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KERALA WATER AUTHORITY

Jalabhavan
Thiruvananthapuram-695033
Kerala

No. KWA/JB/EW/EMC/EA/7813/2019

Dated: 10.03.2022

From

The Managing Director

To

The Additional Chief Secretary
Water Resources Department
Government of Kerala
Thiruvananthapuram

Sir,

Sub:- Detailed Energy Audit of 16 HT connections in KWA- Implementation of energy audit recommendations conducted by Energy Management Centre (EMC)-Issue of Administrative Sanction under RKI - Proposal submitting -reg

Ref:- 1. G.O(Rt) No.28/2019/P&EA dated 15.11.2019

Kind attention is invited to the subject and references cited.

As per Government Order read 1 above, "in-principle" sanction was accorded for the project, 'Energy optimization and replacing the inefficient pumping systems' maintained by Kerala Water Authority for Rs.7 crore under Rebuild Kerala Initiative (RKI). The detailed investment grade energy audit of 16 HT connections in KWA was carried out by EMC through RKI funding. EMC has forwarded recommendations for 16 HT stations. Based on the recommendations of EMC, the field officers of KWA have prepared estimate/DER. As phase I of the project 6 nos of DER amounting to Rs. 2,06,74,100/- have been prepared. The details of DERs are as follows:

Sl.No	Name of installation	Name of Division	Total Amount (Rs)	Annual energy Savings (KWH)	Annual Financial Savings
1	Intake well at Kuyiloor	WS Division Thaliparamba	Rs. 4,25,921	0	947462



2	JICA intake at Punalur	PH Division Kottarakkara	Rs.3,82,700	0	922611
3	STP Muttathara	Sewerage Dn Pattoor	Rs. 2,30,100	0	693714
4	Cwss to Mala	PH Division Irinjalakkuda	Rs.1,25,65,379	103615	2461769
5	Cwss to Kodungalloor	PH Division Irinjalakkuda	Rs.17,70,000	94666	624272
6	Raw Water PH, Fresh Cola kadavu	PH Division Muvattupuzha	Rs.53,00,000	28314	379429
	Total Amount		Rs.2,06,74,100/-	226595	6029257/-

Once the project is implemented in these 6 HT connection financial savings of Rs 60,29,257/- and an annual energy savings of 226595(kwh) will be there for KWA.

I request that the proposal may be considered for funding under RKI.

Yours faithfully,
Venkatesapathy S. IAS
Managing Director

Copy To

Additional Chief Secretary Finance & CEO, RKI, with C/L, Government of Kerala





KERALA WATER AUTHORITY

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**IMPLEMENTATION OF ENERGY AUDIT
RECOMMENDATIONS CONDUCTED BY
ENERGY MANAGEMENT CENTRE (EMC)-
FUNDING BY RKI
PHASE I (6 HT Connections)**

DETAILED ENGINEERING REPORT

FEBRUARY - 2022

JALA BHAVAN

Thiruvananthapuram



Table of Contents

SI No	Description	Page No
1	Project at a glance	2
2	Need of the Project	4
3	Proposal details	4
4	Abstract	6
5	Implementation Plan	7
6	Summary and Conclusion	8
7	Annexure	8

1. Project at a glance

Government as per the Order GO(MS) No 12/92/PD dated 30.09.1992 have ordered that energy audit will be mandatory in order to regulate consumption and use of electrical energy and directed all High Tension/Extra High Tension/High rise buildings, apartments to conduct energy audits. As per the order GO(MS) No 19/92/PD dated 03.11.1992, Government have also issued revised guidelines in connection with the Energy Audit. Government of India as per the Energy Conservation Act 2001 has made Energy Audit mandatory for designated consumers in all states. Following this the Energy Management Centre has furnished a proposal for making energy audit mandatory for all the High Tension/Extra High-Tension installations once in three years.

Vide G.O.(Rt) No.164/2021/WRD, Govt. of Kerala accorded A.S for an amount of Rs.30 lakhs (Rupees thirty lakhs only) to KWA for conducting the Energy Audit of selected pumping stations of KWA as part of the project 'Energy optimization and replacing inefficient pumping systems' under RKI. The work was entrusted to EMC (Energy Management Centre). EMC has executed the energy audit activities of 16 HT connections and energy audit reports were submitted by EMC. Based on the recommendations of EMC, the field officers of KWA have prepared estimate/DER. As phase I of the project 6 nos of DER have been as below.



Salient features

Project title	Implementation of energy audit recommendations conducted by Energy Management Centre (EMC)- funding by RKI
Energy Audit conducted by	Energy Management Centre (EMC)
Funds allotted for Energy Audit	RKI (Rebuild Kerala Initiative)
Funding agency for implementing the recommendations by EMC	RKI (Rebuild Kerala Initiative)
Detailed Engineering Report prepared by	Kerala Water Authority (KWA)
Budget provision required for first phase	Rs. 2,06,74,100/-
Administrative sanction	to be obtained
Nature of work	Electromechanical /Civil works

2.Need of the Project

Energy Efficiency is considered as the fifth fuel which when enhanced will reduce the cost of energy which holds a prominent share among the operating expenditure. The increased demand of energy and faster depletion of conventional energy sources like petroleum extracts, the alternative solutions to retain the reserves are increasing energy efficiency and integration of renewable energy sources. Implementation of this project will help to improve performance of 6 pumping stations of Kerala water authority thereby improve KWA revenue as well as energy management. The project is expected to generate a financial savings of Rs 60,29,257/- and an annual energy savings of 226595(kwh).

3.Proposal details

a.Intake well cum pump house kuyiloor

The Raw water pump house at Kuyiloor, which supplies water to the 93 MLD water treatment plant at Peruvalathuparamba of JICA aided Water supply scheme to Pattuvam and adjoining areas was included in the list and the audit was conducted on 5th and 6th of October 2021.



Energy Audit report was published for Intake Well cum Pump house at Kuyiloor by Energy management Centre- Kerala & M/s Athul Consultants Pvt Ltd., Thrissur, and it was recommended that existing Power Factor for Intake Well Kuyiloor is 0.95 only. As per latest rules of KSEB it is not sufficient for obtaining Power Factor incentives. So, each VT pumps are required to be installed by 30 kVAr Capacitors and 25 kVAr capacitor, for 160KVA LT transformer's APFC panel for necessary PF improvement. Also, they recommended that 36Watts T8 Florescent tubes (1 16Nos) have to be replaced by LED Fittings so as to reduce power consumptions. Hence estimate is prepared for the same

b.JICA Intake at Punaloor

The JICA intake pump house at punaloor which supplies water to 73 MLD KWSS to JICA Meenad and adjoining villages designed for 18 villages and for 1 municipality in kollam District. Energy Audit Report suggested that PF can be improved to 0.98 by installation of 260 KVAR Parallel capacitor by replacing existing 225Kvar. Also install parallel capacitors against motors. Also it was instructed to prevent the over flow of cooling tank by providing 19 mm M.S direct pipelines the intake pump. Estimate for implementing both these suggestions were included in the estimate

C.STP Muttathara

Energy Audit in TSS. Mace of 107 MLD Sewage Treatment Plant at Muttathara, Thiruvananthapuram-Supply, erection of suitable Current Transformer (CT) & Potential transformer (PT) to reduce the Contract Demand to 1100 KVA from 1250 KVA. By improving the PF to near unity, the plant will generate sufficient cost savings through incentives at a rate of 0.05% of energy charges for every 0.01 increase PF from the base 0.95. Rectification of the damaged capacitors in the APFC panel of TR-2 and TR-3 to improve PF. Also change suitable capacitors for PF improvement. Estimate for the same is included

