15 mm dia PN 16 of PVC material	Nos.	92	22,257	20,47,670
ii	25 mm dia PN 16 of PVC material	Nos.	4	22,257	89,029
iii	50 mm dia PN 16 of PVC material	Nos.	8	22,257	1,78,058
iv	63 mm dia PN 16 of PVC material	Nos.	8	22,257	1,78,058
3.6	**Diaphragm Valve**				
i	15 mm dia PN 16 of PVC material	Nos.	104	2,968	3,08,634
ii	63 mm dia PN 16 of PVC material	Nos.	20	2,968	59,353
3.7	**Float Valve**				
i	15 mm dia PN 16 of PVC material	Nos.	4	2,968	11,871
ii	25 mm dia PN 16 of 316SS material	Nos.	8	4,451	35,612
iii	32 mm dia PN 16 of PVC material	Nos.	4	5,935	23,741
3.8	**Gate Valve**				
i	50 mm dia PN 16 of PVC material	Nos.	8	4,451	35,612
3.9	**Needle Valve**				
i	15 mm dia PN 16 of PVC material	Nos.	4	2,968	11,871
3.10	**Penstock Valve**				
i	450 mm dia PN 16 of DI material	Nos.	2	66,772	1,33,544
ii	600 mm dia PN 16 of DI material	Nos.	3	2,22,573	6,67,718
iii	700 mm dia PN 16 of DI material	Nos.	3	2,59,668	7,79,005
iv	750 mm dia PN 16 of DI material	Nos.	5	2,96,764	14,83,819
3.11	**Pressure reducing valve**				
i	15 mm dia PN 16 of PVC material	Nos.	16	2,968	47,482
ii	25 mm dia PN 16 of PVC material	Nos.	16	4,451	71,223
iii	50 mm dia PN 16 of PVC material	Nos.	4	7,419	29,676
3.12	**Pressure relief valve**				
i	15 mm dia PN 16 of PVC material	Nos.	16	4,451	71,223
ii	25 mm dia PN 16 of PVC material	Nos.	4	7,419	29,676

Sl No	Description of work	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
3.13	**Pressure Sustain valve**				
i	15 mm dia PN 16 of PVC material	Nos.	32	4,451	1,42,447
3.14	**Reduced pressure zone (RPZ) valve**				
i	250 mm dia PN 16 of DI mterial	Nos.	8	74,191	5,93,528
3.15	**S/S Knife gate valve**				
i	150 mm dia PN 16 of 316SS material	Nos.	4	74,191	2,96,764
ii	200 mm dia PN 16 of 316SS material	Nos.	8	1,11,286	8,90,291
iii	300 mm dia PN 16 of 316SS material	Nos.	4	2,22,573	8,90,291
3.16	**Slide gate valve**				
i	200 mm dia PN 16 of 316SS material	Nos.	8	37,095	2,96,764
3.17	**Sluice Gate valve**				
i	50 mm dia PN 16 of DI material	Nos.	12	22,257	2,67,087
ii	100 mm dia PN 16 of DI material	Nos.	52	29,676	15,43,172
iii	150 mm dia PN 16 of DI mterial	Nos.	37	37,095	13,72,532
iv	200 mm dia PN 16 of DI mterial	Nos.	54	44,515	24,03,786
v	300 mm dia PN 16 of DI mterial	Nos.	20	59,353	11,87,055
vi	350 mm dia PN 16 of DI mterial	Nos.	2	89,029	1,78,058
vii	400 mm dia PN 16 of DI mterial	Nos.	2	2,22,573	4,45,146
viii	450 mm dia PN 16 of DI material	Nos.	1	2,59,668	2,59,668
ix	500 mm dia PN 16 of DI material	Nos.	2	2,96,764	5,93,528
3.18	**Solenoid valve**				
i	15 mm dia PN 16 of PVC material	Nos.	8	2,968	23,741
ii	20 mm dia PN 16 of PVC material	Nos.	92	3,710	3,41,278
iii	25 mm dia PN 16 of PVC material	Nos.	12	7,419	89,029
iv	50 mm dia PN 16 of PVC material	Nos.	4	11,871	47,482
3.19	**Swing check valve**				
i	25 mm dia PN 16 of PVC material	Nos.	4	5,935	23,741
ii	200 mm dia PN 16 of DI mterial	Nos.	1	22,257	22,257
iii	250 mm dia PN 16 of DI mterial	Nos.	3	29,676	89,029
3.20	**Vacuum relief valve**				
i	50 mm dia PN 16 of PVC material	Nos.	4	11,871	47,482
					65,85,15,143

ANNEXURE 4 - COST ESTIMATE – PRODUCTION PUMPING STATION

Sl No	Description of work	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
1	**Pumps and motors**				
1.1	Design, Supply at Site, Installation, Construction, Commissioning, Testing & Trial Run of best efficient approved make **Vertical Turbine pumps** with combined efficiency levels of at least 80 % for Raw Water Pumping Station conforming to the latest relevent IS Codes including cost of motor, pump, control panel, VFD drives (if required), all civil, mechanical, electrical and instrumentation works etc all complete as per Specification for the discharge and head ratings shown below:				
i	Capable of discharging 1894 Cum/hr at a total head of 20 m for pumping raw water KPS02	No's	4	40,90,337	1,63,61,347
ii	Capable of discharging 1875 Cum/hr at a total head of 27 m for pumping raw water KPS03	No's	1	31,81,373	31,81,373
iii	Capable of discharging 1458 Cum/hr at a total head of 60 m for pumping raw water KPS07	No's	1	34,84,361	34,84,361
1.2	Installing **Motor** with capacity rating 250 kW for pumping Clear water KPS01	No's	3	25,49,568	76,48,703
2	**Suction & Deivery pipe**				
2.1	**Double flanged (welded) centrifugally (spun) Ductile iron ISI marked K-9 grade pipes** Providing, lowering, laying in trenches, aligning, fixing in position and double flanged (welded) centrifugally (spun) Ductile iron ISI marked K-9 grade pipes as per IS:8329-2000 (amended upto date), (including jointing and jointing material) complete including all material, labour, hydraulic testing and commissioning as per Technical Specifications and as per direction of Engineer. Note : E/w to be measured and paid separately.				
vi	400 mm dia	m	24	11,118	2,66,832
ii	500 mm dia	m	20	16,132	3,22,640
3	**Valves**				
3.1	**Isolation valves (Sluice valves)** Providing, lowering, laying, aligning, fixing in position in pipe line, Resilient Seated D/F DI Sluice valves of approved make & design standard of following dia complete (including jointing & jointing material) including all material, labour, testing and commissioning along with pipe line as per Technical Specification & as per direction of Engineer.				

Sl No	Description of work	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
	Electrically Operated & SCADA Compatible class PN 1.6				
i	250 mm dia	No's	2	1,64,672	3,29,344
ii	400 mm dia	No's	9	4,42,804	39,85,236
iii	500 mm dia	No's	2	6,60,176	13,20,352
3.2	**Non-return valve (Check Valve)** Supply & fixing of ductile iron double flanged swing check valves with slanted seat or with lever weight with straight disc, with metallic corrosion proof and wear resistant seat faces with nickel overlay micro-finished/ integral seat with body and disc in Ductile Iron in GGG 50 shaft of stainless steel and bearings of zinc free bronze and surface protection with epoxy liquid of GSK quality. Note: Rate inclusive of cost of valves, Bolts & Nuts for joining and fixing and Labour charges for joining & fixing valve				
i	500 mm dia	No's	5	4,56,395	22,81,975
3.3	**Air valve** Supply and fixing of triple function tamper proof (Both sides the orifice to be housed in the single chamber) Air valves with body and cover in Ductile Cast iron of grade GGG 50. All internal parts such as float, shell etc., all cover bolts of austenic alloy / SS 304 steel, DN 50 float of HOSTAFLON / SS 304 and gaskers and steel of EPDM. Epoxy Powder Coating (EP-P) inside and outside colour blue RAL5005. The valves should be designed for all 3 functions i.e., 1. Large orifice for venting of large air volumes on startup. 2. Large orifice for intake of large air volumes. 3. Small orifice for dischrge of pressurized air during operation. Note: Rate inclusive of cost of valves, Bolts & Nuts for joining and fixing and Labour charges for joining & fixing valve				
i	50 mm dia	No's	6	18,529	1,11,172
ii	80 mm dia	No's	4	25,917	1,03,667
iii	100 mm dia	No's	3	39,134	1,17,401
4	**Delivery pressure gauge**				
4.1	Supply, delivery, installation, testing, and commissioning of Pressure measuring instruments as per the General Specifications and as directed by Engineer-in -charge				

Sl No	Description of work	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
i	Pressure gauges	No.s	19	6,000	1,14,000
5	**Painting of pipes**				
5.1	Painting of MS/DI Pipes & specials on outside with Anti- corrosive paint including cost of painting				
i	600 mm dia	m	20	181	3,626
6	**Flow meters**				
6.1	**Electromagnetic Bulk Flow Meters**				
i	Electromagnetic Flow Meter- 400 mm Size	Nos.	1	5,67,734	5,67,734
ii	Electromagnetic Flow Meter- 800 mm Size	Nos.	3	10,90,841	32,72,524
iii	Electromagnetic Flow Meter- 1000 mm Size	Nos.	1	16,35,112	16,35,112
7	**SCADA and instruments**				
7.1	Pump house monitoring system				
i	Instrumentation, control	Job	8	20,00,000	1,60,00,000
8	**HT cables upgradation**				
8.1	Upgrading of LT cables to HT cable connection for KPS02				
i	Supply of 3 C x 185 Sq. mm 11 kV Gr XLPE Al Conductor UG Cable for the purpose of erection of the motor, starter, capacitor erection and supply incommer cable from 11 kV substation No. II / 110 kV New substation for keeping sufficient distance as per site condition including layong as required length and terminaition. Quantity= 2000 mtrs	Job	4	5,00,000	20,00,000
ii	Supply of 12 kV Grade 3 C x 185 Sq. mm XLPE Shrinking type end termination kit end terminating the r incommer cables	Nos.	8	6,195	49,560
9	**Dismantling and extra items in connection with pump station**				
9.1	Dismantling of damaged pumpset and motor, starter, foundation wirings, damaged panel board and disconnecting unwanted electrical connections in the pump house and stacking the Store as per direction of departmental officers.	Job	6	50,000	3,00,000
					6,34,56,959

