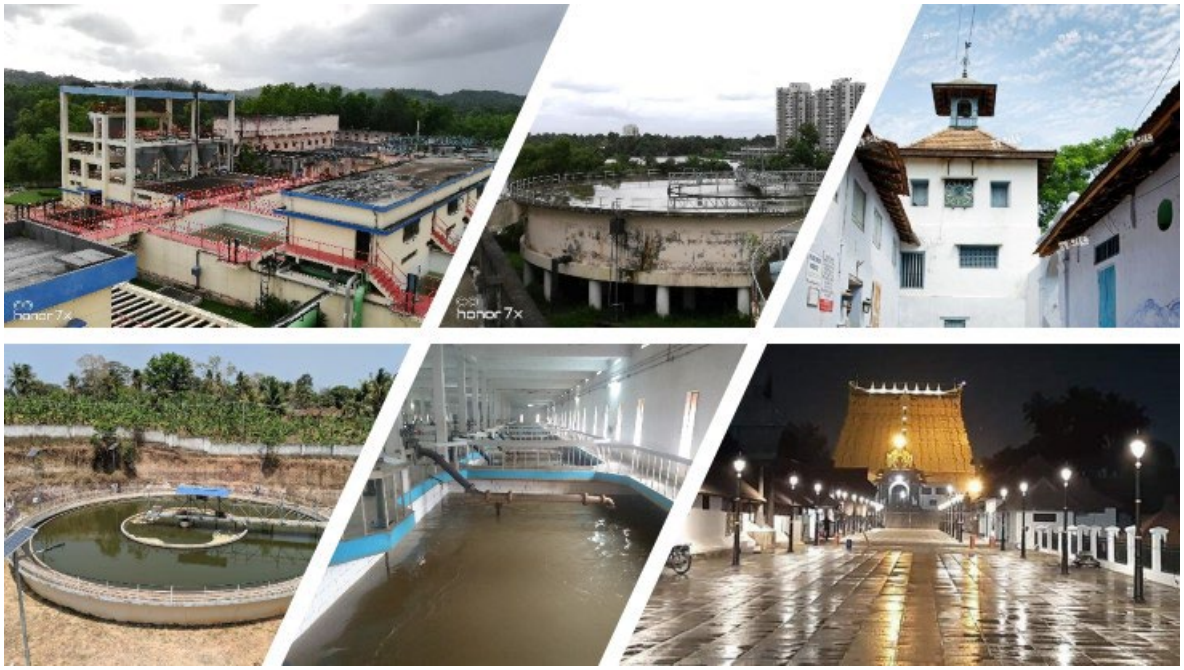
KERALA URBAN WATER SUPPLY IMPROVEMENT PROJECT



THIRUVANANTHAPURAM CITY AND KOCHI CORPORATION WATER SUPPLY SYSTEMS

THIRUVANANTHAPURAM ESTIMATES

VOLUME - IIA

PREPARED FOR KERALA WATER AUTHORITY

KERALA, INDIA

JUNE 2021

VERSION 12

CONTENTS

ANNEXURE 1 - THIRUVANANTHAPURAM FINANCIAL SUMMARY

Data		
One USD$	INR	72.394
Physical contingencies	%	0%
Price inflation	%	0%
Network length	Km	824
Maintenance cost for WTW rehab	%	3%

TVM 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
TW1 - Expenditure profile	100%	10%	20.0%	20.0%	25.0%	25.0%					
TW1- Production Capex	100.29	10.03	20.06	20.06	25.07	25.07					
TW1 - Maintenance Cost	20.01		0.3	0.9	1.5	2.26	3.01	3.01	3.01	3.01	3.01
TW1 - Subtotal	**120.3**	**10.03**	**20.36**	**20.96**	**26.57**	**27.33**	**3.01**	**3.01**	**3.01**	**3.01**	**3.01**
TW2 - Expenditure Profile	100%	10%	10.0%	20%	20%	20%	10%	10%			
TW2 - Distribution Capex	795.08	79.51	79.51	159.02	159.02	159.02	79.51	79.51			
TW2 - Maintenance Cost	202.54		18.29	17.82	17.36	16.8	27.37	26.88	26.43	26	25.59
TW2 - Operator Fee	295.70	38.51	34.83	28.15	28.16	28.16	27.56	27.56	27.56	27.60	27.60
TW2 - Subtotal	**1293.34**	**118.02**	**132.63**	**204.99**	**204.54**	**203.98**	**134.44**	**133.95**	**53.99**	**53.60**	**53.19**
Total TVM Packages Cost	1413.64	128.05	152.99	225.95	231.11	231.31	137.45	136.96	57.00	56.61	56.20
	INR Cr	USD$m									
TVM Package cost Yr 1 - 7	1243.83	172									
TVM Package cost Yr 8-10	169.81	23									
TVM total package cost	1413.64	195									

ANNEXURE 2- THIRUVANANTHAPURAM CAPITAL COSTS

Abstract - Water Supply Improvements in Thiruvananthapuram

Sl. No.	Package	Project Area	Description	Estimated cost (Rs Cr)	Estimated cost USD $ millions
1	**I**	**Thiruvananthapuram**	**Water Treatment plants and Pump stations**		
			Pumping stations	15.4	2.1
			Water treatment plant (i) Civil & Mechanical Works (ii) Pumps & Motors (iii) Valves	68.6	9.5
			Instrumentation	15.9	2.2
			SCADA for plant operations monitoring	0.5	0.1
			Total Package I	**100.3**	**13.9**
2	**II**	**Thiruvananthapuram**	**Networks, Property service connections, Customer meters**		
			Networks	349.6	48.3
			Tanks Rehabilitation	1.4	0.2
			Property service connections & Customer meters	436.7	60.3
			SCADA for flow and pressure monitoring	0.5	0.1
			Setup Costs	6.9	1.0
			Total Package II	**795.1**	**109.8**
				895.4	**123.7**

USD$ 1 = INR 72.394 as on 31st May 2021

ANNEXURE 3- COST ESTIMATE – WATER TREATMENT PLANT

Sl.No	Description	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	46,611	11	4,89,416
ii	Storage building/workshop for repairable equipment	Job	6	5,25,000	31,50,000
iii	Landscaping the yards	Sqm	46,423	110	51,18,136
iv	Painting all civil structures	Sqm	37,816	158	59,55,991
v	Colour code painting and marking of all process pipes	Job	6	10,50,000	63,00,000
vi	Pasivating and painting all mechanical items of work	Job	6	2,62,500	15,75,000
vii	Structural repairs and grouting	Job	7	5,25,000	36,75,000
viii	Repair and retrofitting doors and windows, fly screens	m^2	1,954	3,956	77,28,796
ix	Repair and retrofitting all floors	m^2	5,432	1,130	61,40,030
x	Improving internal roads	m^2	2,079	1,050	21,82,950
xi	New toilet blocks	Nos.	13	52,500	6,82,500
xii	Repair/retrofitting walkways	m	2,451	3,150	77,21,773
xiii	CC TV security system with 20 view stations	Nos.	85	78,750	66,93,750
1.2	**Construction of raw water oxidation/balance tank at plant inlet**	Job	7	5,25,000	36,75,000
1.3	**Replacement of Paddles, gears, motor and panels in Flash mixers**	Job	5	1,15,500	5,77,500
1.4	**Chemical House**				
i	Replacement of paddles, gears, motor and panels	Job	7	1,36,500	9,55,500
ii	Coagulant mixing and solution tanks	Nos.	14	2,10,000	29,40,000
iii	Lime mixing and solution tanks	Nos.	14	2,10,000	29,40,000
iv	New Coagulant dosing system	Job	7	2,10,000	14,70,000
v	New Lime dosing system	Job	7	2,10,000	14,70,000
vi	New Coagulant Aid Polymer dosing system	Job	7	5,88,000	41,16,000
vii	New Filtration Aid Polymer dosing system	Job	7	5,88,000	41,16,000
viii	New corrosion inhibitor dosing system	Job	7	10,50,000	73,50,000
ix	New pH correction dosing system with pH control loop	Job	7	2,10,000	14,70,000

Sl.No	Description	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
x	Weighing machine for chemicals	Nos.	7	42,000	2,94,000
1.5	**Flocculator**				
i	Replacement of paddles, gears, motor and panels	Job	10	8,40,000	84,00,000
1.6	**Clarifier**				
i	Lamella plates/Tube settler equipment	m^3	4,833	9,450	4,56,74,379
ii	Support structure for lamella plates/Tube settlers (by assuming 0.3 m thickness of structure)	m^3	1,867	7,350	1,37,24,378
iii	Replacement of scraper bridge with new sludge scraper bridge and sludge suction system	MLD	201	33,600	67,50,240
1.7	**Rapid Gravity Filters**				
i	Replacement of filter media with dual media (2 layers of sand and 1 layer GAC)	Sub estimate	1	8,82,768	8,82,768
ii	Replacement of underdrainage system with Apollo screens	Sub estimate	1	3,66,28,741	3,66,28,741
iii	Installation charges for underdrainage system	Sub estimate	1	30,71,250	30,71,250
1.8	**Air Blower**				
i	Capable of discharging 7200 m3/hr at a total head of 5m WC for clear water (86 MLD)	Nos.	2	7,35,000	14,70,000
ii	Capable of discharging 4452 m3/hr at a total head of 5m WC for clear water (48 MLD)	Nos.	2	6,30,000	12,60,000
iii	Capable of discharging 2842 m3/hr at a total head of 5m WC for clear water (24 MLD)	Nos.	2	4,72,500	9,45,000
iv	Capable of discharging 5443 m3/hr at a total head of 5m WC for clear water (36 MLD)	Nos.	2	6,82,500	13,65,000
v	Capable of discharging 1892 m3/hr at a total head of 5m WC for clear water (16 MLD)	Nos.	2	4,20,000	8,40,000
vi	Capable of discharging 1622 m3/hr at a total head of 5m WC for clear water (5 MLD)	Nos.	2	4,20,000	8,40,000
1.9	**Backwash water recovery tank**				