D. CWSS to Mala and adjoining villages

The comprehensive WS Scheme to Mala and adjoining panchayaths provides drinking water to Mala, Poyya, Vellangallur, Puthenchira Annamanada Kuzhur Grama panchayaths (JALANIDHI) and for Kodungallur WSS. It is located on the south western boundary of Thrissur district at 37 km southwest of Thrissur town. Source of the scheme is Chalakudy River at Vynthala. The



installed capacity of WTP is 26.1 M LD Treatment capacity. Motor pumpset details of 26.1 MLD WTP are depicted in the following tabulation. The Energy Audit Wing recommended the following 'measures energy conservation to be applied at WTP, Power Factor Improvement in Electrical System - 0.95 To 0.99 by investing for 50kVAr inline capacitor across motors and transformer. Reduction of contract Demand from 750 kvA from 1560 kvA by investing towards CT at the 11 KV incomer side. Reducing the Idle Running of Transformer-1. Optimization of Clear Water Sump Suction Head by installing a U-tube bend in over flow line. Replacement of existing 7.5KW motor with energy efficient IE-3 or IE-4 motor. Replacement of Existing two numbers of Raw. Water Motors of 55kW and 33kW with IE3. Energy Efficient Motors of same rating. Replacement of Existing three numbers of Clear Water Motors of rating 132kW, 110KW. with IE-3 Energy Efficient Motors of same rating. Estimate for the same is included.

E. CWSS to Kodungalloor

The comprehensive WS scheme to Methala Eriyad Edaviilangu and Kadukutty pachayths provides drinking water to Methala Eriyad Edaviilangu and Kadukutty pachayths . It is located on the south western boundary. of Trissur district at 37 km southwest of Thrissur town. Source of the scheme is Chalakudy River at Vynthala. The installed capacity of WTP is 15 mld and utilized is 11 mld. treatment capacity. The energy audit team recommended to Reducing the Idle Running of Transformer -1. Power Factor Improvement in Electrical System - 0.97 To 0.99 by installation of additional 60kVAr capacitors across raw water pumps and transformer. Replacement of Existing Raw Water Motors of 45kW with IE3 Energy Efficient Motors of same rating. Replacement of Existing Back Wash Motor of 5.5kW with IE-3 Energy Efficient Motor of same rating. Estimate includes provision for these suggestions.

F.Raw water pump house at Fresh cola Kadavu

The Raw water pump house of the scheme ARWSS to Mulavoor Asamannur and Trikkariyoor village is for Paipra , Nellikuzhy and Asamannur panchayath having a capacity of 7.MLD. The Energy audit team recommended to increase PF from existing 0.95 to 0.98 range. Installation of parallel capacitors and connecting the same with inline capacitors to reduce PF. Increase contract demand from 160 KVA to 190 KVA. The present maximum demand is 11.8% excess of contract demand and for every excess demand, the charges are levied in the rate of Rs.170 per KVA. Estimate for above recommendations are included in the proposals.



4. General Abstract

Sl. No	Name of installation	Name of Division	Total Estimate Amount submitted (including GST)
1	Intake well cum pump house, Kuyiloor	WS Division Thaliparamba	Rs. 4,25,921/-
2	JICA intake at Punalur	P.H Division Kottarakkara	Rs. 3,82,700/-
3	STP Muttathara	Sewerag Division Pattoor	Rs. 2,30,100/-
4	CWSS to Mala & adjoining panchayaths	P.H Division Irinjalakkuda	Rs. 1,25,65,379/-
5	CWSS to Kodungalloor	P.H Division Irinjalakkuda	Rs. 17,70,000/-
6	Raw Water PH, Fresh Cola kadavu	PH Division Muvattupuzha	Rs. 53,00,000
	Total Amount		Rs 2,06,74,100/-

Expected Energy and Financial Savings

Sl No	Installation	Annual Energy Savings (kWh)	Annual Financial Savings (Rs)	Estimate Amount	Division
1	Intake Well Kuyiloor	0	947,462	425921	WS Thaliparamba
2	JICA – Intake at Punalur	0	922,611	382700	PH Kottarakkara



3	STP Muttathara	0	693,714	230100	Sewarage patoor
4	CWSS to Mala and adjoining, Irinjalakkuda	103,615	2,461,769	12565379	PH Irinjalakuda
5	CWSS Kodungalloor	94,666	624,272	1770000	PH Irinjalakuda
6	Raw Water PH, Fresh Cola kadavu	28,314	379,429	5300000	PH Muvattupuzha

Once the project is implemented in these 6 HT connection financial savings of Rs 60,29,257/- and an annual energy savings of 226595(kwh) will be there for KWA

5.Implementation plan

The work can be arranged after calling competitive Tender and work can be arranged through certified A Class electrical contractor. The work will be done under the Supervision of KWA engineers and electro mechanical team. O&M will be done by KWA

6.Summary and Conclusion

By implementing the project existing capacitors can be replaced and can improve power factor PF to 0.98. Hence the pump house will generate sufficient cost savings through incentives at a rate of 0.05% of energy charges for every 0.01 increase PF from the base 0.95. Also, by reducing/Increasing the contract demand based on the recommendation of energy audit team, the excess payment in KSEB bills can be reduced thereby saving the unnecessary expense of KWA. Once the project is implemented in these 6 HT connection financial savings of Rs 60,29,257/- and an annual energy savings of 226595(kwh) will be there for KWA.



As a pilot phase this project is implemented in 6 HT pump houses. Proposal for 10 H.T pump house where Energy Audit was carried out by EMC is under preparation. In all other remaining HT pump houses energy Audit will be carried out by Electro mechanical team of KWA.

7. Annexure

Attached as Annexures

Annexure 1- Intake well cum pump house, Kuyiloor

Annexure 2- JICA intake at Punalur

Annexure 3- STP Muttathara

Annexure 4- CWSS to Mala & adjoining panchayaths

Annexure 5- CWSS to Kodungalloor

Annexure 6- Raw Water PH, Fresh Cola kadavu



Detailed Estimate

JICA Assisted WSS to Pattuvam and adjoining villages-Mace. Of intake well cum pump house at Kuyiloor - supply & fitting 30Kvar power factor capacitor for No.1,2,3,4,5&6 845 HP 3.3KV VT pumpset&25 Kvar capacitor for 160 KVA transformer APFC Panel

(Dsr year: 2018)

SI No	Description	No	L	B	D	CF	Quantity	Remark
1Appendix (Cost Index:33.9 %)								
1	od270981/2021_2022 Supply and delivery of 30Kvar 3.3KV super heavy duty power factor capacitor of standard make for 845 HP VT Pumps of suitable rating confirming to BEE standards of atleast 2year warranty.	6					6.000	
							Total Quantity	6.000 No
							Total Deducted Quantity	0.000 No
							Net Total Quantity	6.000 No
							Say 6.000 No @ Rs 27000.00 / No	Rs 162000.00
2	od270984/2021_2022 Towards the labor charges for switching off starter panel current line and checking existing capacitor panel board cleaning starter panel, termination of cable and fitting new 30Kvar power factor capacitor bank cubicle type board installation, giving all electrical connection, earth connection and switch ON starter panel current and testing, trial running etc. including all material cost, hire charges of tools etc. complete	6					6.000	
							Total Quantity	6.000 No
							Total Deducted Quantity	0.000 No
							Net Total Quantity	6.000 No
							Say 6.000 No @ Rs 6000.00 / No	Rs 36000.00
3	od319864/2021_2022 Supply and delivery 5 kvar 440 V super heavy duty Power Factor capacitor of standard make for 160 KVA transformer APFC Panel of suitable rating conforming to BEE standards of at least 2 year warranty.	5					5.000	
							Total Quantity	5.000 No
							Total Deducted Quantity	0.000 No
							Net Total Quantity	5.000 No