ANNEXURE 5 - COST ESTIMATE – DISTRIBUTION PUMPING STATION

Sl No	Description of work	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
1	**Pumps and motors**				
1.1	Design, Supply at Site, Installation, Construction, Commissioning, Testing & Trial Run of best efficient approved make **Horizontal Split Casing Centrifugal Pumping Sets** with combined efficiency levels of at least 80 % for Clear Water Pumping Station conforming to the latest relevent IS Codes including cost of motor, pump, control panel, VFD drives (if required), all civil, mechanical, electrical and instrumentation works etc all complete as per Specification for the discharge and head ratings shown below:				
i	Capable of discharging 510 Cum/hr at a total head of 29 m for pumping clear water KPS10	No's	1	15,36,224	15,36,224
ii	Capable of discharging 504 Cum/hr at a total head of 36 m for pumping clear water KPS16 and KPS17	No's	3	15,92,262	47,76,786
iii	Capable of discharging 85 Cum/hr at a total head of 60 m for pumping clear water KPS10	No's	2	5,17,367	10,34,734
iv	Capable of discharging 108 Cum/hr at a total head of 28 m for pumping clear water KPS10	No's	3	6,04,491	18,13,474
v	Capable of discharging 126 Cum/hr at a total head of 65 m for pumping clear water KPS11	No's	1	7,65,211	7,65,211
vi	Capable of discharging 250 Cum/hr at a total head of 30 m for pumping clear water KPS11	No's	1	10,06,935	10,06,935
vii	Capable of discharging 1500 Cum/hr at a total head of 30 m for pumping clear water KPS13	No's	1	42,00,321	42,00,321
viii	Capable of discharging 306 Cum/hr at a total head of 45 m for pumping clear water KPS13	No's	3	12,07,695	36,23,084
ix	Capable of discharging 288 Cum/hr at a total head of 55 m for pumping clear water KPS17	No's	1	16,14,759	16,14,759
x	Capable of discharging 1042 Cum/hr at a total head of 30 m for pumping clear water KPS18	No's	2	25,27,737	50,55,474
1.2	Installing **Motor** with capacity rating 75 kW for pumping Clear water KPS10	No's	6	9,30,779	55,84,673
1.3	Installing **Motor** with capacity rating 55 kW for pumping Clear water KPS12	No's	3	6,60,059	19,80,177
2	**Suction & Deivery pipe**				

Sl No	Description of work	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
2.1	**Double flanged (welded) centrifugally (spun) Ductile iron ISI marked K-9 grade pipes** Providing, lowering, laying in trenches, aligning, fixing in position and double flanged (welded) centrifugally (spun) Ductile iron ISI marked K-9 grade pipes as per IS:8329-2000 (amended upto date), (including jointing and jointing material) complete including all material, labour, hydraulic testing and commissioning as per Technical Specifications and as per direction of Engineer. Note : E/w to be measured and paid separately.				
i	150 mm dia	m	28	3,303	92,476
ii	200 mm dia	m	44	4,316	1,89,922
iii	250 mm dia	m	40	5,570	2,22,796
iv	300 mm dia	m	24	7,009	1,68,209
v	350 mm dia	m	8	9,330	74,643
vi	400 mm dia	m	16	11,118	1,77,888
vii	450 mm dia	m	24	13,516	3,24,384
viii	500 mm dia	m		16,132	-
3	**Valves**				
3.1	**Isolation valves (Sluice valves)** Providing, lowering, laying, aligning, fixing in position in pipe line, Resilient Seated D/F DI Sluice valves of approved make & design standard of following dia complete (including jointing & jointing material) including all material, labour, testing and commissioning along with pipe line as per Technical Specification & as per direction of Engineer. ***Electrically Operated & SCADA Compatible class PN 1.6***				
i	150 mm dia	No's	12	95,604	11,47,248
ii	200 mm dia	No's	9	1,36,524	12,28,716
iii	250 mm dia	No's	12	1,64,672	19,76,064
iv	300 mm dia	No's	5	1,86,992	9,34,960
v	450 mm dia	No's	6	4,73,804	28,42,824
vi	500 mm dia	No's	8	6,60,176	52,81,408
3.2	**Non-return valve (Check Valve)** Supply & fixing of ductile iron double flanged swing check valves with slanted seat or with lever weight with straight disc, with metallic corrosion proof and wear resistant seat faces with nickel overlay micro-finished/ integral seat with body and disc in Ductile Iron in GGG 50 shaft of stainless steel and bearings of zinc free bronze and surface protection with epoxy liquid				

Sl No	Description of work	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
	of GSK quality. Note: Rate inclusive of cost of valves, Bolts & Nuts for joining and fixing and Labour charges for joining & fixing valve				
i	150 mm dia	No's	7	23,552	1,64,864
ii	200 mm dia	No's	5	47,613	2,38,064
iii	250 mm dia	No's	11	86,582	9,52,400
iv	300 mm dia	No's	5	1,28,909	6,44,543
v	400 mm dia	No's	2	2,70,125	5,40,249
vi	450 mm dia	No's	3	4,40,001	13,20,002
3.3	**Air valve** Supply and fixing of triple function tamper proof (Both sides the orifice to be housed in the single chamber) Air valves with body and cover in Ductile Cast iron of grade GGG 50. All internal parts such as float, shell etc., all cover bolts of austenic alloy / SS 304 steel, DN 50 float of HOSTAFLON / SS 304 and gaskers and steel of EPDM. Epoxy Powder Coating (EP-P) inside and outside colour blue RAL5005. The valves should be designed for all 3 functions i.e., 1. Large orifice for venting of large air volumes on startup. 2. Large orifice for intake of large air volumes. 3. Small orifice for dischrge of pressurized air during operation. Note: Rate inclusive of cost of valves, Bolts & Nuts for joining and fixing and Labour charges for joining & fixing valve				
i	50 mm dia	No's	12	18,529	2,22,344
ii	80 mm dia	No's	1	25,917	25,917
iii	100 mm dia	No's	2	39,134	78,268
4	**Delivery pressure gauge**				
4.1	Supply, delivery, installation, testing, and commissioning of Pressure measuring instruments as per the General Specifications and as directed by Engineer-in -charge				
i	Pressure gauges	No.s	38	6,000	2,28,000
5	**Painting of pipes**				
5.1	Painting of MS/DI Pipes & specials on outside with Anti- corrosive paint including cost of painting				
i	100 mm dia	m	20	26	515
ii	150 mm dia	m	12	40	482
iii	200 mm dia	m	4	56	222
iv	250 mm dia	m	24	70	1,681

Sl No	Description of work	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
v	300 mm dia	m	20	79	1,586
vi	600 mm dia	m	12	181	2,175
6	**Flow meters**				
6.1	**Electromagnetic Bulk Flow Meters**				
i	Electromagnetic Flow Meter- 100 mm Size	Nos.	2	2,38,319	4,76,638
ii	Electromagnetic Flow Meter- 150 mm Size	Nos.	5	2,75,585	13,77,926
iii	Electromagnetic Flow Meter- 200 mm Size	Nos.	4	3,32,635	13,30,540
iv	Electromagnetic Flow Meter- 250 mm Size	Nos.	1	3,59,780	3,59,780
v	Electromagnetic Flow Meter- 300 mm Size	Nos.	2	4,22,350	8,44,699
vi	Electromagnetic Flow Meter- 350 mm Size	Nos.	1	5,00,103	5,00,103
vii	Electromagnetic Flow Meter- 400 mm Size	Nos.	4	5,67,734	22,70,937
viii	Electromagnetic Flow Meter- 450 mm Size	Nos.	1	6,26,624	6,26,624
ix	Electromagnetic Flow Meter- 500 mm Size	Nos.	1	7,03,918	7,03,918
x	Electromagnetic Flow Meter- 700 mm Size	Nos.	1	9,33,496	9,33,496
xi	Electromagnetic Flow Meter- 900 mm Size	Nos.	1	13,56,305	13,56,305
xii	Electromagnetic Flow Meter- 1000 mm Size	Nos.	1	16,35,112	16,35,112
7	**Booster Chlorination**				
i	Booster Chlorination equipments with automated dosing pump	Nos.	9	1,25,000	11,25,000
ii	Chlorine safety equipment	Nos.	9	12,338	1,11,044
8	**Switchboards & control system**				
8.1	Switchboards & control system				
i	MCC board with feeder supply (2 incommers) and electric cables	Job	2	10,00,000	20,00,000
9	**SCADA and instruments**				
9.1	Pump house monitoring system				
i	Instrumentation, control	Job	9	20,00,000	1,80,00,000
10	**Dismantling and extra items in connection with pump station**				
10.1	Dismantling of damaged pumpset and motor, starter, foundation wirings, damaged panel board and disconnecting unwanted electrical connections in the pump house and stacking the Store as per direction of departmental officers.	Job	18	50,000	9,00,000
					8,66,26,824

ANNEXURE 6 - COST ESTIMATE – FEEDER AND DISTRIBUTION NETWORKS

Sl No	Description	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
1	**ROAD CUTTING AND EARTHWORK**				
1.1	**Road cutting**				
1.2 (a)	Dismantling manually / by mechanical means including stacking of serviceable material and disposal of unserviceable material within 50 metres lead as per direction of Engineer -in-Charge:				
i	***Water bound macadam road***	m^2	1,29,986	184	2,38,63,982
ii	***Bituminous road surface (Asphalt Road)***	m^2	45,495	361	1,64,20,992
1.2 (b)	Demolishing cement concrete manually / by mechanical means including disposal of material within 50 metres lead as per direction of Engineer - in-Charge. ***Nominal concrete 1:3:6 or richer mix (i/c equivalent design mix)***	m^3	19,498	2,045	3,98,76,759
1.2	**Earth work excavation**				
i	Excavating trenches of required width for pipes, cables, etc including excavation for sockets, and dressing of sides, ramming of bottoms, *depth up to 1.5 m*, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20 cm in depth, including consolidating each deposited layer by ramming, watering, etc. and disposing of surplus excavated soil as directed, within a lead of 50 m : ***All kinds of soil***	m^3	4,05,868	556	22,54,64,638
ii	Excavating trenches of required width for pipes, cables, etc including excavation for sockets, and dressing of sides, ramming of bottoms, depth up to 1.5 m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20 cm in depth, including consolidating each deposited layer by ramming, watering, etc. and disposing of surplus excavated soil as directed, within a lead of 50 m : ***Ordinary Rock.***	m^3	50,733	807	4,09,29,380
iii	Excavation work by mechanical means (Hydraulic excavator) / manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 m2 on plan), including dressing of sides and	m^3	50,733	1,060	5,37,72,263