Sl.No	Description	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
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	7	5,25,000	36,75,000
ii	Construction of backwash water recovery tank supernatant return line to the WTP inlet main	Job	7	1,05,000	7,35,000
iii	Construction of sludge dewatering system (depending on land availability can be lagoon system or dewatering screw press	job	7	1,05,000	7,35,000
1.10	**Chlorination**				
i	Supply and installation of chlorine safety equipment	Job	7	10,500	73,500
ii	Construction of chlorine contact tank	Job	7	5,25,000	36,75,000
1.11	**Mixers**				
i	Balance Tank Mixers	Job	14	10,50,000	1,47,00,000
ii	Rapid Mix Tank Mixer	Job	13	10,50,000	1,36,50,000
iii	Washwater Tank Submersible Mixers	Job	14	10,50,000	1,47,00,000
1.12	**Supplier Packages**				
i	Liquid Coagulant Truck Fill Station/ Local Panel (loading control panel)	Job	7	42,00,000	2,94,00,000
ii	Lime Silo (Complete System - Hopper, Feeders, Dust Extraction, Screw Conveyor, Batch Tank and Mixer and Local control Panel)	Job	7	42,00,000	2,94,00,000
iii	Lime Unloader System	Job	7	42,00,000	2,94,00,000
iv	Polymer(Dry) Storage, Handling, and Batching System (Complete System -Hopper, Feeders, Filters, Heater, Batch Tanks and	Job	7	42,00,000	2,94,00,000

Sl.No	Description	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
	Mixers and Local control Panel)				
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	7	42,00,000	2,94,00,000
1.13	**Laboratory and Office**				
i	Testing equipment and apparatus as per list	Job	6	26,25,000	1,57,50,000
ii	Furniture for lab and operator offices	Job	6	1,05,000	6,30,000
iii	Washing & drying machine 10kg capacity	Job	6	52,500	3,15,000
1.14	**Electrical**				
i	Replacement/ Refurbishment of electrical transformer	kVA			-
ii	Refurbishment of substation (Aruvikkara 86 MLD 11 kV substation)	Job	1	1,05,00,000	1,05,00,000
iii	Refurbishment of substation (Aruvikkara 72 MLD 11 kV substation)	Job	1	1,05,00,000	1,05,00,000
iv	Refurbishment of substation (Aruvikkara 16 MLD 11 kV substation)	Job	1	1,05,00,000	1,05,00,000
v	Refurbishment of substation (Aruvikkara 5 MLD)	Job	1	52,50,000	52,50,000
vi	Air conditioned electrical switchboards room	Nos.	6	52,500	3,15,000
vii	Yard lighting improvements	Job	6	52,500	3,15,000
viii	Installation of cable trays and new cabling	Job	6	52,50,000	3,15,00,000
1.15	**SCADA**				
i	PLC, HMI Screens and cables	Job	7	78,75,000	5,51,25,000
2	**Pumps**				
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				

Sl.No	Description	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
	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**				
i	Capable of discharging 98809 L/hr at a total head of 5m	Nos.	2	1,53,000	3,06,000
ii	Capable of discharging 55149 L/hr at a total head of 5m	Nos.	2	76,500	1,53,000
iii	Capable of discharging 41362 L/hr at a total head of 5m	Nos.	2	76,500	1,53,000
iv	Capable of discharging 27574 L/h rat a total head of 5m	Nos.	2	76,500	1,53,000
v	Capable of discharging 25162 L/hr at a total head of 5m	Nos.	2	76,500	1,53,000
vi	Capable of discharging 18383 L/hr at a total head of 5m	Nos.	2	76,500	1,53,000
vii	Capable of discharging 5745 L/hr at a total head of 5m	Nos.	2	22,950	45,900
2.1 (b)	**Permanganate Transfer Pump**				
i	Capable of discharging 39523 L/hr at a total head of 5m	Nos.	1	76,500	76,500
ii	Capable of discharging 22060 L/hr at a total head of 5m	Nos.	1	76,500	76,500
iii	Capable of discharging 16545 L/hr at a total head of 5m	Nos.	1	76,500	76,500
iv	Capable of discharging 11030 L/hr at a total head of 5m	Nos.	1	45,900	45,900
v	Capable of discharging 10065 L/hr at a total head of 5m	Nos.	1	45,900	45,900
vi	Capable of discharging 7353 L/hr at a total head of 5m	Nos.	1	38,250	38,250
vii	Capable of discharging 2298 L/hr at a total head of 5m	Nos.	1	38,250	38,250
2.1 (c)	**Treated Water Sample Pump**				
i	Capable of discharging 2988 L/hr at a total head of 5m for clear water	Nos.	14	15,300	2,14,200

Sl.No	Description	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
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 for the discharge and head ratings shown below:				
2.2 (a)	**Process Drainage Pit pump**				
i	Capable of discharging 263 m3/hr at a total head of 5m	Nos.	2	3,06,000	6,12,000
ii	Capable of discharging 147 m3/hr at a total head of 5m	Nos.	2	2,29,500	4,59,000
iii	Capable of discharging 110 m3/hr at a total head of 5m	Nos.	2	2,29,500	4,59,000
iv	Capable of discharging 73 m3/hr at a total head of 5m	Nos.	2	1,53,000	3,06,000
v	Capable of discharging 67 m3/hr at a total head of 5m	Nos.	2	1,53,000	3,06,000
vi	Capable of discharging 49 m3/hr at a total head of 5m	Nos.	2	1,14,750	2,29,500
vii	Capable of discharging 15 m3/hr at a total head of 5m	Nos.	2	76,500	1,53,000
2.2 (b)	**Washwater Transfer pump**				
i	Capable of discharging 1146 m3/hr at a total head of 5m	Nos.	2	7,65,000	15,30,000
ii	Capable of discharging 640 m3/hr at a total head of 5m	Nos.	2	4,59,000	9,18,000
iii	Capable of discharging 479 m3/hr at a total head of 5m	Nos.	2	4,59,000	9,18,000
iv	Capable of discharging 319 m3/hr at a total head of 5m	Nos.	2	3,82,500	7,65,000
v	Capable of discharging 291 m3/hr at a total head of 5m	Nos.	2	3,82,500	7,65,000
vi	Capable of discharging 213 m3/hr at a total head of 5m	Nos.	2	3,06,000	6,12,000
vii	Capable of discharging 66 m3/hr at a total head of 5m	Nos.	2	1,53,000	3,06,000
2.2 (c)	**Subnatant pump**				

Sl.No	Description	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
i	Capable of discharging 277 m3/hr at a total head of 5m	Nos.	2	3,82,500	7,65,000
ii	Capable of discharging 154 m3/hr at a total head of 5m	Nos.	2	3,06,000	6,12,000
iii	Capable of discharging 116 m3/hr at a total head of 5m	Nos.	2	2,29,500	4,59,000
iv	Capable of discharging 77 m3/hr at a total head of 5m	Nos.	2	1,53,000	3,06,000
v	Capable of discharging 70 m3/hr at a total head of 5m	Nos.	2	1,53,000	3,06,000
vi	Capable of discharging 51 m3/hr at a total head of 5m	Nos.	2	1,14,750	2,29,500
vii	Capable of discharging 16 m3/hr at a total head of 5m	Nos.	2	76,500	1,53,000
2.2 (d)	**Supernatant return pump**				
i	Capable of discharging 1344 m3/hr at a total head of 5m	Nos.	2	7,65,000	15,30,000
ii	Capable of discharging 750 m3/hr at a total head of 5m	Nos.	2	4,59,000	9,18,000
iii	Capable of discharging 563 m3/hr at a total head of 5m	Nos.	2	4,59,000	9,18,000
iv	Capable of discharging 375 m3/hr at a total head of 5m	Nos.	2	3,82,500	7,65,000
v	Capable of discharging 341 m3/hr at a total head of 5m	Nos.	2	3,82,500	7,65,000
vi	Capable of discharging 250 m3/hr at a total head of 5m	Nos.	2	3,82,500	7,65,000
vii	Capable of discharging 78 m3/hr at a total head of 5m	Nos.	2	1,53,000	3,06,000
2.2 (e)	**Emergency overflow pump**				
i	Capable of discharging 988 m3/hr at a total head of 5m	Nos.	2	6,12,000	12,24,000
ii	Capable of discharging 551 m3/hr at a total head of 5m	Nos.	2	4,59,000	9,18,000
iii	Capable of discharging 414 m3/hr at a total head of 5m	Nos.	2	4,59,000	9,18,000
iv	Capable of discharging 276 m3/hr at a total head of 5m	Nos.	2	3,82,500	7,65,000
v	Capable of discharging 252 m3/hr at a total head of 5m	Nos.	2	3,82,500	7,65,000
vi	Capable of discharging 184 m3/hr at a total head of 5m	Nos.	2	3,06,000	6,12,000
vii	Capable of discharging 57 m3/hr at a total head of 5m	Nos.	2	1,14,750	2,29,500
2.2 (f)	**Treated water service pump**				
i	Capable of discharging 10 m3/hr at a total head of 5m	Nos.	21	38,250	8,03,250

Sl.No	Description	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
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 747 L/hr at a total head of 5m	Nos.	5	3,06,000	15,30,000
ii	Capable of discharging 469 L/hr at a total head of 5m	Nos.	3	2,29,500	6,88,500
iii	Capable of discharging 417 L/hr at a total head of 5m	Nos.	7	2,29,500	16,06,500
iv	Capable of discharging 625 L/hr at a total head of 5m	Nos.	2	2,67,750	5,35,500
v	Capable of discharging 130 L/hr at a total head of 5m	Nos.	2	1,53,000	3,06,000
vi	Capable of discharging 570 L/hr at a total head of 5m	Nos.	2	2,67,750	5,35,500
2.3 (b)	**Filter Aid Polymer Dosing Pump**				
i	Capable of discharging 72 L/hr at a total head of 5m	Nos.	2	1,53,000	3,06,000
ii	Capable of discharging 30 L/hr at a total head of 5m	Nos.	2	76,500	1,53,000
iii	Capable of discharging 40 L/hr at a total head of 5m	Nos.	2	1,53,000	3,06,000
iv	Capable of discharging 20 L/hr at a total head of 5m	Nos.	2	76,500	1,53,000
v	Capable of discharging 13 L/hr at a total head of 5m	Nos.	2	61,200	1,22,400
vi	Capable of discharging 4 L/hr at a total head of 5m	Nos.	2	45,900	91,800
vii	Capable of discharging 18 L/hr at a total head of 5m	Nos.	2	76,500	1,53,000
2.3 (c)	**Corrosion Inhibitor Dosing Pump**				