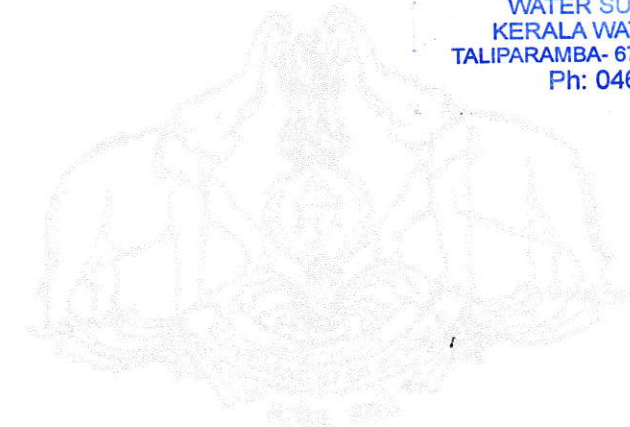
		Say 5.000 No @ Rs 3750.00 / No	Rs 18750.00
4	od319865/2021_2022	Towards the labor charges for switching off starter panel current line and checking existing capacitor panel board cleaning starter panel, termination of cable and fitting new 5Kvar power factor capacitor bank cubicle type board installation, giving all electrical connection, earth connection and switch ON starter panel current and testing, trial running etc. including all material cost, hire charges of tools etc. complete	
	5		5.000
		Total Quantity	5.000 No
		Total Deducted Quantity	0.000 No
		Net Total Quantity	5.000 No
		Say 5.000 No @ Rs 1000.00 / No	Rs 5000.00
5	od319866/2021_2022	Supply and delivery 36 watts LED tube of standard make having atleast 2 year warranty.	
	116		116.000
		Total Quantity	116.000 No
		Total Deducted Quantity	0.000 No
		Net Total Quantity	116.000 No
		Say 116.000 No @ Rs 900.00 / No	Rs 104400.00
6	od319867/2021_2022	Towards the labour charges of installation of 36watts LED tubes including all material cost and hire charges of tools etc. complete	
	116		116.000
		Total Quantity	116.000 No
		Total Deducted Quantity	0.000 No
		Net Total Quantity	116.000 No
		Say 116.000 No @ Rs 300.00 / No	Rs 34800.00
		Total	360950.00
		Centage @	0.0%
		Centage Amount	0.00
		Provision for GST payments (in %) @	18.0%
		Amount reserved for GST payments	64971.00
		Total & Centage	425921.00
		Lumpsum for round off	0.00
		GRAND TOTAL Rs	425921.00
		Rounded Grand Total Rs 4,25,921	



Rupees Four Lakh Twenty Five Thousand Nine Hundred and Twenty One Only



EXECUTIVE ENGINEER
WATER SUPPLY DIVISION
KERALA WATER AUTHORITY
TALIPARAMBA- 670141, KANNUR (DIST)
Ph: 0460 2203230



Kerala Water Authority

PRICE



ESTIMATE REPORT

Energy Management Centre – Kerala (EMC) has entrusted Athul Energy Consultants Pvt Ltd, an Accredited Energy Auditor of Bureau of Energy Efficiency and Empaneled Energy Auditor of Energy Management Centre, Government of Kerala, to conduct Detailed Energy Audit of 16 HT installations of Kerala Water Authority. The energy audit has identified energy conservation opportunities and recommended projects to improve energy efficiency of the facility. The Raw water pump house at Kuyiloor, which supplies water to the 93 MLD water treatment plant at Peruvalathuparamba of JICA aided Water supply scheme to Pattuvam and adjoining areas was included in the list and the audit was conducted on 5th and 6th of October 2021. Energy Audit report was published for Intake Well cum Pump house at Kuyiloor by Energy Management Centre- Kerala & M/s Athul Consultants Pvt Ltd., Thrissur, and it was recommended that existing Power Factor for Intake Well Kuyiloor is 0.95 only. As per latest rules of KSEB it is not sufficient for obtaining Power Factor incentives. So each VT pumps having capacity 845 HP are required to be installed by 30 kVAr Capacitors and 25 kVAr capacitor, to be installed for 160KVA LT transformer's APFC panel for necessary PF improvement.

Also they recommended that 36Watts T8 Florescent tubes (116Nos) have to be replaced by LED Fittings so as to reduce power consumptions. Hence this Estimate is prepared for an amount of Rs 360950+18%GST for further action. The estimate was sent to the Electrical special officer, O/o the Chief Engineer, NR, Kozhikode for vetting and got vetted for an amount of Rs 425921/-.(including 18% GST). I request that action may please be taken to approve the estimate and arranging the work at the earliest.



EXECUTIVE ENGINEER
WATER SUPPLY DIVISION
KERALA WATER AUTHORITY
TALIPARAMBA- 670141, KANNUR (DIST)
Ph: 0460 2203230



**JICA Assisted KWSS to Meenad and adjoining villages- Detailed Energy Audit -
Intake Pump House -Measures for low- capital and medium-capital savings**



DETAILED ENGINEERING REPORT

P H DIVISION

KOTTARAKKRA



CONTENTS

Sl No	Particulars	Page No
1	Project at a Glance	1
2.	General Introduction (Heading 1-2)	2-4
3.	Energy Details of Intake pump House (Heading 3)	4-5
4.	Present Proposal (Heading 4)	6-7
5.	General Abstract	8
6.	Detailed Estimate	9-13
7.	Conclusion	14



PROJECT AT A GLANCE

Name of Scheme	JICA Assisted KWSS to Meenad and adjoining villages
Name of the project	Detailed Energy Audit -intake Pump House - Measures for low- capital and medium-capital savings
Name of District	Kollam
Back ground	Detailed Energy Audit of Intake pump House (LCN 17/5433)
Purpose of project	To minimize the energy loss and hence maximize the savings
Items included	1) Replacement of existing capacitors
	2) Providing separate pipe from pumping line to the cooling system
Estimated cost	Rs. 3,82,700



JICA Assisted KWSS to Meenad and adjoining villages- Detailed Energy Audit - Intake Pump House -Measures for low- capital and medium-capital savings

1.0 GENERAL

1.1 Introduction

The scheme KWSS to JICA Meenad and adjoining villages is designed for safe and potable water to consumers in 18 villages and 1 Municipality in Kollam District by constructing new facilities. Facilities include technical components for water abstraction; raw water transmission; treated water transmission; storage reservoirs and distribution networks.

1.1.1 Scheme Area

The area delineated for the Water Supply Scheme to Meenad and adjoining villages encompasses an area of 131.92 km². This includes (a) Paravoor Municipality and 8 villages in Kollam Taluk, (b) 4 villages in Pathanapuram Taluk and (c) 6 villages in Kottarakkara Taluk.