Sl No	Description	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
	ramming of bottoms, lift up to 1.5 m, including getting out the excavated soil and disposal of surplus excavated soils as directed, within a lead of 50 m: ***Medium Rock (blasting prohibited)***				
1.3	**Gravel or sand bedding**				
i	Supplying and filling in plinth with Jamuna sand under floors, including watering, ramming consolidating and dressing complete.	m^3	26,051	2,299	5,98,89,385
2	**PIPELINES, SPECIALS AND APPURTENANCES**				
2.1	**Supply of pipes, specials and fittings**				
2.1 (a)	**Supplying of HDPE Pipes of PE100 PN10 class**				
i	Supply of HDPE Pipe PE 100 (IS 4984/1995), 10kg, 90mm Outer Dia.	RMT	4,20,377	398	16,74,99,869
ii	Supply of HDPE Pipe PE 100 (IS 4984/1995), 10kg, 110mm Outer Dia.	RMT	2,61,535	586	15,31,44,342
iii	Supply of HDPE Pipe PE 100 (IS 4984/1995), 10kg, 160mm Outer Dia.	RMT	36,473	1,240	4,52,41,024
iv	Supply of HDPE Pipe PE 100 (IS 4984/1995), 10kg, 200mm Outer Dia.	RMT	10,692	1,892	2,02,33,568
2.1 (b)	**Supplying of DI pipes K9 Class**				
i	Supply of DI K9 Pipe Conforming to IS 8329/2000, 250mm Dia.	RMT	5,470	4,193	2,29,35,035
ii	Supply of DI K9 Pipe Conforming to IS 8329/2000, 300mm Dia.	RMT	4,256	5,276	2,24,56,229
iii	Supply of DI K9 Pipe Conforming to IS 8329/2000, 500mm Dia.	RMT	4,398	11,212	4,93,09,950
2.2	**Conveying, Laying, Jointing & Hydraulic testing of HDPE pipes**				
2.2 (a)	Laying HDPE pipes (IS : 4984)on land portion including conveying within initial lead and aligning the pipes, electro-fusion welding using automatic or semi automatic electrofusion machines, testing the pipe line thus fabricated to suit the hydraulic working pressure and after testing , aligning the pipeline, lowering the pipe in position into the trenches already made, testing the line to suitable pressure with potable water before back filling and leveling the trenches including all labour charge, hire for appliances etc. complete but excluding cost of pipe and fittings.				
i	90 mm Outer Dia. HDPE pipe	RMT	4,20,377	93	3,92,15,255

Sl No	Description	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
ii	110 mm Outer Dia. HDPE pipe	RMT	2,61,535	127	3,30,85,646
iii	160 mm Outer Dia. HDPE pipe	RMT	36,473	215	78,48,309
iv	200 mm Outer Dia. HDPE pipe	RMT	10,692	320	34,19,909
2.2 (b)	**Conveying, Laying, Jointing & Hydraulic testing of DI pipes** Conveying and laying S&S Centrifugally Cast (Spun) Ductile Iron Pipes conforming to IS: 8329 excluding cost of pipes and specials : 250 mm dia Ductile Iron Class K-9 Pipes				
i	250 mm Dia. DI pipe	RMT	5,470	163	8,91,867
ii	300 mm Dia. DI pipe	RMT	4,256	205	8,73,108
iii	500 mm Dia. DI pipe	RMT	4,398	442	19,45,808
3	**INTERCONNECTIONS WITH EXISTING NETWORKS**				
3.1	Making cross connection to existing distribution main of any type including excavation, breaking and removing existing pipes, lowering, laying of specials and pipes in their position, refilling, closing the water supply in that area, dewatering and restarting the water supply, etc. complete as directed by the Employer's Representative for following diameters of existing pipeline, irrespective of diameter of branch line (the number of joints involved will be paid separately depending upon the nature of joints and required pipes, excluding cost of valves and specials) but including jointing material such as rubber ring, nut bolts etc (variable dia.)				
i	90 mm Dia.	Nos.	500	6,000	30,00,000
ii	110 mm Dia.	Nos.	400	8,000	32,00,000
iii	160 mm Dia.	Nos.	200	12,000	24,00,000
iv	200 mm Dia.	Nos.	100	16,000	16,00,000
v	250 mm Dia.	Nos.	50	18,000	9,00,000
vi	300 mm Dia.	Nos.	25	20,000	5,00,000
vii	500 mm Dia.	Nos.	5	24,000	1,20,000
4	**VALVES AND APPURTENANCES**				

Sl No	Description	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
4.1	**Isolation valves DI PN 1.6 class** Providing, lowering, laying, aligning, fixing in position in pipe line, Resilient Seated D/F DI Sluice valves of approved make & design standard of following dia complete (including jointing & jointing material) including all material, labour, testing and commissioning along with pipe line as per Technical Specification & as per direction of Engineer. (Category "B" Makes / vendors other then Category "A" will be considered in category “B”). **Electrically Operated & SCADA Compatible class PN 1.6**				
i	80 mm Dia.	Nos.	1,401	73,133	10,24,59,053
ii	100 mm Dia.	Nos.	758	75,379	5,71,37,434
iii	150 mm Dia.	Nos.	122	83,491	1,01,85,926
iv	200 mm Dia.	Nos.	36	1,14,317	41,15,405
v	250 mm Dia.	Nos.	18	1,28,669	23,16,038
vi	300 mm Dia.	Nos.	14	1,39,402	19,51,622
4.2	**Butterfly valves** Providing, lowering, laying, aligning, fixing in position in pipe line, Resilient Seated D/F DI Butterfly valves of approved make & design standard of following dia. complete (including jointing & jointing material) including all material, labour, testing and commissioning along with pipeline as per Technical Specification & as per direction of Engineer. **Electrically Operated & SCADA Compatible (PN 1.6 class)**				
i	500mm Dia.	Nos.	15	3,08,506	46,27,584
4	**VALVE CHAMBERS**				
4.1	**RCC valve chambers**				
i	Construction of RCC Valve chamber (150x150x180cm) including earthwork excavation, bailing out, close timbering, CC 1:3:6, RCC base slab 1:2:4, RCC 1:1.5:3 for side wall and cover slab with 20cm thick, including all centering and shuttering, Steel reinforcement with Thermo - Mechanically Treated bars of grade Fe-500D or more, etc. completete as per current DSR and as per the direction of the departmental officers.	Nos.	2,364	1,76,267	41,66,95,188

Sl No	Description	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
	OR Supply and fixing at site of RCC Precast Valve Chamber of same size including all fittings, CI frame and cover etc				
5	**FLOW METERS**				
5.1	**Electromagnetic Bulk Flow Meters**				
i	Electromagnetic Flow Meter- 100 mm Size	Nos.	6	2,38,319	14,29,915
ii	Electromagnetic Flow Meter- 125 mm Size	Nos.	2	2,72,825	5,45,651
iii	Electromagnetic Flow Meter- 150 mm Size	Nos.	6	2,75,585	16,53,511
iv	Electromagnetic Flow Meter- 200 mm Size	Nos.	3	3,32,635	9,97,905
v	Electromagnetic Flow Meter- 250 mm Size	Nos.	5	3,59,780	17,98,900
vi	Electromagnetic Flow Meter- 300 mm Size	Nos.	10	4,22,350	42,23,497
vii	Electromagnetic Flow Meter- 350 mm Size	Nos.	5	5,00,103	25,00,517
viii	Electromagnetic Flow Meter- 400 mm Size	Nos.	2	5,67,734	11,35,469
ix	Electromagnetic Flow Meter- 450 mm Size	Nos.	4	6,26,624	25,06,496
x	Electromagnetic Flow Meter- 500 mm Size	Nos.	6	7,03,918	42,23,506
xi	Electromagnetic Flow Meter- 600 mm Size	Nos.	3	7,58,666	22,75,998
xii	Electromagnetic Flow Meter- 700 mm Size	Nos.	1	9,33,496	9,33,496
xiii	Electromagnetic Flow Meter- 900 mm Size	Nos.	3	13,56,305	40,68,916
xiv	Electromagnetic Flow Meter- 1050 mm Size	Nos.	1	16,35,112	16,35,112
xv	Electromagnetic Flow Meter- 250 mm Size for subzonal measurements	Nos.	59	3,58,854	2,11,72,393
xvi	Pressure transducers with data loggers for Critical measurement points	Nos.	177	18,280	32,35,560
6	**RESTORATION WORKS**				
6.1	**Trench refilling** (Filling with available fly ash and earth (excluding rock) in trenches or embankment in layers (each layer should not exceed 15 cm), with intermediate layer of compacted earth (Soil density of 98%) after every four layers of compacted depth of fly ash, sides & top layer of filling shall be done	m^3	4,75,378	259	12,29,18,551

Sl No	Description	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
	with earth having total minimum compacted thickness 30 cm or as decided by Engineer -in-charge, including compacting each layer by rolling/ ramming and watering, all complete as per drawing and direction of Engineer -in - charge.)				
6.2	**Temporary Road restoration**				
i	**Wet Mixed Macadam (WMM)** Provinding laying sprading and compacting stone aggregaded to wet mixed macadam specification including premixing the material with water at OMC in mechanically mixed plan carriage to mixed material by tipper to site laying in uniform layer with paver in sub base / base course on well prepared surface and compacting with vibratory roller to achieve the desired density as per relevant clause of section-400	m^3	1,94,979	2,554	49,80,53,409
6.3	**Permanent Restoration**				
i	**Wet Mixed Macadam (WMM)** Provinding laying sprading and compacting stone aggregaded to wet mixed macadam specification including premixing the material with water at OMC in mechanically mixed plan carriage to mixed material by tipper to site laying in uniform layer with paver in sub base / base course on well prepared surface and compacting with vibratory roller to achieve the desired density as per relevant clause of section-400	m^3	64,993	2,554	16,60,17,803
ii	**Prime coat** Providing and applying Prime Coat With Bitumen emulsion on prepared surface of granular base including clearing of road surface and spraying primer at the rate of 0.60kg/sqm using mechanical means complete as per specifications. MORTH Specification No. 502	m^2	4,54,952	48	2,16,38,684
iii	**Tack coat** KSRRB M500-10 Providing and applying Tack Coat coat with bitumen emulsion using emulsion pressure distributor at the rate of 0.25kg/sqm on the prepared bitumenous/granular surface cleaned with mechanical broom. complete as per	m^2	4,54,952	17	76,37,183

Sl No	Description	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
	specifications. MORTH Specification No. 503				
iv	**Bituminous Macadam** Providing and laying bituminous macadam with hot mix plant using crushed aggregates of specified grading premixed with bituminous binder , transporated to site laid over a previously prepared surface with machanical paver finisher to the required grade level and aligement and rolled as per clauses 501.6 and 501.7 to achive the desired compaction complete in all respect and as per relevent clauses of section-504 **i)**For grading I (50-75mm Thk bitumen content 3.4%)	m^3	22,748	10,139	23,06,33,368
v	Providing and laying seal coat sealing the voids in a butimenous surface laid to the specified levels, grade and cross fall using Type A and Type B Seal Coats and as per relevant Clause of Section 513 with bitumen Type B (Premixed Seal Coat with hot mixed plant and paver finisher)	m^2	4,54,952	136	6,17,33,893
vi	**Dry Lean Cement Concrete Sub-base** Construction of dry lean cement concrete Sub-base over a prepared sub-grade with coarse and fine aggregate conforming to IS: 383, the size of coarse aggregate not exceeding 25mm, aggregate cement ratio not to exceed 15:1, aggregate gradation after blending to be as per table of MORTH Specifications 600-1, cement content not to be less than 200 kg/cum, optimum moisture content to be determined during trial length construction, concrete strength not to be less than 10 Mpa at 7 days, mixed in a batching plant, transported to site, laid with paver with electronic sensor/mechanical paver, compacting , finishing and curing.	m^3	12,999	7,273	9,45,37,410