Sl.No	Description	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
i	Capable of discharging 11 L/hr at a total head of 5m	Nos.	2	76,500	1,53,000
ii	Capable of discharging 5 L/hr at a total head of 5m	Nos.	2	76,500	1,53,000
iii	Capable of discharging 6 L/hr at a total head of 5m	Nos.	2	76,500	1,53,000
iv	Capable of discharging 3 L/hr at a total head of 5m	Nos.	4	76,500	3,06,000
v	Capable of discharging 2 L/hr at a total head of 5m	Nos.	2	61,200	1,22,400
vi	Capable of discharging 1 L/hr at a total head of 5m	Nos.	2	38,250	76,500
2.3 (d)	**Potassium Permanganate Dosing Pump**				
i	Capable of discharging 358 L/hr at a total head of 5m	Nos.	2	4,59,000	9,18,000
ii	Capable of discharging 150 L/hr at a total head of 5m	Nos.	2	2,29,500	4,59,000
iii	Capable of discharging 200 L/hr at a total head of 5m	Nos.	2	3,06,000	6,12,000
iv	Capable of discharging 100 L/hr at a total head of 5m	Nos.	2	1,53,000	3,06,000
v	Capable of discharging 67 L/hr at a total head of 5m	Nos.	2	1,22,400	2,44,800
vi	Capable of discharging 21 L/hr at a total head of 5m	Nos.	2	76,500	1,53,000
vii	Capable of discharging 91 L/hr at a total head of 5m	Nos.	2	1,53,000	3,06,000
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**				

Sl.No	Description	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
i	Capable of discharging 717 L/hrat a total head of 5m for clear water	Nos.	10	4,59,000	45,90,000
ii	Capable of discharging 533 L/hrat a total head of 5m for clear water	Nos.	9	3,06,000	27,54,000
iii	Capable of discharging 400 L/hrat a total head of 5m for clear water	Nos.	13	2,29,500	29,83,500
iv	Capable of discharging 365 L/hrat a total head of 5m for clear water	Nos.	5	2,29,500	11,47,500
v	Capable of discharging 300 L/hrat a total head of 5m for clear water	Nos.	3	2,29,500	6,88,500
vi	Capable of discharging 167 L/hrat a total head of 5m for clear water	Nos.	4	2,29,500	9,18,000
3	**Valves**				
3.1	**Butterfly Valves**				
i	100 mm dia PN 16 of DI material	Nos.	8	29,600	2,36,800
ii	150 mm dia PN 16 of DI material	Nos.	13	37,000	4,81,000
iii	200 mm dia PN 16 of DI material	Nos.	2	44,400	88,800
iv	250 mm dia PN 16 of DI material	Nos.	117	51,800	60,60,600
v	300 mm dia PN 16 of DI material	Nos.	71	59,200	42,03,200
vi	350 mm dia PN 16 of DI material	Nos.	13	88,800	11,54,400
vii	375 mm dia PN 16 of DI material	Nos.	3	96,200	2,88,600
viii	400 mm dia PN 16 of DI material	Nos.	7	2,22,000	15,54,000
ix	450 mm dia PN 16 of DI material	Nos.	35	2,59,000	90,65,000
3.2	**Check Valves (Non-return valves)**				
i	25 mm dia PN 16 of PVC material	Nos.	14	2,960	41,440
ii	50 mm dia PN 16 of PVC material	Nos.	49	5,920	2,90,080
iii	100 mm dia PN 16 of DI material	Nos.	30	8,880	2,66,400
iv	150 mm dia PN 16 of DI material	Nos.	18	17,760	3,19,680

Sl.No	Description	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
v	300 mm dia PN 16 of DI material	Nos.	8	29,600	2,36,800
vi	350 mm dia PN 16 of DI material	Nos.	1	44,400	44,400
vii	450 mm dia PN 16 of DI material	Nos.	1	59,200	59,200
3.3	**Air Actuated Ball Valve**				
i	25 mm dia PN 16 of 316SS material	Nos.	38	22,200	8,43,600
3.4	**Ball Valve**				
i	15 mm dia PN 16 of 316SS material	Nos.	1,516	14,800	2,24,36,800
ii	20 mm dia PN 16 of PVC material	Nos.	35	22,200	7,77,000
iii	25 mm dia PN 16 of PVC material	Nos.	433	22,200	96,12,600
iv	50 mm dia PN 16 of PVC material	Nos.	175	22,200	38,85,000
v	63 mm dia PN 16 of PVC material	Nos.	28	22,200	6,21,600
3.5	**Ball Check valve**				
i	15 mm dia PN 16 of PVC material	Nos.	161	22,200	35,74,200
ii	25 mm dia PN 16 of PVC material	Nos.	5	22,200	1,11,000
iii	50 mm dia PN 16 of PVC material	Nos.	14	22,200	3,10,800
iv	63 mm dia PN 16 of PVC material	Nos.	14	22,200	3,10,800
3.6	**Diaphragm Valve**				
i	15 mm dia PN 16 of PVC material	Nos.	130	2,960	3,84,800
ii	63 mm dia PN 16 of PVC material	Nos.	35	2,960	1,03,600
3.7	**Float Valve**				
i	15 mm dia PN 16 of PVC material	Nos.	7	2,960	20,720
ii	25 mm dia PN 16 of 316SS material	Nos.	14	4,440	62,160
iii	32 mm dia PN 16 of PVC material	Nos.	7	5,920	41,440
3.8	**Gate Valve**				
i	50 mm dia PN 16 of PVC material	Nos.	14	4,440	62,160
3.9	**Needle Valve**				
i	15 mm dia PN 16 of PVC material	Nos.	7	2,960	20,720

Sl.No	Description	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
3.10	**Penstock Valve**				
i	250 mm dia PN 16 of DI material	Nos.	1	44,400	44,400
ii	400 mm dia PN 16 of DI material	Nos.	2	59,200	1,18,400
iii	450 mm dia PN 16 of DI material	Nos.	2	66,600	1,33,200
iv	500 mm dia PN 16 of DI material	Nos.	2	1,48,000	2,96,000
3.11	**Pressure reducing valve**				
i	15 mm dia PN 16 of PVC material	Nos.	28	2,960	82,880
ii	25 mm dia PN 16 of PVC material	Nos.	28	4,440	1,24,320
iii	30 mm dia PN 16 of PVC material	Nos.	7	5,920	41,440
3.12	**Pressure relief valve**				
i	15 mm dia PN 16 of PVC material	Nos.	28	4,440	1,24,320
ii	25 mm dia PN 16 of PVC material	Nos.	7	7,400	51,800
3.13	**Pressure Sustain valve**				
i	15 mm dia PN 16 of PVC material	Nos.	56	4,440	2,48,640
3.14	**Reduced pressure zone (RPZ) valve**				
i	250 mm dia PN 16 of DI material	Nos.	14	74,000	10,36,000
3.15	**S/S Knife gate valve**				
i	150 mm dia PN 16 of 316SS material	Nos.	7	74,000	5,18,000
ii	200 mm dia PN 16 of 316SS material	Nos.	14	1,11,000	15,54,000
iii	300 mm dia PN 16 of 316SS material	Nos.	7	2,22,000	15,54,000
3.16	**Slide gate valve**				
i	200 mm dia PN 16 of 316SS material	Nos.	14	37,000	5,18,000
3.17	**Sluice Gate valve**				
i	50 mm dia PN 16 of DI material	Nos.	21	22,200	4,66,200
ii	100 mm dia PN 16 of DI material	Nos.	111	29,600	32,85,600
iii	150 mm dia PN 16 of DI material	Nos.	54	37,000	19,98,000
iv	200 mm dia PN 16 of DI material	Nos.	35	44,400	15,54,000

Sl.No	Description	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
v	250 mm dia PN 16 of DI material	Nos.	11	51,800	5,69,800
vi	300 mm dia PN 16 of DI material	Nos.	21	59,200	12,43,200
vii	350 mm dia PN 16 of DI material	Nos.	2	88,800	1,77,600
viii	400 mm dia PN 16 of DI material	Nos.	8	2,22,000	17,76,000
ix	500 mm dia PN 16 of DI material	Nos.	2	2,96,000	5,92,000
3.18	**Solenoid valve**				
i	15 mm dia PN 16 of PVC material	Nos.	14	2,960	41,440
ii	20 mm dia PN 16 of PVC material	Nos.	84	3,700	3,10,800
iii	25 mm dia PN 16 of PVC material	Nos.	21	7,400	1,55,400
iv	50 mm dia PN 16 of PVC material	Nos.	7	11,840	82,880
3.19	**Swing check valve**				
i	25 mm dia PN 16 of PVC material	Nos.	7	5,920	41,440
ii	250 mm dia PN 16 of DI material	Nos.	7	29,600	2,07,200
3.20	**Vacuum relief valve**				
i	50 mm dia PN 16 of PVC material	Nos.	7	11,840	82,880
	Total				**68,55,12,888**