1.2 Technical Components

- Intake works including raw water pumping station
- Raw water transmission main
- Water Treatment works
- Treated water pumping station
- Treated water transmission mains
- Rechlorination system
- Service reservoirs
- Distribution system
- Telemetry System

2.0 INTAKE WORKS

A intake structure for raw water abstraction and raw water pumping station is built at Tholicode on the left bank of the Kallada river. A rectangular reinforced concrete intake chamber of approximate plan size 10 m x 3 m with semicircular ends feed twin 21 m long conduits to supply raw water to the pump well in the raw water pumping station. The pump



well I have two compartments that can be isolated for cleaning, using lightweight manually operated topology. The inlet to each compartment will have an inclined trash screen with access for raking. The inlets will be at a level low enough to ensure the design flow is passed at low water level in the river. Each conduit will be sized to carry the design flow so that half the intake works can be shut down for cleaning while maintaining full flow. The intake chamber will be fully operational when submerged.

2.1 Incoming Power Supply

The power supply is designed to provide the most secure feasible supply based on the KSEB resources available locally. In consultation with KSEB, two sub stations have been identified that are capable of supplying power to the raw water pumping station, namely Punalur and Edamon Sub Stations. Punalur 110/66/11KV substation has 2 No. 12.5MVA 110/11KV transformers and 1 No. 25MVA 110/56KV transformer with 2 Nos 110 KV incoming lines. Edamon 220/110/66/11KV sub stations is a primary transmission substation, which has 2 No 100MVA 220/110KV transformers, 2 No.40MVA, 110/66KV transformers and 2 No. 4MVA 66/11KV transformers with 6 No 220KV incoming line.

2.2 Raw Water Pumps

Pumps will be of the vertical type, with water lubricated bearings. Each pump will be provided with an inlet bell mouth, column assembly, discharge head and vertical induction motor. The pump duty has been selected for phase 2 requirement The particulars of existing pump set are as follows

Type of pumps	Vertical Turbine pumps, water lubricated
Total rate of pumping	73 mld
No. of pumps to work in parallel	2
No. of standby pumps	2
Duty head of each pump at operating point	130m of water
Duty flow per pump	36.5mld
Maximum permissible speed	980 rpm
Rating of each motor	760kW



Maximum ambient temperature at site 35⁰ C

In addition to this cooling pump 10 Hp capacity is working to provide water for cooling the bearing of the raw water pump sets

3. Energy details of Intake pump House

Energy Audit was conducted by M/S Athul Energy Consultant's pvt Ltd based on the existing energy data available for 12 months. The basic energy details collected are as follows

BASIC ENERGY DETAILS

SI No.	Items	Sep -20 to Aug -21 - period
1	Name of the pumping Station:	JICA Intake PH, Punalur
2	KSEBL Consumer No:	LCN 17/5433
3	Tariff category:	HT I (A) INDUSTRIAL
4	KSEBL Section Office:	Punalur
5	Pumping Capacity (MLD)	73
6	Source of water (River/Dam, etc)	Kallada River
7	Connected Load (kW)	2966.68
8	Contract Demand (kVA)	1591
9	Average Recorded Maximum Demand (kVA)	1560
10	Total Transformer capacity (kVA)	5320
11	Average Power Factor	0.95
12	Annual electricity consumption (kWh)	1,03,44,100.00
13	Specific Energy Consumption (kWh/ m ³)	0.53
14	Specific Pumping Volume (litres/kWh)	1883.24
15	Water Source (River/Dam, etc)	Kallada River
16	Number of vehicles - 4 Wheeler (Own)	Not applicable
17	Number of vehicles - 4 Wheeler (Contract)	Not available
18	Number of vehicles (2 Wheeler)	Not available
19	Total Diesel/ Petrol consumption of the vehicles	Not applicable
20	Number of electric vehicles (if any)	Not available
21	Renewable Energy (Solar PV - kWp)	No Renewable energy system
22	Renewable Energy (Bio gas plant - Cub. M)	Not available



23	Present status of the RE system (Working or Not) if any	Not installed
24	Own Diesel Generator (kVA)	No Diesel Generator
25	Annual Diesel Consumption (Lts)	Not applicable





2. ENERGY CONSERVATION MEASURES

The following table shows the energy conservation measures that are applicable in the plant.

TABLE 5: ENERGY CONSERVATION MEASURES

Sl. no	Energy conservation measures	Annual Energy Savings	Annual Financial Savings	Investment	Simple payback period (SPP)
		kWh	Rs	Rs	Months
Low-capital saving (SPP: 0 - 12 months)					
1	Power Factor improvement from 0.96 to 0.98 - installation of 260 kVAR parallel capacitor to intake pump - by replacing existing 225 kVAR inline. Also install parallel capacitor against motors and transformer		713,743	391,000	7
2	Reduction of maximum demand by PF improvement		151,676	Nil	Immediate
Sub total			865,419	391,000	5
Medium capital savings (SPP: 12 -36 months)					
3	Arresting the overflow from the OH cooling tank - by providing 19mm MS direct pipelines for cooling the intake pumps		57,192	100,000	21
Net total			922,611	491,000	06
Renewable energy integration - 25 kWp ON grid solar power plant		48,672	279,864	1,125,000	4 Years



4. Present Proposal

In the final report of Energy Audit team low capital energy saving measures and medium capital energy saving measures were suggested

Low capital saving measures

- 1) Power Factor improvement from 0.96 to 0.98 – installation of 260 KVAR parallel capacitor to intake pump – by replacing existing 225 kVAR inline. Also install parallel capacitor against motors- Based on the suggestion estimate for replacing the existing 225 KVAR capacitor with 260 KVAR capacitor and replacing the 5 KVAR capacitors (10 nos) installed in two panels was prepared and the estimate cost for the item comes to Rs.1,79,003/

Medium Capital saving measures

- 1) Arresting the overflow from the OH cooling tank - by providing 19mm MS direct pipelines for cooling the intake pumps- As per the suggestion estimate for providing a separate pipe line from pumping main to the existing cooling system and replacing the damaged PVC tank was prepared and the amount comes to Rs. 1,4,5,272/-



General Abstract

JICA Assisted KWSS to Meenad and adjoining villages- Detailed Energy Audit -
intake Pump House - Measures for low- capital and medium-capital savings

(Dsor year: 2018)

SI No	Heading Description	Amount
1	Supplying and Installing 260 KVAR, 3.3 KV, 3 PH, 50 Hz. Negative Medium Space;capacitor suitable for existing panel	179003.30
2	Providing direct line to the intake cooling system	145272.50
Total		324275.80
Centage @		0.0%
Centage Amount		0.00
Provision for GST payments (in %) @		18.0%
Amount reserved for GST payments		58369.64
Total & Centage		382645.44
Lumpsum for round off		54.56
GRAND TOTAL Rs		382700.00
Rounded Grand Total Rs 3,82,700		
Rupees Three Lakh Eighty Two Thousand Seven Hundred Only		

Kerala Water Authority
PRICE

AP
03/02/22
ASSISTANT ENGINEER
Head Works Section
panamkuttimala

Sundar
ASSISTANT EXECUTIVE ENGINEER
Kerala Water Authority
P.H. Sub Division Valakom