Sl No	Description	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
vii	**Cement Concrete Pavement PCC** Construction of dowel jointed, plain cement concrete pavement in M-30 grade concrete over a prepared sub base with 43 grade cement maximum size of coarse aggregate not exceeding 25 mm, mixed in a batching and mixing plant as per approved mix design, transported to site, laid with a fixed form or slip form paver with spreading the concrete by shovels, rakes compacted using needle, screed and plate vibrator and finished in a continuous operation including provision of contraction, expansion, and longitudinal joints, joint filler, separation membrane, sealant primer, joint sealant, debonding strip, placing of dowel bar,tie rod admixtures as approved, curing compound, finishing to lines and grades as per approved drawings as per IRC-15 2002 and as per relevant clauses of section-602 of specifications complete but excluding cost of steel in dowel bar & tie rod etc.	m^3	12,999	7,729	10,04,65,319
viii	Road marking with Hot applied Thermoplastic compound with Reflectrising Glass Beads on Bituminous surface:- Providing and laying of hot applied thermoplastic compound 2.5mm thick including Reflectrising Glass Beads at 250gms per sqm area, thichness of 2.5mm is exclusive of surfaceapplied glass beads as per IRC:35. The finished to be level, uniform and free from streaks and holes complete as per specifications.				
	Edge Line marking of width 100mm	m^2	70,909	759	5,38,34,742
7	**Shifting of utilities**				
7.1	Provision for River / Stream crossings	lumpsum	1	50,00,000	50,00,000
7.2	Provision for Railway and Highway Crossings by trenchless technology	lumpsum	1	2,50,00,000	2,50,00,000
7.3	Provisions for relocation of other utilities	lumpsum	1	50,00,000	50,00,000
7.4	Provisions for damage repairs during excavation	lumpsum	1	25,00,000	25,00,000
7.5	Provision for rerouting of pipes and accessories	lumpsum	1	15,00,000	15,00,000
7.6	Maintenance of transmission mains of size 450mm and higher in diameter	lumpsum	1	50,00,000	50,00,000

Sl No	Description	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
7.7	Non-destructive testing of civil structure, housekeeping and miscelaneous works	lumpsum	1	30,00,000	30,00,000
7.8	Service deficiency works		1	50,00,000	50,00,000
	Total				**3,10,33,32,772**

ANNEXURE 7 - COST ESTIMATE – INSTRUMENTATION

Sl No	Description of work	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
1	Raw Water Balance Tank Level Indicator Transmitter	Nos.	4	1,57,491	6,29,963
2	Raw Water Balance Tank Level Switch High High	Nos.	4	38,239	1,52,957
3	Raw Water Balance Tank Level Switch Low Low	Nos.	4	38,239	1,52,957
4	Raw Water Pump Suction Pressure Indicator (Gauge)	Nos.	15	18,893	2,83,393
5	Raw Water Pump Discharge Pressure Indicator (Gauge)	Nos.	15	18,893	2,83,393
6	Raw Water Flow Transducer	Nos.	4	2,95,031	11,80,123
7	Raw Water- Sample Water to pH Flow Chamber with Variable Area Flowmeter & Integral Low Flow Switch Combination	Nos.	4	1,57,491	6,29,963
8	Raw Water- Sample Water to Turbidity - Variable Area Flowmeter- Indicator (Rotameter) & Flow Switch Combination	Nos.	4	24,676	98,706
9	Raw Water Turbidity Indicator/Transmitter	Nos.	4	2,75,533	11,02,133
10	Raw Water Turbidity Sensor with Debubbler	Nos.	4	28,415	1,13,659
11	Raw Water- Sample pH Sensor	Nos.	4	1,19,856	4,79,425
12	Raw Water- Sample Water to pH / ORP & Free Chlorine Sensor Flow Chamber with Variable Area Flowmeter & Integral Low Flow Switch Combination	Nos.	4	1,85,073	7,40,291
13	Dosed Raw Water- Sample pH Sensor	Nos.	4	1,19,856	4,79,425
14	Dosed Raw Water- Sample ORP Sensor	Nos.	4	1,14,113	4,56,451
15	Dosed Raw Water- Sample Cl Sensor/cell	Nos.	4	1,85,073	7,40,291
16	Balance Tank Level Switch High High	Nos.	4	38,239	1,52,957
17	Balance Tank Level Switch Low Low	Nos.	4	38,239	1,52,957
18	Rapid Mix Tank pH Sensor	Nos.	4	1,19,856	4,79,425
19	Clarifloculator Tank 1 Level Switch Low Low	Nos.	4	38,239	1,52,957
20	Clarifloculator Tank 2 Level Switch Low Low	Nos.	4	38,239	1,52,957
21	Clear Water Storage Tank Level Indicator Transmitter (Combined unit)	Nos.	4	1,57,491	6,29,963
22	Clear Water Storage Sump Level Switch High High	Nos.	4	38,239	1,52,957
23	Clear Water Storage Sump Level Switch Low Low	Nos.	4	38,239	1,52,957
24	Clear Water Pump Outlet Low Flow Switch	Nos.	33	38,239	12,61,891
25	Clear Water Pump Suction Pressure Indicator (Gauge)	Nos.	33	18,893	6,23,464
26	Clear Water Pump Outlet Pressure Indicator (Gauge)	Nos.	33	18,893	6,23,464
27	Clear Water Water Flow Transducer	Nos.	4	2,95,031	11,80,123
28	Filter Backwash Water Holding Tank Low Low Level Switch	Nos.	4	38,239	1,52,957
29	Filter Backwash Water Holding Tank Low Level Switch	Nos.	4	38,239	1,52,957
30	Filter Backwash Water Holding Tank High High Level Switch	Nos.	4	38,239	1,52,957
31	Filter Backwash Water Holding Tank Level Transducer	Nos.	4	1,57,491	6,29,963
32	Filter Backwash Water Transfer Pump Discharge Flow Transducer	Nos.	4	2,95,031	11,80,123
33	Filter Backwash Water Transfer Pump Discharge Flow Indicator/Transmitter	Nos.	4	1,57,491	6,29,963

Sl No	Description of work	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
34	Filter Backwash Water Pump Outlet Low Flow Switch	Nos.	8	38,239	3,05,913
35	Filter Backwash Water Pump Suction Pressure Indicator (Gauge)	Nos.	8	18,893	1,51,143
36	Filter Backwash Water Pump Outlet Pressure Indicator (Gauge)	Nos.	8	18,893	1,51,143
37	Filter Backwash Water Pump Outlet Pressure Indicator Transmitter	Nos.	8	2,81,126	22,49,005
38	Filter Backwash Water Flow Transducer	Nos.	4	2,95,031	11,80,123
39	Dosed Filtered Water- Sample pH Sensor	Nos.	4	1,19,856	4,79,425
40	Dosed Filtered Water-Sample pH Indicator/Transmitter	Nos.	4	1,57,491	6,29,963
41	Dosed Filtered Water - Sample Water to pH & Free Chlorine Sensor Flow Chamber with Variable Area Flowmeter & Integral Low Flow Switch Combination	Nos.	4	38,239	1,52,957
42	Dosed Filtered Water- Sample Free Chlorine Sensor/cell	Nos.	4	1,85,073	7,40,291
43	Dosed Filtered Water-- Sample Fl Indicator/Transmitter Complete with integral Flow Switch and Rotameter	Nos.	4	38,239	1,52,957
44	Clear Water Sump Outlet - Water Sample to pH & Free Chlorine Sensor Flow Chamber with Variable Area Flowmeter & Integral Low Flow Switch Combination	Nos.	4	38,239	1,52,957
45	Clear Water Sump Outlet - Water Sample - pH Sensor	Nos.	4	1,19,856	4,79,425
46	Clear Water Sump Outlet - Water Sample pH & Free Chlorine Indicator/Transmitter	Nos.	4	2,81,126	11,24,502
47	Clear Water Sump Outlet - Water Sample Free Chlorine Sensor/cell	Nos.	4	2,81,126	11,24,502
48	Clear Water Sump Outlet - Water Sample to Turbidity Sensor - Variable Area Flowmeter- Indicator (Rotameter) & Flow Switch Combination	Nos.	4	38,239	1,52,957
49	Clear Water Sump Outlet - Water Sample Turbidity Sensor with Debubbler	Nos.	4	2,75,533	11,02,133
50	Clear Water Sump Outlet - Water Sample Turbidity Indicator/Transmitter	Nos.	4	2,75,533	11,02,133
51	Filter Tank Low Level Switch	Nos.	46	38,239	17,59,000
52	Filter Tank Level Indicator Transmitter	Nos.	46	1,57,491	72,44,577
53	Filter - Filtered Water Differential Pressure Indicator/Transmitter	Nos.	46	1,57,491	72,44,577
54	Filter - Sample of Filtered Water to Turbidity Analyser - Variable Area Flowmeter- Indicator (Rotameter)	Nos.	46	1,57,491	72,44,577
55	Filter - Sample of Filtered Water to Turbidity Analyser - Variable Area Flowmeter- Integral Low Flow Switch	Nos.	46	38,239	17,59,000
56	Filter - Filtered Water Turbidity Sensor with Debubbler	Nos.	46	38,239	17,59,000
57	Filter - Filtered Water Turbidity Indicator/Transmitter	Nos.	46	38,239	17,59,000
58	Alum Batching Bund High Level Switch	Nos.	4	38,239	1,52,957
59	Lime Batching Bund High Level Switch	Nos.	4	38,239	1,52,957
60	Lime Dosing Skid System Bund High Level Switch	Nos.	4	38,239	1,52,957
61	Polymer Batching Skid System Bund High Level Switch	Nos.	4	38,239	1,52,957