ANNEXURE 4 - COST ESTIMATE – PRODUCTION PUMPING STATIONS

Sl No	Description of work	Units	Quantity	Unit Rate	Amount in Rs.
(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 263 Cum/hr at a total head of 69 m for pumping raw water TPS07	No's	2	18,36,000	36,72,000
ii	Capable of discharging 335 Cum/hr at a total head of 105 m for pumping raw water TPS08	No's	3	18,36,000	55,08,000
iii	Capable of discharging 290 Cum/hr at a total head of 110 m for pumping raw water TPS09	No's	3	18,36,000	55,08,000
1.2	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 relevant 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 1800 Cum/hr at a total head of 38 m for pumping raw water TPS01 and Capable of discharging 1800 Cum/hr at a total head of 38 m for pumping Clear water TPS02	No's	8	46,17,999	3,69,43,992
ii	Capable of discharging 1620 Cum/hr at a total head of 30 m for pumping raw water TPS05 and Capable of discharging 1620 Cum/hr at a total head of 23 m for pumping Clear water TPS06	No's	2	30,86,178	61,72,357
2	**Pipes (Suction & Deivery pipes)**				

Sl No	Description of work	Units	Quantity	Unit Rate	Amount in Rs.
(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	250 mm dia	m	24	5,519	1,32,451
ii	400 mm dia	m	16	11,016	1,76,256
iii	600 mm dia	m	88	21,168	18,62,784
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. (Category "A" " Make: Kirloskar Bros. Ltd., Indian Valve Co. (IVC), Fouress Engineers Pvt. Ltd., VAG) Electrically Operated & SCADA Compatible class PN 1.6				
i	200 mm dia	No's	2	1,35,423	2,70,846
ii	250 mm dia	No's	6	1,63,344	9,80,064
iii	400 mm dia	No's	2	4,39,233	8,78,466
iv	600 mm dia	No's	24	8,11,431	1,94,74,344
3.2	***Non-return valves (Check Valves)*** *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*				

Sl No	Description of work	Units	Quantity	Unit Rate	Amount in Rs.
(1)	(2)	(3)	(4)	(5)	(6)
	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	200 mm dia	No's	2	47,151	94,301
ii	250 mm dia	No's	6	85,741	5,14,447
iii	400 mm dia	No's	2	2,67,502	5,35,004
iv	600 mm dia	No's	10	5,66,379	56,63,795
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	4	18,349	73,395
ii	80 mm dia	No's	1	25,665	25,665
iii	100 mm dia	No's	3	38,754	1,16,262
4	**Delivery Pressure gauges**				
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	16	6,000	96,000
5	**Painting of pipes**				
5.1	***Painting of MS/DI Pipes*** *& specials on outside with Anti- corrosive paint including cost of painting*				
i	150 mm dia	m	8	40	318

Sl No	Description of work	Units	Quantity	Unit Rate	Amount in Rs.
(1)	(2)	(3)	(4)	(5)	(6)
ii	200 mm dia	m	8	55	441
iii	250 mm dia	m	36	69	2,497
iv	400 mm dia	m	16	119	1,909
v	600 mm dia	m	64	180	11,489
6	**Flow meters**				
6.1	**Electromagnetic Bulk Flow Meters**				
i	EMF350 for DN 350 mm	Nos.	2	4,98,816	9,97,632
ii	EMF400 for DN 400 mm	Nos.	1	5,66,273	5,66,273
iii	EMF450 for DN 450 mm	Nos.	2	6,25,011	12,50,023
iv	EMF600 for DN 600 mm	Nos.	8	7,56,714	60,53,709
v	EMF1000 for DN 1000 mm	Nos.	2	16,30,904	32,61,808
7	**Switchboards & control system**				
7.1	***Switchboards & control system***				
i	MCC board with feeder supply (2 incommers) and electric cables	Job	7	10,00,000	70,00,000
8	**SCADA and instruments**				
8.1	***Pump house monitoring system***				
i	Instrumentation, control	Job	11	20,00,000	2,20,00,000
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	13	50,000	6,50,000
	Total				**13,04,94,528**

ANNEXURE 5 - COST ESTIMATE – DISTRIBUTION PUMPING STATIONS

Sl No	Description of work	Units	Quantity	Unit Rate	Amount in Rs.
(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:				
iii	Capable of discharging 565 Cum/hr at a total head of 48 m for pumping Clear water TPS19 (Additioanl Standby)	No's	1	12,65,310	12,65,310
1.2	Installing Motor with capacity rating 75 kW for pumping Clear water TPS16	No's	1	9,40,032	9,40,032
2	**Pipes (Suction & Deivery pipes)**				
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	16	3,272	52,358
ii	200 mm dia	m	8	4,277	34,214
iii	350 mm dia	m	8	9,245	73,958
3	**Valves**				

Sl No	Description of work	Units	Quantity	Unit Rate	Amount in Rs.
(1)	(2)	(3)	(4)	(5)	(6)
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. (Category "A" " Make: Kirloskar Bros. Ltd., Indian Valve Co. (IVC), Fouress Engineers Pvt. Ltd., VAG) Electrically Operated & SCADA Compatible class PN 1.6				
i	150 mm dia	No's	4	94,833	3,79,332
ii	200 mm dia	No's	1	1,35,423	1,35,423
iii	350 mm dia	No's	2	3,45,507	6,91,014
3.2	***Non-return valves (Check Valves)*** *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	150 mm dia	No's	2	23,323	46,647
ii	200 mm dia	No's	1	47,151	47,151
iii	350 mm dia	No's	1	2,28,228	2,28,228
4	**Delivery Pressure gauges**				
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	6	6,000	36,000
5	**Painting of pipes**				
5.1	***Painting of MS/DI Pipes*** *& specials on outside with Anti- corrosive paint including cost of painting*				
i	150 mm dia	m	24	40	955

Sl No	Description of work	Units	Quantity	Unit Rate	Amount in Rs.
(1)	(2)	(3)	(4)	(5)	(6)
ii	250 mm dia	m	12	69	832
iii	400 mm dia	m	24	119	2,864
6	**Flow meters**				
6.1	**Electromagnetic Bulk Flow Meters**				
i	EMF150 for DN 150 mm	Nos.	3	2,74,876	8,24,628
ii	EMF200 for DN 200 mm	Nos.	2	3,31,779	6,63,558
iii	EMF350 for DN 350 mm	Nos.	3	4,98,816	14,96,449
iv	EMF400 for DN 400 mm	Nos.	2	5,66,273	11,32,546
7	**Switchboards & control system**				
7.1	***Switchboards & control system***				
i	MCC board with feeder supply (2 incommers) and electric cables	Job	2	10,00,000	20,00,000
8	**Booster Chlorination**				
i	Booster Chlorination equipments with automated dosing pump	Nos.	6	1,25,000	7,50,000
ii	Chlorine safety equipment	Nos.	6	10,500	63,000
9	**SCADA and instruments**				
9.1	***Pump house monitoring system***				
i	Instrumentation, control	Job	6	20,00,000	1,20,00,000
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	6	50,000	3,00,000
	Total				**2,31,64,499**

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**				
1.1 (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	In Water bound Macadam Road	m^2	7,44,124	127	9,47,41,812
ii	In Asphalt Road surface	m^2	5,20,887	249	12,97,07,348
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	22,324	1,403	3,13,13,870
1.2	**Earth work**				
(a)	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*** (Ref. Item No. 2.10.1 of DSR)	m^3	4,60,641	411	18,93,28,623
(b)	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	m^3	57,580	579	3,33,46,294

Sl No	Description	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
	each deposited layer by ramming, watering, etc. and disposing of surplus excavated soil as directed, within a lead of 50 m : ***Ordinary Rock.*** (Ref. Item No. 2.13.1 of DSR)				
(c)	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, including getting out the excavated soil and disposal of surplus excavated soils as directed, within a lead of 50 m. ***Medium Rock (blasting prohibited)*** New Data derived from Item No.2.9.3	m^3	57,580	772	4,44,60,375
1.3	**Gravel or sand bedding**				
i	Gravel Bedding/Encasement (Supplying and filling in plinth with sand under floors, including watering, ramming, consolidating and dressing complete)	m^3	29,625	1,291	3,82,49,921
2	**PIPELINES, SPECIALS AND APPURTENANCES**				
2.1	**Supply of pipes**				
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	3,85,086	416	16,03,26,705
ii	Supply of HDPE Pipe PE 100 (IS 4984/1995), 10kg, 110mm Outer Dia.	RMT	3,92,931	615	24,17,29,094
iii	Supply of HDPE Pipe PE 100 (IS 4984/1995), 10kg, 160mm Outer Dia.	RMT	84,593	1295	10,95,58,298
iv	Supply of HDPE Pipe PE 100 (IS 4984/1995), 10kg, 200mm Outer Dia.	RMT	7,138	1895	1,35,26,474

Sl No	Description	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
2.1 (b)	**Supplying of DI pipes K9class**				
i	Supply of DI K9 Pipe Conforming to IS 8329/2000, 300mm Dia.	RMT	5,339	4774	2,54,89,133
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	3,85,086	60	2,30,94,570
ii	110 mm Outer Dia. HDPE pipe	RMT	3,92,931	79	3,10,66,095
iii	160 mm Outer Dia. HDPE pipe	RMT	84,593	130	1,10,12,317
iv	200 mm Outer Dia. HDPE pipe	RMT	7,138	191	13,60,182
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	300 mm Dia. DI pipe	RMT	5,339	121	6,44,377
3	**INTERCONNECTIONS WITH EXISTING NETWORKS**				
i	90 mm dia	Nos.	4,600	6,000	2,76,00,000
ii	110 mm dia	Nos.	2,800	8,000	2,24,00,000
iii	160 mm dia	Nos.	2,200	12,000	2,64,00,000
iv	200 mm dia	Nos.	1,500	16,000	2,40,00,000
v	300 mm dia	Nos.	200	20,000	40,00,000
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. **Electrically Operated & SCADA Compatible class PN 1.6**				
i	80 mm dia	Nos.	1,284	72,078	9,25,48,152
ii	100 mm dia	Nos.	1,139	74,292	8,46,18,588
iii	150 mm dia	Nos.	282	82,287	2,32,04,934
iv	200 mm dia	Nos.	24	1,12,668	27,04,032
v	300 mm dia	Nos.	18	1,37,391	24,73,038
5	**VALVE CHAMBERS**				
5.1	**Brick Masonry 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. OR Supply and fixing at site of RCC Precast Valve Chamber of same size including all fittings, CI frame and cover etc	Nos.	2,747	1,30,000	35,71,10,000
6	**FLOW METERS**				
6.1	**Electromagnetic Bulk Flow Meters**				
i	EMF100 for DN 100 mm	Nos.	27	2,37,706	64,18,056
ii	EMF125 for DN 125 mm	Nos.	1	2,72,123	2,72,123
iii	EMF150 for DN 150 mm	Nos.	6	2,74,876	16,49,256
iv	EMF200 for DN 200 mm	Nos.	13	3,31,779	43,13,127