A
EXECUTIVE ENGINEER
P.H.Division
Kerala Water Authority
Kottarakkara



Detailed Estimate

**JICA Assisted KWSS to Meenad and adjoining villages- Detailed Energy Audit -
intake Pump House - Measures for low- capital and medium-capital savings**

(Dsr year: 2018)

SI No	Description	No	L	B	D	CF	Quantity	Remark
1 Supplying and Installing 260 KVAR, 3.3 KV, 3 PH, 50 Hz. Negative Medium Space;capacitor suitable for existing panel (Cost Index:38.14 %)								
1	od316709/2021_2022 Supplying 260 KVAR, 3.3 KV, 3 PH, 50 Hz. capacitor suitable for existing panel	4					4.000	
							Total Quantity	4.000 No
							Total Deducted Quantity	0.000 No
							Net Total Quantity	4.000 No
							Say 4.000 No @ Rs 40250.00 / No	Rs 161000.00
2	od357282/2021_2022 supplying and fixing cacitors of rating 5 KVAr to the existing panel	10					10.000	
							Total Quantity	10.000 No
							Total Deducted Quantity	0.000 No
							Net Total Quantity	10.000 No
							Say 10.000 No @ Rs 1800.33 / No	Rs 18003.30
SI No	Description	No	L	B	D	CF	Quantity	Remark
2 Providing direct line to the intake cooling system (Cost Index:38.14 %)								
1	od356713/2021_2022 providing 19 mm MS pipe from pumping main to the cooling system	1	120.000				120.000	
							Total Quantity	120.000 metre
							Total Deducted Quantity	0.000 metre
							Net Total Quantity	120.000 metre
							Say 120.000 metre @ Rs 1026.70 / metre	Rs 123204.00
2	od357279/2021_2022 Supplying conveying and fixing 1000 liter capacity PVC water tank (ISI mark)	2					2.000	

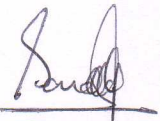


Total Quantity	2.000 No
Total Deducted Quantity	0.000 No
Net Total Quantity	2.000 No
Say 2.000 No @ Rs 11034.25 / No	Rs 22068.50
Total	324275.80
Centage @	0.0%
Centage Amount	0.00
Provision for GST payments (in %) @	18.0%
Amount reserved for GST payments	58369.64
Total & Centage	382645.44
Lumpsum for round off	54.56
GRAND TOTAL Rs	382700.00
Rounded Grand Total Rs 3,82,700	
Rupees Three Lakh Eighty Two Thousand Seven Hundred Only	

Kerala Water Authority

PRICE

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ENGINEER
ASSISTANT
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ASSISTANT EXECUTIVE ENGINEER
Kerala Water Authority
P.H. Sub Division Valakom


EXECUTIVE ENGINEER
P.H.Division
Kerala Water Authority
Kottarakkara



Supplying and Installing 260 KVAR, 3.3 KV, 3 PH, 50 Hz. Negative Medium Space;capacitor suitable for existing panel

1 Specification Code: od316709/2021_2022

od316709/2021_2022 :Supplying 260 KVAR, 3.3 KV, 3 PH, 50 Hz. capacitor suitable for existing panel

Code	Description	Unit	Quantity	Rate	Amount	Remarks
MR	Supplying 260 KVAR, 3.3 KV, 3 PH, 50 Hz. ​capacitor suitable for existing panel	No	1.00000	32500.00	32500.00	
MR	packing and courier charges	L.S	1.00000	500.00	500.00	
MR	Installation Charges	No	1.00000	2000.00	2000.00	
TOTAL					35000.00	
Add CPOH @ 15%					5250.00	
cost for one No					40250.00	
say					40250.00	

Cost index **38.14 %** .00

Total with Cost index 40250.0

Kerala Water Authority

2 Specification Code: od357282/2021_2022

od357282/2021_2022 :supplying and fixing cacitors of rating 5 KVAr to the existing panel

Code	Description	Unit	Quantity	Rate	Amount	Remarks
MR	cost of 5 KVAr capacitor	No	1.00000	1500.00	1500.00	
MR	Installation charge	L.S	1.00000	50.00	50.00	
TOTAL					1550.00	
Add Water Charges @ 1%					15.50	
Add CPOH @ 15%					234.82	
cost for one No					1800.33	
say					1800.33	

Cost index **38.14 %** .00



Total with Cost index	1800.33
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Providing direct line to the intake cooling system

3 Specification Code: od356713/2021_2022

od356713/2021_2022 :providing 19 mm MS pipe from pumping main to the cooling system

Code	Description	Unit	Quantity	Rate	Amount	Remarks
100.37.1	Rate as per item number 100.37.1 of SH: KWA Approved Data	cm	100.00000	2.30	230.00	
100.37.2	Rate as per item number 100.37.2 of SH: KWA Approved Data	cm	17.00000	1.65	28.05	
100.37.3	Rate as per item number 100.37.3 of SH: KWA Approved Data	cm	17.00000	8.80	149.60	
100.37.4	Rate as per item number 100.37.4 of SH: KWA Approved Data	kg	5.34000	10.15	54.20	
MR	Cost of MS sheet 8mm	kg	6.40000	45.00	288.00	
MR	Conveyance charge	L.S	1.00000	50.00	50.00	
TOTAL					799.85	
Add CPOH @ 15%					50.70	
cost for one metre					850.55	
say					850.55	

Cost index 38.14 %	176.15
Total with Cost index	1026.7

4 Specification Code: od357279/2021_2022

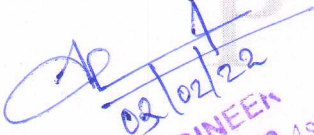
od357279/2021_2022 :Supplying conveying and fixing 1000 liter capacity PVC water tank (ISI mark)

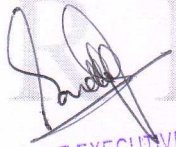
Code	Description	Unit	Quantity	Rate	Amount	Remarks
MR	PVC water tank 1000 litre with ISI mark	No	1.00000	7000.00	7000.00	

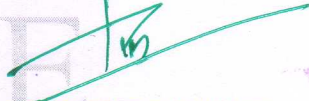


MR	Conveyance loading and unloading charge	No	1.00000	1000.00	1000.00	
MR	Providing connection and fixing ball valve including cost of specials labour charge etc	L.S	1.00000	1500.00	1500.00	
TOTAL					9500.00	
Add Water Charges @ 1%					95.00	
Add CPOH @ 15%					1439.25	
cost for one No					11034.25	
say					11034.25	
Cost index 38.14 %					.00	
Total with Cost index					11034.25	

Kerala Water Authority


 02/02/22
 ASSISTANT EXECUTIVE ENGINEER
 Section
 Kuttimala

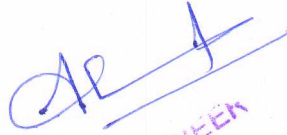

 ASSISTANT EXECUTIVE ENGINEER
 Kerala Water Authority
 P.H. Sub Division Valakom



 EXECUTIVE ENGINEER
 P.H. Division
 Kerala Water Authority
 Kottarakkara

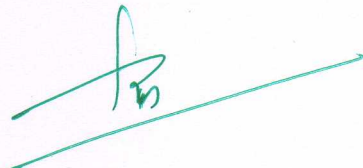


Conclusion

By implementing the project existing capacitors can be replaced and can improve the power factor PF to 0.98 Hence the pump house will generate sufficient cost savings through incentives at a rate of 0.05% of energy charges for every 0.01 increase PF from the base 0.95.