Sl No	Description of work	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
62	Potassium Permanganate Bund High Level Switch	Nos.	4	38,239	1,52,957
63	Process Drainage Pit Low Low Level Switch	Nos.	4	38,239	1,52,957
64	Process Drainage Pit High High Level Switch	Nos.	4	38,239	1,52,957
65	Process Drainage Pit Level Transducer	Nos.	4	1,57,491	6,29,963
66	Process Drainage Pit Pump Outlet Low Flow Switch	Nos.	8	38,239	3,05,913
67	Sludge Storage Tank High High Level Switch	Nos.	4	38,239	1,52,957
68	Sludge Storage Tank Low Low Level Switch	Nos.	4	38,239	1,52,957
69	Sludge Storage Tank Level Transducer	Nos.	4	1,57,491	6,29,963
70	Sludge Pump Outlet Low Flow Switch	Nos.	4	38,239	1,52,957
71	Sludge Pump combined discharge header Outlet Pressure Indicator (Gauge)	Nos.	4	38,239	1,52,957
72	Backwash Recovery Tank Low Low Level Switch	Nos.	4	38,239	1,52,957
73	Backwash Recovery Tank L Low Level Switch	Nos.	4	38,239	1,52,957
74	Backwash Recovery Tank High High Level Switch	Nos.	4	38,239	1,52,957
75	Backwash Recovery Tank High Level Switch	Nos.	4	38,239	1,52,957
76	Backwash Recovery Tank Level Transducer	Nos.	4	1,57,491	6,29,963
77	Backwash Recovery Tank Supernatant Return Pump Outlet Low Flow Switch	Nos.	8	38,239	3,05,913
78	Backwash Recovery Tank Supernatant Return Pump combined discharge header Outlet Pressure Indicator (Gauge)	Nos.	4	18,893	75,571
79	Backwash Recovery Tank Supernatant Sample to Turbidity Analyser - Variable Area Flowmeter- Indicator (Rotameter)	Nos.	4	38,239	1,52,957
80	Backwash Recovery Tank Supernatant Sample Water to Turbidity Analyser - Variable Area Flowmeter- Integral Low Flow Switch	Nos.	4	38,239	1,52,957
81	Backwash Recovery Tank Supernatant Sample Water Turbidity Sensor	Nos.	4	38,239	1,52,957
82	Backwash Recovery Tank Supernatant Sample Water Turbidity Indicator/Transmitter	Nos.	4	38,239	1,52,957
83	Overflow Pump Station Pump Outlet Low Flow Switch	Nos.	8	38,239	3,05,913
84	Overflow Pump Station combined discharge header Outlet Pressure Indicator (Gauge)	Nos.	4	18,893	75,571
85	Overflow Pump Station Low Low Level Switch	Nos.	8	38,239	3,05,913
86	Overflow Pump Station Low Level Switch	Nos.	8	38,239	3,05,913
87	Overflow Pump Station Level Transducer	Nos.	4	1,57,491	6,29,963
88	Emergency Overflow Storage Basin High Level Switch	Nos.	4	38,239	1,52,957
89	Blower Air Flow Combined Indicator/Transmitter/Transducer	Nos.	4	2,95,031	11,80,123
90	Alum Solution Fill Station	Nos.	4	6,16,909	24,67,638
91	Alum Tank Low Low Level Switch	Nos.	4	38,239	1,52,957
92	AlumTank High High Level Switch	Nos.	4	38,239	1,52,957
93	Alum Tank Level Transducer /Transmitter Combined;	Nos.	4	1,57,491	6,29,963
94	Alum Dosing Pulsation Dampener	Nos.	4	61,691	2,46,764

Sl No	Description of work	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
95	Alum Calibration Cylinder (dedicated for Chlorine Dosing Pumps 1 & 2)	Nos.	4	2,468	9,871
96	Alum Pumps 1 & 2 Combined Discharge Pressure Indicator (Gauge)	Nos.	4	18,893	75,571
97	Alum Dosing Pump 1 High Pressure Switch	Nos.	4	38,239	1,52,957
98	Alum Dosing Pump 2 High Pressure Switch	Nos.	4	38,239	1,52,957
99	Alum Dosing Flow Indicator/Transmitter	Nos.	4	38,239	1,52,957
100	Alum Dosing Flow Transducer	Nos.	4	2,95,031	11,80,123
101	Alum Dilution Water - Variable Area Flowmeter-Indicator (Rotameter)	Nos.	4	38,239	1,52,957
102	Alum Dilution Water- Variable Area Flowmeter- Low Flow Switch	Nos.	4	38,239	1,52,957
103	Lime Batching System	Nos.	4	61,691	2,46,764
104	Lime water Make-Up - Variable Area Flowmeter-Indicator (Rotameter)	Nos.	4	38,239	1,52,957
105	Lime water Make-Up - Variable Area Flowmeter- Low Flow Switch	Nos.	4	38,239	1,52,957
106	Lime water Make-Up Pressure Indicator (Gauge)	Nos.	4	18,893	75,571
107	Lime water Make-Up Low Pressure Switch	Nos.	4	38,239	1,52,957
108	Lime water Make-Up Conductivity Sensor	Nos.	4	1,34,668	5,38,673
109	Lime water Make-Up Conductivity Indicator/Transmitter	Nos.	4	38,239	1,52,957
110	Lime Batching Tank Low Low Level Switch	Nos.	4	38,239	1,52,957
111	Lime Batching Tank High High Level Switch	Nos.	4	38,239	1,52,957
112	Lime Batching Tank Level Transducer /Transmitter Combined;	Nos.	4	1,57,491	6,29,963
113	Lime Bin / Hopper Low Level	Nos.	4	38,239	1,52,957
114	Lime Bin / Hopper Load cell (weight)	Nos.	4	38,239	1,52,957
115	Lime Bin / Hopper Load cellIndicator Transmittor (kg)	Nos.	4	6,169	24,676
116	Lime Bin / Hopper High Level	Nos.	4	38,239	1,52,957
117	Lime Hopper Extraction Fan Low Pressure Switch	Nos.	8	38,239	3,05,913
118	Lime Transfer Pump Low Flow Switch	Nos.	8	38,239	3,05,913
119	Lime Dosing Tank Low Low Level Switch	Nos.	8	38,239	3,05,913
120	Lime Dosing Tank High High Level Switch	Nos.	8	38,239	3,05,913
121	Lime Dosing Tank Level Transducer /Transmitter Combined;	Nos.	8	1,57,491	12,59,926
122	Lime (Pre Dose) Dosing Pumps Low Flow Switch	Nos.	8	38,239	3,05,913
123	Lime (Pre Dose) Dosing Pump Pressure Relief Flow Switch	Nos.	8	38,239	3,05,913
124	Lime (Pre Dose) Calibration Cylinder (dedicated for Lime Dosing Pumps 1 & 2)	Nos.	4	2,468	9,871
125	Lime (Pre Dose) Pumps 1 & 2 Combined Discharge Pressure Indicator (Gauge)	Nos.	4	18,893	75,571
126	Lime (Post Dose) Dosing Pumps Low Flow Switch	Nos.	8	38,239	3,05,913
127	Lime (Post Dose) Dosing Pump Pressure Relief Flow Switch	Nos.	8	38,239	3,05,913

Sl No	Description of work	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
128	Lime (Post Dose) Calibration Cylinder (dedicated for Lime Dosing Pumps 3 & 4)	Nos.	4	2,468	9,871
129	Lime (Post Dose) Pumps 3 & 4 Combined Discharge Pressure Indicator (Gauge)	Nos.	4	18,893	75,571
130	Polymer Batching System WITH ALL EQUIPMENT + INSTRUMENTS INCLUDED IN SUPPLIER PACKAGE LOCAL CONTROL PANEL WITH PROPRIETARY PLC ASSUME DRY CONTACTS FOR INPUTS/OUTPUTS SUCH AS: * ENABLE-RUN * GENERAL FAULT * BATCH SYSTEM UNAVAILABLE	Nos.	4	6,16,909	24,67,638
131	Coagulant Aid Polymer Calibration Cylinder dedicated for Alum Aid Polymer Dosing Pumps 1 & 2	Nos.	4	3,08,455	12,33,819
132	Polymer Solution Make-Up Water (Pre carbon Filter) Pressure Indicator (Gauge)	Nos.	4	18,893	75,571
133	Polymer Solution Make-Up Water (Post carbon Filter) Pressure Indicator (Gauge)	Nos.	4	18,893	75,571
134	Polymer Make-Up Water Low Pressure Switch	Nos.	4	38,239	1,52,957
135	Polymer Make-Up Water - Variable Area Flowmeter-Indicator (Rotameter)	Nos.	4	38,239	1,52,957
136	Polymer Make-Up Water - Variable Area Flowmeter-Low Flow Switch	Nos.	4	38,239	1,52,957
137	Polymer Hopper Low Level	Nos.	4	38,239	1,52,957
138	Polymer Hopper High Level	Nos.	4	38,239	1,52,957
139	Polymer Hopper Level Indicator	Nos.	4	38,239	1,52,957
140	Polymer Batching Tank Low Level Switch	Nos.	4	38,239	1,52,957
141	Polymer Batching Tank High Level Switch	Nos.	4	38,239	1,52,957
142	Polymer Batching Tank High High Level Switch	Nos.	4	38,239	1,52,957
143	Polymer Dosing Tank Low Level Switch	Nos.	4	38,239	1,52,957
144	Polymer Dosing Tank High High Level Switch	Nos.	4	38,239	1,52,957
145	Polymer Dosing Tank Level Transducer /Transmitter Combined;	Nos.	4	1,57,491	6,29,963
146	Polymer Batching Skid System Bund High Level Switch	Nos.	4	38,239	1,52,957
147	Filter Aid Polymer Batching System with all equipment + instruments included in supplier package+ local control panel with proprietary PLC; ASSUME DRY CONTACTS FOR INPUTS/OUTPUTS SUCH AS: * ENABLE-RUN * GENERAL FAULT * BATCH SYSTEM UNAVAILABLE	Nos.	4	6,90,939	27,63,754
148	Filter Aid Polymer Calibration Cylinder (dedicated for Filter Aid Polymer Dosing Pumps 1 & 2)	Nos.	4	2,468	9,871
149	Filter Aid Polymer Dosing Pump High Pressure Switch	Nos.	8	38,239	3,05,913
150	Filter Aid Polymer Dosing Pumps 1 & 2 Low Flow Switch	Nos.	4	38,239	1,52,957

Sl No	Description of work	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
151	Filter Aid Polymer Dosing Pumps 1 & 2 Combined Discharge Pressure Indicator (Gauge)	Nos.	4	18,893	75,571
152	Dilution Water for Filter Aid Polymer Dosing - Variable Area Flowmeter- Indicator (Rotameter)	Nos.	4	18,893	75,571
153	Dilution Water for Filter Aid Polymer Dosing - Variable Area Flowmeter- Integral Low Flow Switch	Nos.	4	38,239	1,52,957
154	Potassium Permaganate Batching System	Nos.	4	38,239	1,52,957
155	Potassium Permanganate Water Make-Up Pressure Indicator (Gauge)	Nos.	4	18,893	75,571
156	Potassium Permanganate Water Make-Up - Variable Area Flowmeter- Indicator (Rotameter)	Nos.	4	6,90,939	27,63,754
157	Potassium Permanganate Water Make-Up - Variable Area Flowmeter- Low Flow Switch	Nos.	4	38,239	1,52,957
158	Potassium Permanganate Hopper Low Level Switch	Nos.	4	38,239	1,52,957
159	Potassium Permanganate Hopper High Level Switch	Nos.	4	38,239	1,52,957
160	Permanganate Hopper Level Indication	Nos.	4	1,01,568	4,06,272
161	Potassium Permanganate Batching Tank High High Level Switch	Nos.	4	38,239	1,52,957
162	Potassium Permanganate Batching Tank High Level Switch	Nos.	4	38,239	1,52,957
163	Potassium Permanganate Batching Tank Low Level Switch	Nos.	4	38,239	1,52,957
164	Potassium Permanganate Dosing Tank Low Low Level Switch	Nos.	4	38,239	1,52,957
165	Potassium Permanganate Dosing Tank High High Level Switch	Nos.	4	38,239	1,52,957
166	Potassium Permanganate Dosing Tank Level Transducer /Transmitter Combined;	Nos.	4	1,57,491	6,29,963
167	Potassium Permanganate Calibration Cylinder dedicated for Potassium Permanganate Dosing Pumps 1 & 2	Nos.	4	2,468	9,871
168	Potassium Permanganate Dosing Pump High Pressure Switch	Nos.	8	38,239	3,05,913
169	Potassium Permanganate Dosing Pump Low Flow Switch	Nos.	4	38,239	1,52,957
170	Potassium Permanganate Dosing Pumps 1 & 2 Combined Discharge Pressure Indicator (Gauge)	Nos.	4	18,893	75,571
171	Dilution Water for Potassium Permanganate Dosing - Variable Area Flowmeter- Indicator (Rotameter)	Nos.	4	38,239	1,52,957
172	Dilution Water for Potassium Permanganate Dosing - Variable Area Flowmeter- Integral Low Flow Switch	Nos.	4	38,239	1,52,957
173	AIR COMPRESOR PACKAGE 1	Nos.	4	6,16,909	24,67,638
174	AIR COMPRESOR PACKAGE 2	Nos.	4	6,16,909	24,67,638
175	Main Air Receiver Pressure Indicator/ Transmitter	Nos.	4	18,893	75,571
176	Main Air Line Header Pressure Indicator (Gauge)	Nos.	4	18,893	75,571