Sl No	Description	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
v	EMF250 for DN 250 mm	Nos.	4	3,58,854	14,35,416
vi	EMF300 for DN 300 mm	Nos.	14	4,21,263	58,97,679
vii	EMF350 for DN 350 mm	Nos.	5	4,98,816	24,94,081
viii	EMF400 for DN 400 mm	Nos.	11	5,66,273	62,29,005
ix	EMF450 for DN 450 mm	Nos.	5	6,25,011	31,25,057
x	EMF500 for DN 500 mm	Nos.	6	7,02,106	42,12,636
xi	EMF600 for DN 600 mm	Nos.	1	7,56,714	7,56,714
xii	EMF700 for DN 700 mm	Nos.	2	9,31,093	18,62,186
xiii	EMF750 for DN 750 mm	Nos.	2	10,88,034	21,76,068
xiv	EMF900 for DN 900 mm	Nos.	2	13,52,815	27,05,629
xv	EMF1000 for DN 1000 mm	Nos.	1	16,30,904	16,30,904
xvi	Electromagnetic Flow Meter-250 mm Size for subzonal measurements	Nos.	99	3,58,854	3,55,26,558
xvii	Pressure transducers with data loggers for Critical measurement points	Nos.	297	18,280	54,29,160
7	**ROAD RESTORATION**				
7.1	**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 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	5,38,554	177	9,52,76,335
7.2	**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	m^3	2,23,237	2,554	57,02,35,107

Sl No	Description	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
	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				
7.3	**Permanent 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	74,412	2,554	19,00,78,369
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	5,20,887	48	2,47,74,727
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	5,20,887	17	87,44,021

Sl No	Description	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
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	26,044	10,139	26,40,58,515
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	5,20,887	136	7,06,80,839
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	m^3	14,882	7,273	10,82,38,493

Sl No	Description	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
	site, laid with paver with electronic sensor/mechanical paver, compacting , finishing and curing.				
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	14,882	7,729	11,50,25,519
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.				

Sl No	Description	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
	Edge Line marking of width 100mm	m^2	82,384	759	6,25,46,460
8	**Shifting of utilities**				
8.1	Provision for River / Stream crossings	lumpsum	1	50,00,000	50,00,000
8.2	Provision for Railway and Highway Crossings	lumpsum	1	2,50,00,000	2,50,00,000
8.3	Provisions for relocation of utilities, pipes	lumpsum	1	50,00,000	50,00,000
8.4	Provisions for damage repairs during excavation	lumpsum	1	25,00,000	25,00,000
8.5	Provision for rerouting of pipes and accessories	lumpsum	1	15,00,000	15,00,000
8.6	Maintenance of transmission mains of size 450mm and higher in diameter	lumpsum	1	75,00,000	75,00,000
8.7	Non-destructive testing of civil structure, housekeeping and miscelaneous works	lumpsum	1	30,00,000	30,00,000
8.8	Service deficiency works		1	50,00,000	50,00,000
	Total				**3,49,63,06,272**

ANNEXURE 7 - COST ESTIMATE – INSTRUMENTATION

Sl. No.	Description	Units	Quantity	Unit Rate	Amount in Rs.
(1)	(2)	(3)	(4)	(5)	(6)
1	Raw Water Balance Tank Level Indicator Transmitter	Nos.	6	1,34,027	8,04,164
2	Raw Water Balance Tank Level Switch High High	Nos.	6	32,542	1,95,253
3	Raw Water Balance Tank Level Switch Low Low	Nos.	6	32,542	1,95,253
4	Raw Water Pump Suction Pressure Indicator (Gauge)	Nos.	20	16,078	3,21,563
5	Raw Water Pump Discharge Pressure Indicator (Gauge)	Nos.	20	16,078	3,21,563
6	Raw Water Flow Transducer	Nos.	6	2,51,076	15,06,456
7	Raw Water- Sample Water to pH Flow Chamber with Variable Area Flowmeter & Integral Low Flow Switch Combination	Nos.	6	1,34,027	8,04,164
8	Raw Water- Sample Water to Turbidity - Variable Area Flowmeter- Indicator (Rotameter) & Flow Switch Combination	Nos.	6	21,000	1,26,000
9	Raw Water Turbidity Indicator/Transmitter	Nos.	6	2,34,483	14,06,900
10	Raw Water Turbidity Sensor with Debubbler	Nos.	6	24,182	1,45,089
11	Raw Water- Sample pH Sensor	Nos.	6	1,02,000	6,11,998
12	Raw Water- Sample Water to pH / ORP & Free Chlorine Sensor Flow Chamber with Variable Area Flowmeter & Integral Low Flow Switch Combination	Nos.	6	1,57,500	9,45,000
13	Dosed Raw Water- Sample pH Sensor	Nos.	6	1,02,000	6,11,998
14	Dosed Raw Water- Sample ORP Sensor	Nos.	6	97,112	5,82,671
15	Dosed Raw Water- Sample Cl Sensor/cell	Nos.	6	1,57,500	9,45,000
16	Balance Tank Level Switch High High	Nos.	6	32,542	1,95,253
17	Balance Tank Level Switch Low Low	Nos.	6	32,542	1,95,253
18	Rapid Mix Tank pH Sensor	Nos.	6	1,02,000	6,11,998
19	Clarifloculator Tank 1 Level Switch Low Low	Nos.	6	32,542	1,95,253
20	Clarifloculator Tank 2 Level Switch Low Low	Nos.	6	32,542	1,95,253
21	Clear Water Storage Tank Level Indicator Transmitter (Combined unit)	Nos.	6	1,34,027	8,04,164
22	Clear Water Storage Sump Level Switch High High	Nos.	6	32,542	1,95,253
23	Clear Water Storage Sump Level Switch Low Low	Nos.	6	32,542	1,95,253
24	Clear Water Pump Outlet Low Flow Switch	Nos.	15	32,542	4,88,132
25	Clear Water Pump Suction Pressure Indicator (Gauge)	Nos.	15	16,078	2,41,172
26	Clear Water Pump Outlet Pressure Indicator (Gauge)	Nos.	15	16,078	2,41,172
27	Clear Water Water Flow Transducer	Nos.	6	2,51,076	15,06,456
28	Filter Backwash Water Holding Tank Low Low Level Switch	Nos.	6	32,542	1,95,253

Sl. No.	Description	Units	Quantity	Unit Rate	Amount in Rs.
(1)	(2)	(3)	(4)	(5)	(6)
29	Filter Backwash Water Holding Tank Low Level Switch	Nos.	6	32,542	1,95,253
30	Filter Backwash Water Holding Tank High High Level Switch	Nos.	6	32,542	1,95,253
31	Filter Backwash Water Holding Tank Level Transducer	Nos.	6	1,34,027	8,04,164
32	Filter Backwash Water Transfer Pump Discharge Flow Transducer	Nos.	6	2,51,076	15,06,456
33	Filter Backwash Water Transfer Pump Discharge Flow Indicator/Transmitter	Nos.	6	1,34,027	8,04,164
34	Filter Backwash Water Pump Outlet Low Flow Switch	Nos.	12	32,542	3,90,506
35	Filter Backwash Water Pump Suction Pressure Indicator (Gauge)	Nos.	12	16,078	1,92,938
36	Filter Backwash Water Pump Outlet Pressure Indicator (Gauge)	Nos.	12	16,078	1,92,938
37	Filter Backwash Water Pump Outlet Pressure Indicator Transmitter	Nos.	12	2,39,243	28,70,910
38	Filter Backwash Water Flow Transducer	Nos.	6	2,51,076	15,06,456
39	Dosed Filtered Water- Sample pH Sensor	Nos.	6	1,02,000	6,11,998
40	Dosed Filtered Water-Sample pH Indicator/Transmitter	Nos.	6	1,34,027	8,04,164
41	Dosed Filtered Water - Sample Water to pH & Free Chlorine Sensor Flow Chamber with Variable Area Flowmeter & Integral Low Flow Switch Combination	Nos.	6	32,542	1,95,253
42	Dosed Filtered Water- Sample Free Chlorine Sensor/cell	Nos.	6	1,57,500	9,45,000
43	Dosed Filtered Water-- Sample Fl Indicator/Transmitter Complete with integral Flow Switch and Rotameter	Nos.	6	32,542	1,95,253
44	Clear Water Sump Outlet - Water Sample to pH & Free Chlorine Sensor Flow Chamber with Variable Area Flowmeter & Integral Low Flow Switch Combination	Nos.	6	32,542	1,95,253
45	Clear Water Sump Outlet - Water Sample - pH Sensor	Nos.	6	1,02,000	6,11,998
46	Clear Water Sump Outlet - Water Sample pH & Free Chlorine Indicator/Transmitter	Nos.	6	2,39,243	14,35,455
47	Clear Water Sump Outlet - Water Sample Free Chlorine Sensor/cell	Nos.	6	2,39,243	14,35,455
48	Clear Water Sump Outlet - Water Sample to Turbidity Sensor - Variable Area Flowmeter-Indicator (Rotameter) & Flow Switch Combination	Nos.	6	32,542	1,95,253
49	Clear Water Sump Outlet - Water Sample Turbidity Sensor with Debubbler	Nos.	6	2,34,483	14,06,900