ASSISTANT ENGINEER
Head Works Section
panamkulam


ASSISTANT EXECUTIVE ENGINEER
Kerala Water Authority
P.H. Sub Division Valakom


EXECUTIVE ENGINEER
P.H.Division
Kerala Water Authority





KERALA WATER AUTHORITY

SEWAGE DIVISION, PATTOOR

THIRUVANANTHAPURAM

DETAILED PROJECT REPORT

**Name of work : TSS. Mace of 107 MLD Sewage Treatment Plant at
Muttathara, Thiruvananthapuram –Supply ,erection of suitable Current
Transformer (CT) & Potential transformer (PT) to reduce the Contract Demand
to 1100 KVA from 1250 KVA**

**FOR
ADMINISTRATIVE SANCTION
2021-22**

January 2022




Contents

1. Work at a Glance.
2. Scope of Work
3. Detailed Estimate
4. Observed Data.
5. Proposals from Auditor
6. Proposal from the authorised Contractor.



WORK AT A GLANCE

- 1.Name of the work : TSS. Mace of 107 MLD Sewage Treatment Plant at Muttathara, Thiruvananthapuram –Supply ,erection of suitable Current Transformer (CT) & Potential transformer (PT) to reduce the Contract Demand to 1100 KVA from 1250 KVA
- 2.Name of block/District/State: Thiruvananthapuram Corporation/Kerala
3. Estimate cost : Rs. 2,30,100.00
- 4.Name of Agency Executing : KWA (Sewerage Division, Thiruvananthapuram)
- 5.Name agency for O&M : KWA (Sewerage Division, Thiruvananthapuram)


ASSISTANT ENGINEER
107 MLD SEWAGE TREATMENT PLANT
KERALA WATER AUTHORITY, Thiruvananthapuram-26


ASSISTANT EXECUTIVE ENGINEER
Sewerage South Sub Division
Kerala Water Authority
Kuriyathy
Thiruvananthapuram 695 009


EXECUTIVE ENGINEER
* SEWERAGE DIVISION
KWA THIRUVANANTHAPURAM.



SCOPE OF WORK

Name of work : TSS. Mace of 107 MLD Sewage Treatment Plant at Muttathara , Thiruvananthapuram –Supply ,erection of suitable Current Transformer (CT) & Potential transformer (PT) to reduce the Contract Demand to 1100 KVA from 1250 KVA

Subject to the Power audit Conducted by Energy Management Centre Kerala, prosed to implement the following with STP for saving energy charges.

1. By improving the PF to near unity, the maximum demand will reduce on an estimated average of 20 kVA.
2. Thus the contract demand can reduce after the installation of demand controller in the plant to 1100kVA without much investment in the side of current transformer.

In the case of proposal no.1,the current O&M contractor liable to maintain the PF near to unity and we enjoying the benefit on maintaining PF with power charges.

In the case of proposal no.2, Presently the CT provided with the Metering system is suitable for 1250 KVA (ratio 70/5).To reduce the contract to 1100 KVA demand the CT/PT are to be replaced with suitable ratio. The existing system of metering were inspected by an authorised Electrical contractor and Proposed suitable metering unit with new cubical according to the norms of KSEBL norms in force. The proposals received from the auditor and the contractors are enclosed for the perusal of officials.

~~ASSISTANT ENGINEER
107 MLD SEWAGE TREATMENT PLANT
KERALA WATER AUTHORITY, Thiruvananthapuram-26~~

Eg. A
ASSISTANT EXECUTIVE ENGINEER
Sewerage South Sub Division
Kerala Water Authority
Kudiyattin
Thiruvananthapuram-26

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EXECUTIVE ENGINEER
SEWERAGE DIVISION
KWA THIRUVANANTHAPURAM



Detailed Estimate

TSS. Maintenance to 107 MLD Sewage treatment plant at Muttathara, Thiruvananthapuram. Supply, Installation, Testing and Commissioning of a new 11kV HT Metering Cubicle outdoor type as per KSEBL standards for reducing cotract demand from 1250 KVA to 1100KVA.

(Dsr year: 2018)

Sl No	Description	No	L	B	D	CF	Quantity	Remark
1TSS. Maintenance to 107 MLD Sewage treatment plant at Muttathara, Thiruvananthapuram. Supply, Installation, Testing and Commissioning of a new 11kV HT Metering Cubicle outdoor type as per KSEBL standards (Cost Index:35.59 %)								
1	od356089/2021_2022 Supply installation and commissioning of a new 11kV HT Metering Cubicle outdoor type as per KSEBL standards to reduce contract demand to be reduced from 1250 kVA to 1100 kVA.							
	supply instalation and commissioning of 11kV HT Metering Cubicle outdoor type as per KSEBL	1	1.000				1.000	
							Total Quantity	1.000 No
							Total Deducted Quantity	0.000 No
							Net Total Quantity	1.000 No
							Say 1.000 No @ Rs 195000.00 / No	Rs 195000.00
							Total	195000.00
							Centage @	0.0%
							Centage Amount	0.00
							Provision for GST payments (in %) @	18.0%
							Amount reserved for GST payments	35100.00
							Total & Centage	230100.00
							Lumpsum for round off	0.00
							GRAND TOTAL Rs	230100.00
							Rounded Grand Total Rs	2,30,100
								Rupees Two Lakh Thirty Thousand One Hundred Only

ASSISTANT ENGINEER
107 MLD SEWAGE TREATMENT PLANT
KERALA WATER AUTHORITY, Thiruvananthapuram-26

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ASSISTANT EXECUTIVE ENGINEER
Sewerage South Sub Division
Kerala Water Authority
Kerala
Thiruvananthapuram

EXECUTIVE ENGINEER
SEWERAGE DIVISION
KWA THIRUVANANTHAPURAM



TSS. Maintenance to 107 MLD Sewage treatment plant at Muttathara, Thiruvananthapuram.
Supply, Installation, Testing and Commissioning of a new 11kV HT Metering Cubicle outdoor type as per KSEBL standards

1 Specification Code: od356089/2021_2022

od356089/2021_2022 :Supply installation and commissioning of a new 11kV HT Metering Cubicle outdoor type as per KSEBL standards to reduce contract demand to be reduced from 1250 kVA to 1100 kVA.