Sl No	Description of work	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
177	Main Air Line Header Low Low Pressure Switch	Nos.	4	38,239	1,52,957
178	Dried Air Receiver Low Low Pressure Switch	Nos.	4	38,239	1,52,957
179	Dried Air Air Receiver Pressure Indicator (Gauge)	Nos.	4	18,893	75,571
180	Blower Discharge High Pressure Switch	Nos.	4	38,239	1,52,957
181	Blower Discharge Pressure Indicator (Gauge)	Nos.	4	18,893	75,571
182	Blower Suction Pressure Indicator (Gauge)	Nos.	4	18,893	75,571
183	Blower Inlet Filter Pressure Diffierntial Indicator (Gauge)	Nos.	4	18,893	75,571
184	Treated Service Water Pumps Outlet Pressure Gauge	Nos.	4	18,893	75,571
185	Treated Service Water Pump Outlet Pressure Transducer	Nos.	4	1,57,491	6,29,963
					9,97,40,321

ANNEXURE 8 - COST ESTIMATE - HOUSE SERVICE CONNECTION

Sl No	Description	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
1	**ROAD CUTTING AND EARTHWORK**				
1.1	**Road cutting**				
1.1 (a)	Dismantling manually / by mechanical means including stacking of serviceable material and disposal of unserviceable material within 50 metres lead as per direction of Engineer -in-Charge:				
i	***Water bound macadam road***	m^3	1,31,908	184	2,42,16,839
ii	***Bituminous road surface (Asphalt Road)***	m^3	46,168	361	1,66,63,905
1.1 (b)	Demolishing cement concrete manually / by mechanical means including disposal of material within 50 metres lead as per direction of Engineer - in-Charge. ***Nominal concrete 1:3:6 or richer mix (i/c equivalent design mix)***	m^3	26,382	2,045	5,39,55,722
1.2	**Earth work excavation**				
i	Excavating trenches of required width for pipes, cables, etc including excavation for sockets, and dressing of sides, ramming of bottoms, *depth up to 1.5 m*, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20 cm in depth, including consolidating each deposited layer by ramming, watering, etc. and disposing of surplus excavated soil as directed, within a lead of 50 m : ***All kinds of soil***	m^3	2,37,434	556	13,18,97,491
ii	Excavating trenches of required width for pipes, cables, etc including excavation for sockets, and dressing of sides, ramming of bottoms, depth up to 1.5 m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20 cm in depth, including consolidating each deposited layer by ramming, watering, etc. and disposing of surplus excavated soil as directed, within a lead of 50 m : ***Ordinary Rock.***	m^3	29,679	807	2,39,43,845
iii	Excavation work by mechanical means (Hydraulic excavator) / manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 m2 on plan), including dressing of sides and ramming of bottoms, lift up to 1.5 m,	m^3	29,679	1,060	3,14,56,981

Sl No	Description	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
	including getting out the excavated soil and disposal of surplus excavated soils as directed, within a lead of 50 m: ***Medium Rock (blasting prohibited)***				
2	**WATER METERS**				
2.1	Supply, execution, testing and commissioning of approved make **Multijet class B Magnetic type water meters**				
i	15mm	Nos.	1,07,122	2,160	23,13,83,520
ii	20mm	Nos.	12,603	3,600	4,53,70,800
2.2	Providing, installing and giving satisfactory field testing of domestic Battery operated **AMR Ultrasonic Water Meters**				
i	20mm	Nos.	24,265	10,800	26,20,62,000
ii	25mm	Nos.	2,696	13,200	3,55,87,640
3	**HOUSE SERVICE CONNECTION**				
3.1	Supply and installation of water connections to individuals houses upto water meter point (which shall be fixed about one meter from customer boundary) and includes civil works like Earthwork excavation for the pipeline trenches for laying of MDPE of following diameters for the house connections in all types of soils. disintigrated rock, soft rock, hard rock. including cutting of any road using machine cutter, crossing drains, compound, cutting any surfaces along the pipelines such as tiles floor/concrete/ or any other surfaces using machine cutter, boring the wall surfaces comprising of BBM or SSM for conveying the pipelines to customer property, restoring the damaged portions inside or outside the property premises, refilling etc., complete. supply and laying of MDPE PW-80, PN 12.5 pipes with specials such as Electrofusion tapping ferrule or saddles of pressure rating PN 12.5/SDR 11 or higher grade of approved make conforming to standard specifications with brass cutter, flow regulator, water tight cap-cutting edges for making hole / tapping suitable top HDPE distribution mains by electrofusion welding. Tapping ferrules (Mechanical				

Sl No	Description	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
	type clamp saddle) including cost of pipes, all specials such as GI/CPVC tee, GI/CPVC ebow, GI/CPVC coupler, stopper etc, and brass or SS tap for the following diameters.				
3.2	15 mm dia	Nos.	107122	5,988	64,14,91,527
3.3	20 mm dia	Nos.	12603	6,199	7,81,20,200
3.4	Supply and fixing of HDPE water meter box to protect the water meter of Class 'B' Multijet typoe of **size 15 to 32 mm** including HDPE box with base dia 300mm x lid dia 200mm x height 250mm with openable lid and the cover is buried below height 250mm with operable lid and the cover is buried below GI. with lid flush with GI. including earth work excavation for 600mm x 600mm and base sand filling for 100mm thick over which the cover is placed and enclosed by PCC 1:2:4 using 12-20mm BG jelly for an balance 100mm height, disposal of excess earth with all lead and lifts etc complete as per drawing enclosed	Nos.	1,46,686	515	7,55,43,307
3.5	Providing temporary water supply to customers to minimise customer inconvenience during pipe laying, commissioning and utility shifting periods	Nos.	21,400	824	1,76,33,600
4	**RESTORATION WORKS**				
4.1	**Trench refilling**				
	Trench refilling (Filling with available fly ash and earth (excluding rock) in trenches or embankment in layers (each layer should not exceed 15 cm), with intermediate layer of compacted earth (Soil density of 98%) after every four layers of compacted depth of fly ash, sides & top layer of filling shall be done with earth having total minimum compacted thickness 30 cm or as decided by Engineer -in-charge, including compacting each layer by rolling/ ramming and watering, all complete as per drawing and direction of Engineer -in - charge.)	m^3	2,50,748	259	6,48,35,943
4.2	**Restoration**				

Sl No	Description	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
i	**Wet Mixed Macadam (WMM)** Providing laying sprading and compacting stone aggregaded to wet mixed macadam specification including premixing the material with water at OMC in mechanically mixed plan carriage to mixed material by tipper to site laying in uniform layer with paver in sub base / base course on well prepared surface and compacting with vibratory roller to achieve the desired density as per relevant clause of section-400	m^3	1,97,861	2,554	50,54,14,437
ii	**Prime coat** Providing and applying Prime Coat With Bitumen emulsion on prepared surface of granular base including clearing of road surface and spraying primer at the rate of 0.60kg/sqm using mechanical means complete as per specifications. MORTH Specification No. 502	m^2	4,61,677	48	2,19,58,558
iii	**Tack coat** KSRRB M500-10 Providing and applying Tack Coat coat with bitumen emulsion using emulsion pressure distributor at the rate of 0.25kg/sqm on the prepared bitumenous/granular surface cleaned with mechanical broom. complete as per specifications. MORTH Specification No. 503	m^2	4,61,677	17	77,50,079
iv	**Bituminous Macadam** Providing and laying bituminous macadam with hot mix plant using crushed aggregates of specified grading premixed with bituminous binder , transporated to site laid over a previously prepared surface with machanical paver finisher to the required grade level and aligement and rolled as per clauses 501.6 and 501.7 to achive the desired compaction complete in all respect and as per relevent clauses of section-504 **i)**For grading I (50-75mm Thk bitumen content 3.4%)	m^3	23,084	10,139	23,40,44,233
v	Providing and laying seal coat sealing the voids in a butimenous surface laid to the specified levels, grade and cross fall using Type A and Type B Seal Coats and as per relevant Clause of Section 513	m^2	4,61,677	136	6,26,46,476

Sl No	Description	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
	with bitumen Type B (Premixed Seal Coat with hot mixed plant and paver finisher)				
vi	**Dry Lean Cement Concrete Sub-base** Construction of dry lean cement concrete Sub-base over a prepared sub-grade with coarse and fine aggregate conforming to IS: 383, the size of coarse aggregate not exceeding 25mm, aggregate cement ratio not to exceed 15:1, aggregate gradation after blending to be as per table of MORTH Specifications 600-1, cement content not to be less than 200 kg/cum, optimum moisture content to be determined during trial length construction, concrete strength not to be less than 10 Mpa at 7 days, mixed in a batching plant, transported to site, laid with paver with electronic sensor/mechanical paver, compacting , finishing and curing.	m^3	13,191	7,273	9,59,36,575
vii	**Cement Concrete Pavement PCC** Construction of dowel jointed, plain cement concrete pavement in M-30 grade concrete over a prepared sub base with 43 grade cement maximum size of coarse aggregate not exceeding 25 mm, mixed in a batching and mixing plant as per approved mix design, transported to site, laid with a fixed form or slip form paver with spreading the concrete by shovels, rakes compacted using needle, screed and plate vibrator and finished in a continuous operation including provision of contraction, expansion, and longitudinal joints, joint filler, separation membrane, sealant primer, joint sealant, debonding strip, placing of dowel bar,tie rod admixtures as approved, curing compound, finishing to lines and grades as per approved drawings as per IRC-15 2002 and as per relevant clauses of section-602 of specifications complete but excluding cost of steel in dowel bar & tie rod etc.	m^3	13,191	7,729	10,19,52,217
	Total				**2,76,38,65,895**