Sl. No.	Description	Units	Quantity	Unit Rate	Amount in Rs.
(1)	(2)	(3)	(4)	(5)	(6)
50	Clear Water Sump Outlet - Water Sample Turbidity Indicator/Transmitter	Nos.	6	2,34,483	14,06,900
51	Filter Tank Low Level Switch	Nos.	39	32,542	12,69,143
52	Filter Tank Level Indicator Transmitter	Nos.	39	1,34,027	52,27,063
53	Filter - Filtered Water Differential Pressure Indicator/Transmitter	Nos.	39	1,34,027	52,27,063
54	Filter - Sample of Filtered Water to Turbidity Analyser - Variable Area Flowmeter- Indicator (Rotameter)	Nos.	39	1,34,027	52,27,063
55	Filter - Sample of Filtered Water to Turbidity Analyser - Variable Area Flowmeter- Integral Low Flow Switch	Nos.	39	32,542	12,69,143
56	Filter - Filtered Water Turbidity Sensor with Debubbler	Nos.	39	32,542	12,69,143
57	Filter - Filtered Water Turbidity Indicator/Transmitter	Nos.	39	32,542	12,69,143
58	Alum Batching Bund High Level Switch	Nos.	6	32,542	1,95,253
59	Lime Batching Bund High Level Switch	Nos.	6	32,542	1,95,253
60	Lime Dosing Skid System Bund High Level Switch	Nos.	6	32,542	1,95,253
61	Polymer Batching Skid System Bund High Level Switch	Nos.	6	32,542	1,95,253
62	Potassium Permanganate Bund High Level Switch	Nos.	6	32,542	1,95,253
63	Process Drainage Pit Low Low Level Switch	Nos.	6	32,542	1,95,253
64	Process Drainage Pit High High Level Switch	Nos.	6	32,542	1,95,253
65	Process Drainage Pit Level Transducer	Nos.	6	1,34,027	8,04,164
66	Process Drainage Pit Pump Outlet Low Flow Switch	Nos.	12	32,542	3,90,506
67	Sludge Storage Tank High High Level Switch	Nos.	6	32,542	1,95,253
68	Sludge Storage Tank Low Low Level Switch	Nos.	6	32,542	1,95,253
69	Sludge Storage Tank Level Transducer	Nos.	6	1,34,027	8,04,164
70	Sludge Pump Outlet Low Flow Switch	Nos.	6	32,542	1,95,253
71	Sludge Pump combined discharge header Outlet Pressure Indicator (Gauge)	Nos.	6	32,542	1,95,253
72	Backwash Recovery Tank Low Low Level Switch	Nos.	6	32,542	1,95,253
73	Backwash Recovery Tank L Low Level Switch	Nos.	6	32,542	1,95,253
74	Backwash Recovery Tank High High Level Switch	Nos.	6	32,542	1,95,253
75	Backwash Recovery Tank High Level Switch	Nos.	6	32,542	1,95,253
76	Backwash Recovery Tank Level Transducer	Nos.	6	1,34,027	8,04,164
77	Backwash Recovery Tank Supernatant Return Pump Outlet Low Flow Switch	Nos.	12	32,542	3,90,506

Sl. No.	Description	Units	Quantity	Unit Rate	Amount in Rs.
(1)	(2)	(3)	(4)	(5)	(6)
78	Backwash Recovery Tank Supernatant Return Pump combined discharge header Outlet Pressure Indicator (Gauge)	Nos.	6	16,078	96,469
79	Backwash Recovery Tank Supernatant Sample to Turbidity Analyser - Variable Area Flowmeter- Indicator (Rotameter)	Nos.	6	32,542	1,95,253
80	Backwash Recovery Tank Supernatant Sample Water to Turbidity Analyser - Variable Area Flowmeter- Integral Low Flow Switch	Nos.	6	32,542	1,95,253
81	Backwash Recovery Tank Supernatant Sample Water Turbidity Sensor	Nos.	6	32,542	1,95,253
82	Backwash Recovery Tank Supernatant Sample Water Turbidity Indicator/Transmitter	Nos.	6	32,542	1,95,253
83	Overflow Pump Station Pump Outlet Low Flow Switch	Nos.	12	32,542	3,90,506
84	Overflow Pump Station combined discharge header Outlet Pressure Indicator (Gauge)	Nos.	6	16,078	96,469
85	Overflow Pump Station Low Low Level Switch	Nos.	12	32,542	3,90,506
86	Overflow Pump Station Low Level Switch	Nos.	12	32,542	3,90,506
87	Overflow Pump Station Level Transducer	Nos.	6	1,34,027	8,04,164
88	Emergency Overflow Storage Basin High Level Switch	Nos.	6	32,542	1,95,253
89	Blower Air Flow Combined Indicator/Transmitter/Transducer	Nos.	6	2,51,076	15,06,456
90	Alum Solution Fill Station	Nos.	6	5,25,000	31,50,000
91	Alum Tank Low Low Level Switch	Nos.	6	32,542	1,95,253
92	AlumTank High High Level Switch	Nos.	6	32,542	1,95,253
93	Alum Tank Level Transducer /Transmitter Combined;	Nos.	6	1,34,027	8,04,164
94	Alum Dosing Pulsation Dampener	Nos.	6	52,500	3,15,000
95	Alum Calibration Cylinder (dedicated for Chlorine Dosing Pumps 1 & 2)	Nos.	6	2,100	12,600
96	Alum Pumps 1 & 2 Combined Discharge Pressure Indicator (Gauge)	Nos.	6	16,078	96,469
97	Alum Dosing Pump 1 High Pressure Switch	Nos.	6	32,542	1,95,253
98	Alum Dosing Pump 2 High Pressure Switch	Nos.	6	32,542	1,95,253
99	Alum Dosing Flow Indicator/Transmitter	Nos.	6	32,542	1,95,253
100	Alum Dosing Flow Transducer	Nos.	6	2,51,076	15,06,456
101	Alum Dilution Water - Variable Area Flowmeter- Indicator (Rotameter)	Nos.	6	32,542	1,95,253
102	Alum Dilution Water- Variable Area Flowmeter- Low Flow Switch	Nos.	6	32,542	1,95,253
103	Lime Batching System	Nos.	6	52,500	3,15,000
104	Lime water Make-Up - Variable Area Flowmeter- Indicator (Rotameter)	Nos.	6	32,542	1,95,253

Sl. No.	Description	Units	Quantity	Unit Rate	Amount in Rs.
(1)	(2)	(3)	(4)	(5)	(6)
105	Lime water Make-Up - Variable Area Flowmeter- Low Flow Switch	Nos.	6	32,542	1,95,253
106	Lime water Make-Up Pressure Indicator (Gauge)	Nos.	6	16,078	96,469
107	Lime water Make-Up Low Pressure Switch	Nos.	6	32,542	1,95,253
108	Lime water Make-Up Conductivity Sensor	Nos.	6	1,14,605	6,87,629
109	Lime water Make-Up Conductivity Indicator/Transmitter	Nos.	6	32,542	1,95,253
110	Lime Batching Tank Low Low Level Switch	Nos.	6	32,542	1,95,253
111	Lime Batching Tank High High Level Switch	Nos.	6	32,542	1,95,253
112	Lime Batching Tank Level Transducer /Transmitter Combined;	Nos.	6	1,34,027	8,04,164
113	Lime Bin / Hopper Low Level	Nos.	6	32,542	1,95,253
114	Lime Bin / Hopper Load cell (weight)	Nos.	6	32,542	1,95,253
115	Lime Bin / Hopper Load cellIndicator Transmittor (kg)	Nos.	6	5,250	31,500
116	Lime Bin / Hopper High Level	Nos.	6	32,542	1,95,253
117	Lime Hopper Extraction Fan Low Pressure Switch	Nos.	12	32,542	3,90,506
118	Lime Transfer Pump Low Flow Switch	Nos.	12	32,542	3,90,506
119	Lime Dosing Tank Low Low Level Switch	Nos.	12	32,542	3,90,506
120	Lime Dosing Tank High High Level Switch	Nos.	12	32,542	3,90,506
121	Lime Dosing Tank Level Transducer /Transmitter Combined;	Nos.	12	1,34,027	16,08,327
122	Lime (Pre Dose) Dosing Pumps Low Flow Switch	Nos.	12	32,542	3,90,506
123	Lime (Pre Dose) Dosing Pump Pressure Relief Flow Switch	Nos.	12	32,542	3,90,506
124	Lime (Pre Dose) Calibration Cylinder dedicated for Lime Dosing Pumps 1 & 2	Nos.	6	2,100	12,600
125	Lime (Pre Dose) Pumps 1 & 2 Combined Discharge Pressure Indicator (Gauge)	Nos.	6	16,078	96,469
126	Lime (Post Dose) Dosing Pumps Low Flow Switch	Nos.	12	32,542	3,90,506
127	Lime (Post Dose) Dosing Pump Pressure Relief Flow Switch	Nos.	12	32,542	3,90,506
128	Lime (Post Dose) Calibration Cylinder (dedicated for Lime Dosing Pumps 3 & 4)	Nos.	6	2,100	12,600
129	Lime (Post Dose) Pumps 3 & 4 Combined Discharge Pressure Indicator (Gauge)	Nos.	6	16,078	96,469