Code	Description	Unit	Quantity	Rate	Amount	Remarks
MR	Supply, Installation, Testing and Commissioning of a new 11kV HT Metering Cubicle outdoor type as per KSEBL standards with following components: (A) 11kV HT Metering CTs of Ratio: -/5A, Accuracy class: 0.2S and Burden: 10VA - 3 Nos. (B) 11kV HT Metering PT of ratio: 11kV/110V, Accuracy class: 0.2 and Burden: 25VA - 1 No. (C) HT TOD Meter of latest KSEBL standards (3phase 4wire HT TOD meter, DLMS compatible, Make: L&T, Accuracy Class: 0.2S, PT Ratio: 11kV/110V, Voltage: 3x63.5V, CT Current -/5A) - 1 No. (D) All related accessories and as per the KSEBL & the Electrical Inspectorate standards, complete in all respects. Also, the rate for this work is inclusive of dismantling the existing HT Metering cubicle for arranging installation of the new one, including disconnection & reconnection of HT Cables, using the existing HT cable terminations and disconnection & reconnection of all earthing connections, complete in all respect	No	1.00000	175000.00	175000.00	Offer received from Electrical contractor
MR	Testing of above CTs, PT & TOD Meter at the TMR Division of KSEBL and obtaining test reports, doing all documentation works, including arranging execution of new HT Agreement with KSEBL for a reduced Contract Demand and suitable coordination & liasoning works with KSEB for executing the above job. Testing fee and other Govt fees to be remitted to	L.S	1.00000	20000.00	20000.00	Offer received from Electrical contractor



KSEBL / any other agency shall be remitted by KWA. New CT's ratio is required to be finalised in discussion with KSEBL based on the new Contract Demand as required by KWA (to be reduced from 1250 kVA to 1100 kVA).					
---	--	--	--	--	--

	TOTAL	195000.00
	cost for one No	195000.00
	say	195000.00

	Cost index	35.59 %	.00
	Total with Cost index		195000.0



ASSISTANT ENGINEER
 107 MLD SEWAGE TREATMENT PLANT
 KERALA WATER AUTHORITY, Thiruvananthapuram-26



ASSISTANT EXECUTIVE ENGINEER
 Sewerage South Sub Division
 Kerala Water Authority
 Kuriyathy
 Thiruvananthapuram 695 009



EXECUTIVE ENGINEER
 SEWERAGE DIVISION
 KWA THIRUVANANTHAPURAM

Kerala Water Authority
PRICE





ENERGY CONSERVATION MEASURES - DETAILED

ENERGY CONSERVATION MEASURE - 1

POWER FACTOR IMPROVEMENT IN ELECTRICAL SYSTEM

Background

1. By referring the last year bills, it is clear that the power factor is in the lagging condition at 0.93 to 0.98 range.
2. The reactive power compensation done main panel areas at the transformer secondary side with automatic controls.
3. The present reactive power requirement that measured during the period of 24-hour logging at the main incomer was -105.43 kVAr minimum to 172.67 kVAr maximum with an average value of 45.31 kVAr.
4. At present one of the transformer in the plant run at full load condition and another was kept as stand by.

Proposal

1. By improving the PF to near unity, the plant will generate sufficient cost savings through incentives at a rate of 0.05% of energy charges for every 0.01 increase PF from the base 0.95.
2. Rectify the damaged capacitors in the APFC panel of TR-2 & TR-3 will improve the PF.
3. Revamp the TR-1 APFC panel and keep it in manual mode while the bus coupler in ON condition. This will increase the overall PF in the system.
4. The total required capacitor values for the PF improvement 225 kVAr comprising the damaged or degraded capacitors in the TR-2 & 3 APFC panel.
5. PF meter shall place in the main substation and at the operator's room for continuous monitoring and recording.

Calculation

TABLE 36: ECM-01

Particulars	Units	Values
Present PF – average of past 12 months		0.96
Proposed PF		0.99
Present average energy consumption/month	kWh	2,94,942
Present average energy charge/month	Rs	16,95,914
Incentives for improving the PF/month	Rs	25,439
Annual incentive	Rs	3,05,264
Investment cost for estimated value of 225 kVAr for APFC panel	Rs	2,15,000
Payback period	Months	8



Dear Sir,

This has reference to your requirement of HT Electrical works at M/s KWA, Sewerage Treatment Plant at Muttathara, Thiruvananthapuram.

As per our joint site inspection conducted today on 01.02.2022, please note as under:

1) KWA is planning to reduce the Contract demand of KSEBL from 1250 kVA to 1100 kVA.

2) Hence, the following works have to be done as per the latest KSEBL norms:

(a) The existing 2 Nos 11kV HT Metering CTs of Ratio: 70/5A, Accuracy class: 0.5S and Burden: 10VA have to be replaced with new 3 Nos 11kV HT Metering CTs of Ratio: * /5A, Accuracy class: 0.2S and Burden: 10VA.

(b) The existing 1 No 11kV HT Metering PT of ratio: 11kV/110V, Accuracy class: 0.5 and Burden: 25VA has to be replaced with new 1 No HT Metering PT of ratio: 11kV/110V, Accuracy class: 0.2 and Burden: 25VA.

(c) The existing 1 No HT TOD Meter of 0.5S Accuracy class has to be replaced with new 1 No HT TOD Meter of 0.2S Accuracy class with specifications 3phase 4 wire HT TOD meter, DLMS compatible, Make: L&T, Accuracy Class: 0.2S, PT Ratio: 11kV/110V, Voltage: 3x63.5V, CT Current * /5A.

3) So, the existing HT Metering cubicle (total enclosure) is also required to be replaced with a new one [in view of the additional space required for accommodating the additional one number HT Metering CT required as mentioned in the above Sl No. 2(a)].

*Note: The new CTs ratio will be finalised in discussion with TMR Division of KSEBL based on the new Contract Demand of 1100 kVA as required by KWA.

Further, please find attached our most competitive offer for the SITC of a new HT Metering Cubicle for your kind perusal.

Preferred make: M/s Intrans / M/s Unipower / M/s Triotech / Any approved make of KWA.

Also, we are attaching herewith our Company Profile letter for your kind reference.

With the best interest to associate with you, we look forward to your invitation to further discuss your project requirements. In return, Power Control Solutions assures appreciation to your invitation by being systematic in all aspects of Project Engineering, Project Monitoring and most of all scheduling Timely Project Completion.

We look forward to a bright future and await your valuable response in reply.

For any clarification, kindly feel free to contact us.

Warm regards,

Rishikesh Nath S S
Director - Technical
POWER CONTROL SOLUTIONS,
1st Floor, Bethany Building, Nalanchira,
Nalanchira P O, Thiruvananthapuram,
Kerala 695015
Phone: 9072 645 145, 9400 400 314
<http://www.powercontrolsolutions.in/>
GSTIN: 32BTVPP8532P22N



**Quote for SITC of New HT Metering cubicle at KWA Muttathara Sewerage Plant,
Thiruvananthapuram**

SI No	Specification	Unit	Qty	Rate	Amount
1	<p>Supply, Installation, Testing and Commissioning of a new 11kV HT Metering Cubicle outdoor type as per KSEBL standards with following components:</p> <p>(A) 11kV HT Metering CTs of Ratio: --/5A, Accuracy class: 0.2S and Burden: 10VA - 3 Nos.</p> <p>(B) 11kV HT Metering PT of ratio: 11kV/110V, Accuracy class: 0.2 and Burden: 25VA - 1 No.</p> <p>(C) HT TOD Meter of latest KSEBL standards (3phase 4 wire HT TOD meter, DLMS compatible, Make: L&T, Accuracy Class: 0.2S, PT Ratio: 11kV/110V, Voltage: 3x63.5V, CT Current --/5A) - 1 No.</p> <p>(D) All related accessories and as per the KSEBL & the Electrical Inspectorate standards, complete in all respects.</p> <p>Also, the rate for this work is inclusive of dismantling the existing HT Metering cubicle for arranging installation of the new one, including disconnection & reconnection of HT Cables, using the existing HT cable terminations and disconnection & reconnection of all earthing connections, complete in all respects.</p>	Job	1	1,75,000	1,75,000
2	<p>Testing of above CTs, PT & TOD Meter at the TMR Division of KSEBL and obtaining test reports, doing all documentation works, including arranging execution of new HT Agreement with KSEBL for a reduced Contract Demand and suitable coordination & liasoning works with KSEB for executing the above job. Testing fee and all other Govt fees to be remitted to KSEBL / any other agency shall be remitted by KWA. New CT's ratio is required to be finalised in discussion with KSEBL based on the new Contract Demand as required by KWA (to be reduced from 1250 kVA to 1100 kVA).</p>	Job	1	20,000	20,000
				Total	1,95,000
				GST @ 18%	35,100
				Grand Total	2,30,100