Annexure 9 - Cost Estimate – Tanks Rehabilitation

Sl No	Description	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
1	Procuring and fixing of air ventilators as per specifications	Each	44	6,169	2,71,436
2	Providing and fixing M.S.Inspection door of size 60cmsX60cms including M.S.frame, size 50X50X6mm and shutters of 3mm thickness with hinges at top and locking arrangements, painting with all lead and lifts etc., complete.	Each	11	1,234	13,574
3	Supplying & fixing 40 mm dia G.I medium duty pipes hand railing 3 rows fixed to 1:2:4 vibrated R.C.C. post of size 100 x 150 mm at top and 150 x 150 mm at bottom placed at 2 Mtr. intervals for a height of 750 mm including curing, painting G.I. pipes with two coats of anticorrosive steel paint over a primer coat with all lead and lift etc., complete as directed by the Engineer-in-charge . (Rate per Mtr. is for 3 rows of G.I. pipes.)	Sq.m	550	2,097	11,53,350
4	Dismantling of existing stuctures - Reinforced cement concrete grade M-20 & above	Cum	22	9,871	2,17,162
5	Providing and laying in position reinforced cement concrete of design mix M25 with OPC cement @ 340Kgs, with 20mm and down size graded granite coarse aggregates @0.7cum and fine aggregate @0.47cum with super plasticizer @ 3lts confirming to IS 9103-1999 reaffirmed-2008, machine mixed, concrete laid in layers not exceeding 15cms thick, vibrated for all works in groundfloor level for roof slab etc., including cost of materials, labour, HOM of machinery, curing complete but excluding cost of reinforcement as per specifications No.KBS 4.1,4.6	cum	220	9,254	20,35,880
6	Providing T.M.T steel reinforcement for R.C.C work including straightning, cutting, bending, hooking, placing in position, lapping and / or welding wherever required, tying with biding wire and anchoring to the adjoining members wherever necessary complete as per design (laps, hooks and wastage shall not be measured and paid) cost of materials, labour, HOM complete as per specification. Specification No.KBS 4.6.3 **(-do- TMT bars Fe 500)**	MT	26	308	8,131

Sl No	Description	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
7	Providing and laying four courses water proofing treatment with bitumen felt over roof consiting of first and third courses of blown and /or residual bitumen applied hot @1.45Kg/Sqm of area for each course second course of roofing felt type -3 grade-I (hesssion based self finish bitumen felt) and fourth and final course of stone grit 6mm and down size or pea sized gravel spread at 0.06 Cum / Sqm including preparation of surface but excluding grading complete with bitumen felt (hessian based) type-3 grade-I blown or / and residual bitumen applied hot 1.4Kg/Sqm including cost of materials, labour complete as per specificatio. KBS 10.4.3.	Sq.m	2,200	43	94,600
8	Providing and fixing food grade epoxy painting after cleaning and drying including pumping and bailing out of water including cost of all materials labour lead and lift etc., complete	Sq.m	6,639	148	9,82,572
9	Providing and fixing Non-corrosive uPVC ladder	Each	11	92,536	10,17,896
10	Providing ultrasonic level sensors with associated instrumentation, power supply, communications with SCADA , installation, commissioning etc complete	Each	11	6,169	67,859
11	Cleaning and removal offsite of all debris, weeds, trash, excess vegetation and other unwanted things and safely disposed of at the designated disposal sites from all open areas. All materials like spares, damaged parts, metal products etc having salvage value have been stored in a segregated tidy manner at an appropriate location which does not affect the operations of the pumping station or reservoir. Reinstatement of roads and pathways to a good all-weather access standard and clearly delineated. Repair and renovation of the gates, fences and other security arrangements if found broken or dysfunctional and made good with secured locking arrangements using corrosion resistant materials. Repairs to all building surfaces (walls and roofs) have been made to fill cracks with putty and made good for preventing algal or fungus or other bacterial growth. Painting of all buildings (inside and outside) with a mould resistant paint using a colour as agreed with the Engineer. Repair or replacement of all windows, broken panes replaced and insect screens added. The gates, fences and other security barriers have been repaired or renewed and made good with secured locking arrangements. Lighting has been improved to enhance the illumination and security of the buildings and surrounding areas.	Each	11	3,00,000	33,00,000

Sl No	Description	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
	Drainage of the entire premises has been renovated so as to ensure no water logging during rains with stormwater draining to the nearest public drain. Broken or dysfunctional furniture (desks, chairs, cabinets and the like) have been replaced with new furniture. Electrical switch boards and cabling in buildings have been checked and made safe in accordance with Indian Standards and certified as safe to use by an authorised electrician. The preventative maintenance program has been updated to include the renewed site.				
	Total				**91,62,460**

ANNEXURE 10 - COST ESTIMATE – SETUP COST

Sl No.	Description	Unit	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
1	**SURVEY AND INVESTIGATION WORK**				
1.1	Topographical survey work using Total Station, preparation and finalization of survey drawings and CADD files	km	1,300	5,000	65,00,000
1.2	Conducting customer door to door survey for establishing the location, type of property, number of households, families, population, use of water, customer water demand,	Each	1,50,000	50	75,00,000
1.3	Develop, up-date and maintain calibrated strategic and hydraulic network models using compatible software (EPAnet, WaterGEMS, etc.) hand over models to Employer regularly and at the end of contract	km	1,300	2,000	26,00,000
1.4	Develop a GIS System covering the entire water infrastructure including cost of hardware, software, field surveys, validation and launching on a cloud server including four year post commissioning maintenance and update	km	1,300	3,000	39,00,000
2	**Offices and Equipment**				
2.1	Supply, delivery, erection, installation, testing, and commissioning of Central Server PC	Set	1	5,00,000	5,00,000
2.2	Construction of Operating Office with work desks, conference room, furniture, lighting, communications, interiors, airconditioning etc to be implemented by KWA	Sqm	800	30,000	2,40,00,000
2.3	**Supplying** , installation, testing and commissioning of data processing, data management equipment				
2.3.1	**Computers and Printers**				
(a)	Servers	Nos.	3	2,00,000	6,00,000
(b)	PC's	Nos.	49	50,000	24,50,000
(c)	Bulk Printer	Nos.	2	2,00,000	4,00,000
(d)	Desktop Printer	Nos.	19	50,000	9,50,000
(e)	Plotters	Nos.	1	2,50,000	2,50,000
(f)	LCD Projector	Nos.	1	1,50,000	1,50,000
(g)	Networking	Nos.	1	5,00,000	5,00,000
2.3.2	**Softwares**				
(a)	MS Office	Nos.	52	5,000	2,60,000
(b)	Autocad	Nos.	6	2,50,000	15,00,000
(c)	WaterGems	Nos.	1	20,00,000	20,00,000
2.3.4	**Operational Equipment**				
(a)	Leak Noise Correlaters	Nos.	6	50,000	3,00,000
(b)	Leak detection ground phones	Nos.	20	50,000	10,00,000
	Subtotal				**5,53,60,000**
2.3.5	**Transport**				

Sl No.	Description	Unit	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
(a)	Cars on hire	Nos.	11		-
(b)	Crew Cab on hire	Nos.	27		-
(c)	Trucks on hire	Nos.	5		-
(d)	Water Tankers on hire	Nos.	15		-
	Subtotal				**-**
	Grand Total				**5,53,60,000**
	Grand Total Price Adjusted				**6,83,04,000**

ANNEXURE 11 - COST ESTIMATE – KOCHI - PROPOSED EXPAT STAFFING REQUIREMENTS

S.No.	Staff	Months	Rate/Month	Amount	Flights	Housing
			US$	US$		
1	General Manager (Operations)	24	30000	720000	12	Private
2	Capital Works Planning	3	30000	90000	3	Shared
3	Institutional Change Manager		30000	0	4	Shared
4	Asset Management Manager	12	20000	240000	6	Private
5	Network and NRW Manager	18	20000	360000	9	Shared
6	Production Engineer		20000	0	3	Shared
7	Flights	37	3000	111000		
8	Housing Private	36	1000	36000		
9	Housing Shared	24	1000	24000		
10	Insurance			50000		
11	Transport	24	2000	48000		
12	Contingencies	10%		167900		
	Total Estimated Cost			**1846900**	**37**	**0**

ANNEXURE 12 - COST ESTIMATE – KOCHI – PERSONNEL

Kochi Personnel								
Treatment Plant Locations	Number		2					
Intake Locations	Number		3					
Customer service centres one for	Connections		50,000					
Contract option	Number		1	meter reading and billing and collection by KWA				
Connections managed by Contractor	Number		1,47,000					
Number of network sub-zones	Number		49					
Customer Service Centres	Number		3					

Sl. No.	Staff	Location	Division	Required	Proposed	Cars	Crew Cabs	Trucks	Tankers	Laptops	Desktops	Printers	Plotters	Salary	Total
1	Operational Manager	HQ	Management	1	1	1				1				15,00,000	15,00,000
2	Personal Secretaries	HQ	Support	1	1						1	1		5,00,000	5,00,000
3	Finance Manager	HQ	Finance & Accounts	1	1	1				1		1		13,00,000	13,00,000
4	Hydraulic Engineer	HQ	Engineering	1	1	1				1				12,00,000	12,00,000
5	Procurement Engineer	HQ	Engineering	1	1						1			12,00,000	12,00,000
6	Procurement Assistant	HQ	Engineering	1	1							1		7,50,000	7,50,000
7	Asset Management Manager	HQ	Engineering	1	1	1								10,00,000	10,00,000
8	Asset Management Engineers	HQ	Engineering	2	2		1							6,00,000	12,00,000
9	Construction Manager	HQ	Engineering	1	1	1				1				12,00,000	12,00,000
10	Construction Engineers	Field	Engineering	2	2						2	1		7,50,000	15,00,000
11	Construction supervisors	Field	Engineering	6	6		2				2			5,00,000	30,00,000
12	GIS/CAD Technicians	HQ	Engineering	3	3						3		1	6,00,000	18,00,000
13	Customer Manager	HQ	Commercial	1	1	1								12,00,000	12,00,000
14	Commercial Manager	HQ	Commercial	1										12,00,000	-
15	Billing Supervisors	HQ	Commercial	2										6,00,000	-
16	Accountants	HQ	Finance & Accounts	2	2						2	1		5,00,000	10,00,000
17	Audit Staff	HQ	Finance & Accounts	1										7,50,000	-
18	Legal Superintendent	HQ	Finance & Accounts	1										6,00,000	-
19	MIS Manager	HQ	Management	1	1	1				1				8,00,000	8,00,000
20	MIS Assistants	HQ	Management	3	3						3			4,00,000	12,00,000
21	IT Manager	HQ	Management	1	1									9,00,000	9,00,000
22	IT Maintenance	HQ	Management	2	2						2			4,00,000	8,00,000
23	PR Manager	HQ	Management	1	1	1				1				7,50,000	7,50,000