Sl. No.	Description	Units	Quantity	Unit Rate	Amount in Rs.
(1)	(2)	(3)	(4)	(5)	(6)
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.	6	5,25,000	31,50,000
131	Coagulant Aid Polymer Calibration Cylinder (dedicated for Alum Aid Polymer Dosing Pumps 1 & 2)	Nos.	6	2,62,500	15,75,000
132	Polymer Solution Make-Up Water (Pre carbon Filter) Pressure Indicator (Gauge)	Nos.	6	16,078	96,469
133	Polymer Solution Make-Up Water (Post carbon Filter) Pressure Indicator (Gauge)	Nos.	6	16,078	96,469
134	Polymer Make-Up Water Low Pressure Switch	Nos.	6	32,542	1,95,253
135	Polymer Make-Up Water - Variable Area Flowmeter- Indicator (Rotameter)	Nos.	6	32,542	1,95,253
136	Polymer Make-Up Water - Variable Area Flowmeter- Low Flow Switch	Nos.	6	32,542	1,95,253
137	Polymer Hopper Low Level	Nos.	6	32,542	1,95,253
138	Polymer Hopper High Level	Nos.	6	32,542	1,95,253
139	Polymer Hopper Level Indicator	Nos.	6	32,542	1,95,253
140	Polymer Batching Tank Low Level Switch	Nos.	6	32,542	1,95,253
141	Polymer Batching Tank High Level Switch	Nos.	6	32,542	1,95,253
142	Polymer Batching Tank High High Level Switch	Nos.	6	32,542	1,95,253
143	Polymer Dosing Tank Low Level Switch	Nos.	6	32,542	1,95,253
144	Polymer Dosing Tank High High Level Switch	Nos.	6	32,542	1,95,253
145	Polymer Dosing Tank Level Transducer /Transmitter Combined;	Nos.	6	1,34,027	8,04,164
146	Polymer Batching Skid System Bund High Level Switch	Nos.	6	1,95,253	11,71,517
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.	6	5,88,000	35,28,000
148	Filter Aid Polymer Calibration Cylinder dedicated for Filter Aid Polymer Dosing Pumps 1 & 2	Nos.	6	2,100	12,600

Sl. No.	Description	Units	Quantity	Unit Rate	Amount in Rs.
(1)	(2)	(3)	(4)	(5)	(6)
149	Filter Aid Polymer Dosing Pump High Pressure Switch	Nos.	12	1,95,253	23,43,033
150	Filter Aid Polymer Dosing Pumps 1 & 2 Low Flow Switch	Nos.	6	1,95,253	11,71,517
151	Filter Aid Polymer Dosing Pumps 1 & 2 Combined Discharge Pressure Indicator (Gauge)	Nos.	6	3,21,563	19,29,375
152	Dilution Water for Filter Aid Polymer Dosing - Variable Area Flowmeter- Indicator (Rotameter)	Nos.	6	3,21,563	19,29,375
153	Dilution Water for Filter Aid Polymer Dosing - Variable Area Flowmeter- Integral Low Flow Switch	Nos.	6	1,95,253	11,71,517
154	Potassium Permaganate Batching System	Nos.	6	1,95,253	11,71,517
155	Potassium Permanganate Water Make-Up Pressure Indicator (Gauge)	Nos.	6	3,21,563	19,29,375
156	Potassium Permanganate Water Make-Up - Variable Area Flowmeter- Indicator (Rotameter)	Nos.	6	5,88,000	35,28,000
157	Potassium Permanganate Water Make-Up - Variable Area Flowmeter- Low Flow Switch	Nos.	6	1,95,253	11,71,517
158	Potassium Permanganate Hopper Low Level Switch	Nos.	6	1,95,253	11,71,517
159	Potassium Permanganate Hopper High Level Switch	Nos.	6	1,95,253	11,71,517
160	Permanganate Hopper Level Indication	Nos.	6	86,436	5,18,616
161	Potassium Permanganate Batching Tank High High Level Switch	Nos.	6	1,95,253	11,71,517
162	Potassium Permanganate Batching Tank High Level Switch	Nos.	6	1,95,253	11,71,517
163	Potassium Permanganate Batching Tank Low Level Switch	Nos.	6	1,95,253	11,71,517
164	Potassium Permanganate Dosing Tank Low Low Level Switch	Nos.	6	1,95,253	11,71,517
165	Potassium Permanganate Dosing Tank High High Level Switch	Nos.	6	1,95,253	11,71,517
166	Potassium Permanganate Dosing Tank Level Transducer /Transmitter Combined;	Nos.	6	8,04,164	48,24,981
167	Potassium Permanganate Calibration Cylinder (dedicated for Potassium Permanganate Dosing Pumps 1 & 2)	Nos.	6	2,100	12,600
168	Potassium Permanganate Dosing Pump High Pressure Switch	Nos.	12	1,95,253	23,43,033
169	Potassium Permanganate Dosing Pump Low Flow Switch	Nos.	6	1,95,253	11,71,517
170	Potassium Permanganate Dosing Pumps 1 & 2 Combined Discharge Pressure Indicator (Gauge)	Nos.	6	3,21,563	19,29,375

Sl. No.	Description	Units	Quantity	Unit Rate	Amount in Rs.
(1)	(2)	(3)	(4)	(5)	(6)
171	Dilution Water for Potassium Permanganate Dosing - Variable Area Flowmeter- Indicator (Rotameter)	Nos.	6	1,95,253	11,71,517
172	Dilution Water for Potassium Permanganate Dosing - Variable Area Flowmeter- Integral Low Flow Switch	Nos.	6	1,95,253	11,71,517
173	AIR COMPRESOR PACKAGE 1	Nos.	6	5,25,000	31,50,000
174	AIR COMPRESOR PACKAGE 2	Nos.	6	5,25,000	31,50,000
175	Main Air Receiver Pressure Indicator/ Transmitter	Nos.	6	3,21,563	19,29,375
176	Main Air Line Header Pressure Indicator (Gauge)	Nos.	6	3,21,563	19,29,375
177	Main Air Line Header Low Low Pressure Switch	Nos.	6	1,95,253	11,71,517
178	Dried Air Receiver Low Low Pressure Switch	Nos.	6	1,95,253	11,71,517
179	Dried Air Air Receiver Pressure Indicator (Gauge)	Nos.	6	3,21,563	19,29,375
180	Blower Discharge High Pressure Switch	Nos.	6	1,95,253	11,71,517
181	Blower Discharge Pressure Indicator (Gauge)	Nos.	6	3,21,563	19,29,375
182	Blower Suction Pressure Indicator (Gauge)	Nos.	6	3,21,563	19,29,375
183	Blower Inlet Filter Pressure Diffierntial Indicator (Gauge)	Nos.	6	3,21,563	19,29,375
184	Treated Service Water Pumps Outlet Pressure Gauge	Nos.	6	3,21,563	19,29,375
185	Treated Service Water Pump Outlet Pressure Transducer	Nos.	6	8,04,164	48,24,981
	Total				**15,87,22,386**

ANNEXURE 8 - COST ESTIMATE - HOUSE SERVICE CONNECTION

Item 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	In Water bound Macadam Road	m^3	2,22,269	127	2,82,99,272
ii	In Asphalt Road surface	m^3	77,794	249	1,93,71,675
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	44,454	1,403	6,23,55,617
1.2	**Earth work**				
(a)	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*** (Ref. Item No. 2.10.1 of DSR)	m^3	3,20,068	411	13,15,51,542
(b)	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	m^3	40,008	579	2,31,69,825

Item No.	Description	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
	each deposited layer by ramming, watering, etc. and disposing of surplus excavated soil as directed, within a lead of 50 m : ***Ordinary Rock.*** (Ref. Item No. 2.13.1 of DSR)				
(c)	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, including getting out the excavated soil and disposal of surplus excavated soils as directed, within a lead of 50 m. ***Medium Rock (blasting prohibited)*** New Data derived from Item No.2.9.3	m^3	40,008	772	3,08,92,162
2	**WATER METERS**				
2.1	Supply, execution, testing and commissioning of approved make **Multijet class B Magnetic type water meters**				
i	15mm	Nos.	1,94,998	2,160	42,11,95,680
ii	20mm	Nos.	24,970	3,600	8,98,92,000
2.2	Providing, Installing and Giving satisfactory field testing of domestic Battery operated **AMR Ultrasonic Water Meters**				
i	20mm	Nos.	24,544	10,800	26,50,75,200
ii	25mm	Nos.	2,454	13,200	3,23,92,800
3	**HOUSE SERVICE CONNECTION**				

Item No.	Description	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
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 / GI pipes 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 type clamp saddle) with cost of GI pipes, all specials such as GI tee, GI ebow, GI coupler, stopper etc, and brass or SS tap for the following diameters.				
i	15 mm dia	Nos.	1,94,998	5,930	1,15,63,92,739
ii	20 mm dia	Nos.	24,970	6,138	15,32,74,849

Item No.	Description	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
3.2	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.	2,46,966	510	12,59,52,660
3.4	Providing temporary water supply to customers to minimise customer inconvenience during pipe laying, commissioning and utility shifting periods	Nos.	39,000	816	3,18,24,000
4	**ROAD RESTORATION**				
4.1	**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 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	3,38,046	177	5,98,04,187
4.2	**Road restoration**				

Item No.	Description	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
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	3,33,404	2,554	85,16,44,310
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	7,77,943	48	3,70,00,992
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	7,77,943	17	1,30,59,174
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	m^3	38,897	10,139	39,43,69,196

Item No.	Description	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
	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%)				
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	7,77,943	136	10,55,61,653
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	22,227	7,273	16,16,54,328
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	m^3	22,227	7,729	17,17,90,760

Item No.	Description	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
	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.				
	Total				**4,36,65,24,621**

ANNEXURE 9 - 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	76	5000	3,80,000
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	19	1000	19,000
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	950	1700	16,15,000
4	Dismantling of existing stuctures - Reinforced cement concrete grade M-20 & above	Cum	38	8000	3,04,000
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 ground floor 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	380	7500	28,50,000
6	Providing T.M.T steel reinforcement for R.C.C work including straightening, 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	45.6	250	11,400

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	3800	35	1,33,000
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	8550	120	10,26,000
9	Providing and fixing Non-corrosive uPVC ladder	Each	19	75000	14,25,000
10	Providing ultrasonic level sensors with associated instrumentation, power supply, communications with SCADA , installation, commissioning etc complete	Each	19	5000	95,000

Sl No	Description	Units	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
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. 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.	Each	19	3,00,000	57,00,000
	Total				**1,35,58,400**

ANNEXURE 10 - COST ESTIMATE – SETUP COST

Item 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	2000	5,000	1,00,00,000
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	250000	50	1,25,00,000
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	2000	2,000	40,00,000
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	2000	3,000	60,00,000
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, air conditioning 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.	78	50,000	39,00,000
(c)	Bulk Printer	Nos.	2	2,00,000	4,00,000
(d)	Desktop Printer	Nos.	28	50,000	14,00,000
(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	**Software**				
(a)	MS Office	Nos.	81	5,000	4,05,000
(b)	Autocad	Nos.	6	2,50,000	15,00,000
(c)	WaterGEMS	Nos.	1	20,00,000	20,00,000

Item No.	Description	Unit	Quantity	Unit Rate	Amount
(1)	(2)	(3)	(4)	(5)	(6)
2.3.4	**Operational Equipment**				
(a)	Leak Noise Correlators	Nos.	6	50,000	3,00,000
(b)	Leak detection ground phones	Nos.	20	50,000	10,00,000
	Subtotal				**6,94,05,000**
2.3.5	**Transport**				
(a)	Cars on hire	Nos.	10		-
(b)	Crew Cab on hire	Nos.	37		-
(c)	Trucks on hire	Nos.	5		-
(d)	Water Tankers on hire	Nos.	25		-
	Subtotal				**-**
	Grand Total				**6,94,05,000**

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

Sl.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 – THIRUVANANTHAPURAM – PERSONNEL

TVM Personnel				
Treatment Plant Locations	Number		4	
Intake Locations	Number		3	
Customer service centres one for	Connections		50000	
Contract option	Number		1	meter reading, billing and collection by KWA
Connections managed by Contractor	Number		250000	
Number of network subzones	Number		84	
Customer Service Centres	Number		5	

Sl. No.	Staff	Location	Division	Required	Proposed	Cars	rew 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	nance & Accour	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	8	8		2				2			5,00,000	40,00,000
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			2				2	1		6,00,000	-
16	Accountants	HQ	nance & Accour	2	2						2	1		5,00,000	10,00,000
17	Audit Staff	HQ	nance & Accour	1										7,50,000	-
18	Legal Superintendent	HQ	nance & Accour	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
24	Zonal Managers	Field	Management	3	3	2					2			12,00,000	36,00,000
25	Zonal Engineers	Field	Engineering	21	21	0	6			21		21		10,00,000	2,10,00,000
11	Quality Assurance	Field	Engineering	2	2						2			10,00,000	20,00,000
12	Customer Representatives	Field	Customer Service	15	15									3,60,000	54,00,000
13	Network Technicians	Field	Operations	63	63		16							3,00,000	1,89,00,000
14	Meter Readers	Field	Commercial	63										4,50,000	-
15	Meter Repair Technicians	Field	Support	2	2									2,00,000	4,00,000
16	NRW Technicians	Field	Operations	16	16		8							4,00,000	64,00,000
17	Network Repair Gangs (Fitter +	Field	Operations	42	42	1								2,00,000	84,00,000
18	Connections Gang (Fitter + Hel	Field	Operations	5	5			2						2,00,000	10,00,000
19	Stores Superintendent	Field	Operations	1	1			2			1	1		5,00,000	5,00,000
20	Stores Assistants	Field	Operations	3	3				25		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	86	86									1,00,000	86,00,000
23	Security	Field	Operations	86	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					1				6,00,000	6,00,000
27	Electrical Engineers	WTW	Production	3	1			1			3			6,00,000	6,00,000
28	Mechanical Engineers	WTW	Production	2	1		1				2			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	24	2									2,00,000	4,00,000
31	Electrical Technicians	WTW	Production	24	2									2,00,000	4,00,000
32	Water Quality Analysists	Lab+Field	Production	3	3		1				2			2,00,000	6,00,000
33	Operational Gangs (2 per gang	WTW	Operations	24										2,00,000	-
	Total Staff			535	316	11	37	5	25	28	34.5	28			10,64,60,000
	Staff per 1000 connections				1.26										

Staff deployment			Connections grov	0.50%	250000	251250	252506	253769	255038	256313	257595	258883	260177	261478	262785
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				8	8	8	8	8	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				3	3	3	3	3	3	3	3	3	3	3
25	Zonal Engineers				21	21	21	21	21	21	21	21	21	21	21
11	Quality Assurance				2	2	2	2	2	2	2	2	2	2	2
12	Customer Representatives				15	15	15	15	15	15	15	15	15	15	15
13	Network Technicians				63	63	64	64	64	65	65	65	66	66	66
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				16	16	16	16	16	16	16	16	16	16	16
17	Network Repair Gangs (Fitter + Helper)				42	42	42	42	42	42	42	42	42	42	42
18	Connections Gang (Fitter + Helper)				5	5	5	5	5	5	5	5	5	5	5
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				86	86	86	86	86	86	86	86	86	86	86
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				1	1	1	1	1	1	1	1	1	1	1
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				3	3	3	3	3	3	3	3	3	3	3
33	Operational Gangs (2 per gang)				0	0	0	0	0	0	0	0	0	0	0
	Total Staff				316	316	317	317	317	310	310	310	311	311	311
	Staff per 1000 connections														
	Staff costs				10.646	10.646	10.676	10.676	10.676	10.211	10.211	10.211	10.241	10.241	10.241

ANNEXURE 13 – AMP COST

						TVM									
Operations ("Asset Owner")		Frequency	Unit	Code	Price	1	2	3	4	5	6	7	8	9	10
Conduct	Subcontractor Training	Quarterly	hours	OP		200	200	200	200	200	200	200	200	200	200
Conduct	Tool Box Meetings	Daily	hours	OP		125	125	125	125	125	125	125	125	125	125
Conduct	Community Consultations	As required	hours	OP		52	52	52	52	52	52	52	52	52	52
Conduct	Leak Detection	Monthly	metres	OP		8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000
Conduct	Hazard Inspections	Monthly	hours	OP		208	208	208	208	208	208	208	208	208	208
Construct	Property Connections	As required	#	OCP	6000	12,200	12,249	12,298	12,347	12,396	12,446	12,496	12,546	12,596	12,646
Construct	Property Disconnections	As required	#	OCP	5000	6,800	6,827	6,855	6,882	6,909	6,937	6,965	6,993	7,021	7,049
Construct	Meters	As required	hours	OP		12,200	12,249	12,298	12,347	12,396	12,446	12,496	12,546	12,596	12,646
Construct	T insertations	As required	hours	OP		200	200	200	200	200	200	200	200	200	200
Construct	Minor Works	As required	#	OCP	50000	12	12	12	12	12	12	12	12	12	12
Maintain	Sites	As programme	#	OCP	50000	4	4	4	4	4	4	4	4	4	4
Maintain	Buildings	As programme	#	OCP	150000	4	4	4	4	4	4	4	4	4	4
Paint	Valves	As programme	#	OCP	1000	0	40	40	40	40	40	40	40	40	40
Paint	Tanks	As programme	#	OCP	50000	0	1	1	1	1	1	1	1	1	1
Paint	Buildings	As programme	#	OCP	350000	0	1	1	1	1	1	1	1	1	1
Relocate	Assets	As required	#	OCP	200000	1	1	1	1	1	1	1	1	1	1
Replace	Batteries	As programme	#	OCP	25000	0	50	100	150	160	160	160	160	160	160
Replace	Meters (Asset Management)	As programme	#	OCP	3000	0	250	250	250	250	450	450	450	450	450
Replace	Spares (Restock)	As required	#	OCP	100000	12	12	12	12	12	12	12	12	12	12
Replace	Equipment (MPE)	As required	#	OCP	25000	12	12	12	12	12	12	12	12	12	12
Repair	Pipes	As required	#	OCP	5000	8,894	8,149	7,407	6,669	5,934	5,623	5,329	5,050	4,785	4,534
Repair	Property Service Connections	As required	#	OCP	2000	2,616	2,397	2,178	1,961	1,745	1,654	1,567	1,485	1,407	1,334
Repair	Valves	As required	#	OCP	2000	916	839	762	686	611	579	549	520	493	467
Repair	Tanks	As required	#	OCP	25000	262	240	218	196	175	165	157	149	141	133
Repair	Pump Stations	As required	#	OCP	50000	262	240	218	196	175	165	157	149	141	133
Repair	Instruments	As required	#	OCP	25000	65	60	54	49	44	41	39	37	35	33
Repair	SCADA Equipment	As required	#	OCP	50000	65	60	54	49	44	41	39	37	35	33
Renew	Pipelines (KUWSIP)	As programme	metres	CP		0	1,36,101	1,36,101	1,36,101	1,36,101	1,36,101	1,36,101	0	0	0
Renew	Pipelines (Asset Management)	As programme	metres	OCP	5000	0	0	0	0	0	10,954	10,954	10,954	10,954	10,954
Renew	Property Service Connections (KU	As programme	#	CP		0	19,396	19,298	19,197	19,094	0	0	0	0	0
Renew	Property Service Connections (AM	As programme	#	OCP	8000	0	0	0	0	0	6,568	6,224	5,898	5,589	5,296
Renew	Meters	As programme	#	CP		34,550	34,550	34,550	34,550	34,550	0	0	0	0	0
	Total cost					**18,63,60,500**	**18,28,52,050**	**17,81,87,420**	**17,35,57,600**	**16,79,63,580**	**27,36,56,660**	**26,88,20,800**	**26,42,63,020**	**25,99,68,840**	**25,59,24,540**
	AMP costs for first 5 years	**88.89**													
	AMP costs for second 5 yea	**132.26**													

ANNEXURE 14 – OPERATING COST ESTIMATE

TVM - 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	7.76	5.17								
Local staff	Rs. Cr	10.65	10.65	10.68	10.68	10.68	10.21	10.21	10.21	10.24	10.24
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	Rs. Cr	0.18	0.18	0.18	0.19	0.19	0.19	0.19	0.19	0.19	0.19
Transport Recurring	Rs. Cr	9.84	9.84	9.84	9.84	9.84	9.84	9.84	9.84	9.84	9.84
Communications & Utilities	Rs. Cr	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32
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%	2.97	2.68	2.17	2.17	2.17	2.12	2.12	2.12	2.13	2.13
GST	18%	5.87	5.31	4.29	4.30	4.30	4.20	4.20	4.20	4.21	4.21
Total cost of Operator Establishment	Rs. Cr	38.51	34.83	28.15	28.16	28.16	27.56	27.56	27.56	27.60	27.60