Sl. No.	Staff	Location	Division	Required	Proposed	Cars	Crew Cabs	Trucks	Tankers	Laptops	Desktops	Printers	Plotters	Salary	Total
24	Zonal Managers	Field	Management	2	2	2					2			12,00,000	24,00,000
25	Zonal Engineers	Field	Engineering	13	13	0	6			13		13		10,00,000	1,30,00,000
11	Quality Assurance	Field	Engineering	2	2						2			10,00,000	20,00,000
12	Customer Representatives	Field	Customer Services	9	9									3,60,000	32,40,000
13	Network Technicians	Field	Operations	37	37		10							3,00,000	1,11,00,000
14	Meter Readers	Field	Commercial	37										4,50,000	-
15	Meter Repair Technicians	Field	Support	2	2									2,00,000	4,00,000
16	NRW Technicians	Field	Operations	9	9		5							4,00,000	36,00,000
17	Network Repair Gangs (Fitter + Helper	Field	Operations	25	25	1								2,00,000	49,00,000
18	Connections Gang (Fitter + Helper)	Field	Operations	3	3			2						2,00,000	6,00,000
19	Stores Superintendent	Field	Operations	1	1			2			1	1		5,00,000	5,00,000
20	Stores Assistants	Field	Operations	3	3				15		3			3,00,000	9,00,000
21	Tanker Supervisor	Field	Operations	2	2						1			5,00,000	10,00,000
22	Drivers including standby	Field	Operations	64	64									1,00,000	64,00,000
23	Security	Field	Operations	10	10									1,00,000	10,00,000
24	Production Manager	WTW	Production	1										7,50,000	-
25	Chemist	WTW	Production	3										4,50,000	-
26	Process engineer	WTW	Production	1						1				6,00,000	-
27	Electrical Engineers	WTW	Production	1	1			1			1			6,00,000	6,00,000
28	Mechanical Engineers	WTW	Production	1	1		1				1			6,00,000	6,00,000
29	Instrumentation Technician	WTW	Production	1	1						1			3,60,000	3,60,000
30	Mechanical Fitters	WTW	Production	2	2									2,00,000	4,00,000
31	Electrical Technicians	WTW	Production	2	2		1							2,00,000	4,00,000
32	Water Quality Analysists	Lab+Field	Production	2	2		1				1			2,00,000	4,00,000
33	Operational Gangs (2 per gang)	WTW	Operations	12										2,00,000	-
	Total Staff			282	223	11	27	5	15	20	29	19			7,66,00,000
	Staff per 1000 connections			1.92	2										

Staff deployment			Connections growth	0.50%	1,47,000	1,47,735	1,48,474	1,49,216	1,49,962	1,50,712	1,51,466	1,52,223	1,52,984	1,53,749	1,54,518
S.No	Position				1	2	3	4	5	6	7	8	9	10	11
1	Operational Manager				1	1	1	1	1	1	1	1	1	1	1
2	Personal Secretaries				1	1	1	1	1	1	1	1	1	1	1
3	Finance Manager				1	1	1	1	1	1	1	1	1	1	1
4	Hydraulic Engineer				1	1	1	1	1	1	1	1	1	1	1
5	Procurement Engineer				1	1	1	1	1	1	1	1	1	1	1
6	Procurement Assistant				1	1	1	1	1	1	1	1	1	1	1
7	Asset Management Manager				1	1	1	1	1	1	1	1	1	1	1
8	Asset Management Engineers				2	2	2	2	2	2	2	2	2	2	2
9	Construction Manager				1	1	1	1	1						
10	Construction Engineers				2	2	2	2	2	1	1	1	1	1	1
11	Construction supervisors				6	6	6	6	6	2	2	2	2	2	2
12	GIS/CAD Technicians				3	3	3	3	3	3	3	3	3	3	3
13	Customer Manager				1	1	1	1	1	1	1	1	1	1	1
14	Commercial Manager				0	0	0	0	0	0	0	0	0	0	0
15	Billing Supervisors				0	0	0	0	0	0	0	0	0	0	0
16	Accountants				2	2	2	2	2	2	2	2	2	2	2
17	Audit Staff				0	0	0	0	0	0	0	0	0	0	0
18	Legal Superintendent				0	0	0	0	0	0	0	0	0	0	0
19	MIS Manager				1	1	1	1	1	1	1	1	1	1	1
20	MIS Assistants				3	3	3	3	3	3	3	3	3	3	3
21	IT Manager				1	1	1	1	1	1	1	1	1	1	1
22	IT Maintenance				2	2	2	2	2	2	2	2	2	2	2
23	PR Manager				1	1	1	1	1	1	1	1	1	1	1
24	Zonal Managers				2	2	2	2	2	2	2	2	2	2	2
25	Zonal Engineers				13	13	13	13	13	13	13	13	13	13	13
11	Quality Assurance				2	2	2	2	2	2	2	2	2	2	2
12	Customer Representatives				9	9	9	9	9	9	9	9	9	9	9
13	Network Technicians				37	37	38	38	38	38	38	39	39	39	39
14	Meter Readers				0	0	0	0	0	0	0	0	0	0	0
15	Meter Repair Technicians				2	2	2	2	2	2	2	2	2	2	2
16	NRW Technicians				9	9	9	9	9	9	9	9	9	9	9
17	Network Repair Gangs (Fitter + Helper)				25	25	25	25	25	25	25	25	25	25	25
18	Connections Gang (Fitter + Helper)				3	3	3	3	3	3	3	3	3	3	3
19	Stores Superintendent				1	1	1	1	1	1	1	1	1	1	1
20	Stores Assistants				3	3	3	3	3	3	3	3	3	3	3
21	Tanker Supervisor				2	2	2	2	2	2	2	2	2	2	2
22	Drivers including standby				64	64	64	64	64	64	64	64	64	64	64
23	Security				10	10	10	10	10	10	10	10	10	10	10
24	Production Manager				0	0	0	0	0	0	0	0	0	0	0
25	Chemist				0	0	0	0	0	0	0	0	0	0	0
26	Process engineer				0	0	0	0	0	0	0	0	0	0	0
27	Electrical Engineers				1	1	1	1	1	1	1	1	1	1	1
28	Mechanical Engineers				1	1	1	1	1	1	1	1	1	1	1
29	Instrumentation Technician				1	1	1	1	1	1	1	1	1	1	1
30	Mechanical Fitters				2	2	2	2	2	2	2	2	2	2	2
31	Electrical Technicians				2	2	2	2	2	2	2	2	2	2	2
32	Water Quality Analysists				2	2	2	2	2	2	2	2	2	2	2
33	Operational Gangs (2 per gang)				0	0	0	0	0	0	0	0	0	0	0
	Total Staff				223	223	224	224	224	218	218	219	219	219	219
	Staff per 1000 connections														
	Staff costs				7.66	7.66	7.69	7.69	7.69	7.295	7.295	7.325	7.325	7.325	7.325

ANNEXURE 13 – AMP COST

							COC									
Operations ("Asset Owner")		Frequency	Unit	Code	Price 11/21	Price 10/22	1	2	3	4	5	6	7	8	9	10
Construct	Property Connections	As required	#	OCP	6,000	7,403	7,475	7,505	7,535	7,565	7,595	7,626	7,656	7,687	7,718	7,748
Construct	Property Disconnections	As required	#	OCP	5,000	6,169	6,842	6,869	6,897	6,924	6,952	6,980	7,008	7,036	7,064	7,092
Construct	Minor Works	As required	#	OCP	50,000	61,691	12	12	12	12	12	12	12	12	12	12
Maintain	Sites	As programmed	#	OCP	50,000	61,691	4	4	4	4	4	4	4	4	4	4
Maintain	Buildings	As programmed	#	OCP	1,50,000	1,85,073	4	4	4	4	4	4	4	4	4	4
Paint	Valves	As programmed	#	OCP	1,000	1,234	0	30	30	30	30	30	30	30	30	30
Paint	Tanks	As programmed	#	OCP	50,000	61,691	0	1	1	1	1	1	1	1	1	1
Paint	Buildings	As programmed	#	OCP	3,50,000	4,31,837	0	1	1	1	1	1	1	1	1	1
Relocate	Assets	As required	#	OCP	2,00,000	2,46,764	2	2	2	2	2	2	2	2	2	2
Replace	Batteries	As programmed	#	OCP	25,000	30,845	0	50	100	100	100	100	100	100	100	100
Replace	Meters (Asset Management)	As programmed	#	OCP	3,000	3,701	0	200	200	200	200	400	400	400	400	400
Replace	Spares (Restock)	As required	#	OCP	1,00,000	1,23,382	12	12	12	12	12	12	12	12	12	12
Replace	Equipment (MPE)	As required	#	OCP	25,000	30,845	12	12	12	12	12	12	12	12	12	12
Repair	Pipes	As required	#	OCP	5,000	6,169	3244	2611	1979	1347	715	677	642	608	576	546
Repair	Property Service Connections	As required	#	OCP	2,000	2,468	954	768	582	396	210	199	189	179	169	161
Repair	Valves	As required	#	OCP	2,000	2,468	334	269	204	139	74	70	66	63	59	56
Repair	Tanks	As required	#	OCP	25,000	30,845	95	77	58	40	21	20	19	18	17	16
Repair	Pump Stations	As required	#	OCP	50,000	61,691	95	77	58	40	21	20	19	18	17	16
Repair	Instruments	As required	#	OCP	25,000	30,845	24	19	15	10	5	5	5	4	4	4
Repair	SCADA Equipment	As required	#	OCP	50,000	61,691	24	19	15	10	5	5	5	4	4	4
Renew	Pipelines (KUWSIP)	As programmed	metres	CP			0	1,08,247	1,08,222	1,08,195	1,08,168	0	0	0	0	0
Renew	Pipelines (Asset Management)	As programmed	metres	OCP	5,000	6,169	0	0	0	0	0	4,516	4,279	4,055	3,842	3,641
Renew	Property Service Connections (KUWSIP)	As programmed	#	CP			0	12,575	12,572	12,569	12,566	0	0	0	0	0
Renew	Property Service Connections (AM)	As programmed	#	OCP	8,000	9,871	0	0	0	0	0	525	497	471	446	423
Renew	Meters	As programmed	#	CP			0	19,200	19,200	19,200	19,200	0	0	0	0	0
	Total cost						13,58,39,840	13,23,70,040	12,76,32,560	12,13,56,000	11,50,82,710	14,88,58,790	14,71,51,450	14,55,56,020	14,40,66,730	14,26,78,110

ANNEXURE 14 – OPERATING COST ESTIMATE

RBI Price Index - All Commodities	23.38%	October 2020 to October 2022									
US Dollar Exchange Rate	81.63										
Kochi - Operator Establishment Costs	Unit	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Expat costs	Rs. Cr	9.05	6.03								
Local staff	Rs. Cr	7.66	7.66	7.69	7.69	7.69	7.30	7.30	7.33	7.33	7.33
Office Rent	Rs. Cr	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
Furnishing	Rs. Cr	0.25									
Booster Chlorination at 1mg/l	Rs. Cr	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
Transport Recurring	Rs. Cr	7.41	7.41	7.41	7.41	7.41	7.41	7.41	7.41	7.41	7.41
Communications & Utilities	Rs. Cr	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Admin+meetings	Rs. Cr	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
Insurance	Rs. Cr	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Office maintenance	Rs. Cr	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
Contingencies	10%	2.53	2.21	1.61	1.61	1.61	1.57	1.57	1.57	1.57	1.57
GST	0%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total cost of Operator Establishment		27.85	24.26	17.66	17.66	17.66	17.22	17.22	17.26	17.26	17.26
Price adjusted cost of Operator Establishment	Rs. Cr	34.36	29.93	21.79	21.79	21.79	21.25	21.25	21.29	21.29	21.29