ASSISTANT EXECUTIVE ENGINEER
 Sewerage South Sub Division
 Kerala Water Authority
 Kuriyathy
 Thiruvananthapuram 695 009


EXECUTIVE ENGINEER
 SEWERAGE DIVISION
 KWA THIRUVANANTHAPURAM





DETAILED ENERGY AUDIT At KWA

CWSS to MALA & ADJOINING AND ADJOINING PANCHAYATHS (26.1 MLD WTP)

DETAILED ENGINEERING REPORT

JANUARY – 2022



DETAILED ENGINEERING REPORT

The comprehensive WS scheme to Mala and adjoining Panchayaths provides drinking water to Mala, Poyya, Vellangallur, Puthenchira, Annamanada, Kuzhur Gramapanchayaths (JALANIDHI) and for Kodungallur WSS. It is located on the south western boundary of Thrissur district at 37 km southwest of Thrissur town. Source of the scheme is Chalakudy River at Vynthala. The installed capacity of WTP is 26.1 MLD Treatment capacity. Motor pumpset details of 26.1 MLD WTP are depicted in the following tabulation.

Rawwater pumphouse(at a time 2no.s working)	Clearwater pumphouse(at a time 2no.s working)
75 HP VT ----- 2 no.s	150HP CF --- 3 no.s 170 HP CF --- 1 no. for CWSS to Mala and adj. Panchayaths
45 HP VT ----- 2 no.s	180HP CF--- 1 no. 200HP CF --- 1 no. for KMWSS(Kodungallur Municipality)

Currently, 750KVA (2 no.s) transformer and electrical system substation installed at WTP. The basic energy details are given below,

KSEBL consumer no	LCN 18/1041
Tarif f category	HT I(A) INDUSTRIAL
KSEBL Section Office	Annamanada
Supply Voltage	11kV
Connected load(kW)	789.5
Contract demand(kVA)	1056
Average recorded max. demand(kVA)	502.16
Total Transformer Capacity(kVA)	1940
Average Power Factor	0.95
Average Consumption / month	299633



The Energy Audit Wing recommended the following energy conservation measures to be applied at WTP,

1. Power Factor Improvement in Electrical System - 0.95 To 0.99 by investing for 50kVAr inline capacitor across motors and transformer

We prepared an estimate for improving the PF to unity by installing parallel capacitor(50kVAr) for the transformer .The estimate amount is Rs. **84745/-** . By improving PF to near unity electricity consumption will reduce with the reduction in the load loss of transformer.

2. Downward revision of Contract Demand To 750 kVA from 1560 kVA by investing towards CT at the 11 KV incomer side

At present , Contract demand (kVA) is 1056 and recommended to reduce the contract demand to 750 kVA after consultation with KSEBL. Hence prepared an estimate to provide CT at the 11kV incomer side and estimate amount comes to Rs. **3,17,349/-**

3. Reducing the Idle Running of Transformer -1

This Proposal is to the Transformer – 1 shall be run in idle condition/in charged condition in alternate days during monsoon and during the summer season, the transformer can switch off the primary voltage for a weekly. and estimate amount comes to Rs. **2,00,324/-**

4. Optimization Of Clear Water Sump Suction Head by installing a U-tube bend in the overflow line of 7Lakh KL tank

Prepared estimate to install a U-tube bend(500mm) in the overflow line of 7Lac KL tank and utilizing the advantage of raising water level in the Clear water pump suction side for energy reduction. An additional advantage is utilizing the full storage capacity of new tank and thus increase of buffer storage of clear water. The estimate amount comes to Rs. **61100/-**

5. Replacement of Existing Back Wash Motor of 7.5 kW with IE-3 Energy Efficient Motor of same rating

As per the recommendation , prepared an estimate to replace old motors with IE-3 or IE-4 energy efficient motors of same rating(10 hp). The estimate amount comes to Rs. **1,09,917/-**




6. Replacement Of Existing two numbers of Raw Water Motors of 55kW and 33kW with IE3 Energy Efficient Motors of same rating.

As per the recommendation , prepared an estimate to replace old motors with IE-3 or IE4 – energy efficient motors of same rating 75hp (55kw) & 45hp (33kw). The estimate amount comes to Rs. 27,91281/-


7. Replacement Of Existing three numbers of Clear Water Motors of rating 132kW, 110kW with IE-3 Energy Efficient Motors of same rating

As per the recommendation , prepared an estimate to replace clear water motors of rating 132kW, 110kW with IE3 Energy efficient motor of same rating 150hp (110kw) & 180hp (132kw). The estimate amount comes to Rs. 90,00,663/-


Asst. Exe. Engineer
Assistant Executive Engineer
Kerala Water Authority
P.H. Sub Division, Mala
P.O. Ashtamichira


Asst. Engineer

അസിസ്റ്റന്റ് എഞ്ചിനീയറർ
കേരള ജല അതോറിറ്റി
പി എച്ച് സെക്ഷൻ, മാള
പി ഒ അഷ്ടമിചിറ


EXECUTIVE ENGINEER
Kerala Water Authority
P.H. DIVISION
IRINJALAKUDA



ABSTRACT ESTIMATE	
Power Factor Improvement in Electrical System - 0.95 To 0.99 by investing for 50kVAR inline capacitor across motors and transformer	84745.00
Downward revision of Contract Demand To 750 kVA from 1560 kVA by investing towards CT at the 11 KV incomer side	317349.00
Reducing the Idle Running of Transformer -1	200324.00
Optimization Of Clear Water Sump Suction Head by installing a U-tube bend in the overflow line of 7Lakh kL tank	61100.00
Replacement of Existing Back Wash Motor of 7.5 kW with IE-3 Energy Efficient Motor of same rating	109917.00
Replacement Of Existing two numbers of Raw Water Motors of 55kW and 33kW with IE3 Energy Efficient Motors of same rating.	2791281.00
Replacement Of Existing three numbers of Clear Water Motors of rating 132kW, 110kW with IE-3 Energy Efficient Motors of same rating	9000663.00
Grand Total	12565379.00

(Rupees One Crore Twenty Five Lakhs Sixty Five Thousand Three Hundred and Seventy Nine only)

Asst. Exe. Engineer

Assistant Executive Engineer
Kerala Water Authority
P.H. Sub Division, Mala
P.O. Ashtamichira

Asst. Engineer

അസിസ്റ്റന്റ് എഞ്ചിനീയർ
കേരള ജല അതോറിറ്റി
പി എച്ച് സെക്ഷൻ, മാള
പി ഒ അഷ്ടമിച്ചിറ

EXECUTIVE ENGINEER
Kerala Water Authority
P.H. DIVISION
IRINJALAKUDA



Detailed Estimate

Name of work: Mace of CWSS to Mala and adjoining panchayaths - 26.1 MLD WTP at Vynthala - Energy Auditing - Power Factor Improvement in Electrical System - 0.95 To 0.99 by investing for 50KVAR inline capacitor across motors and transformer.

(Dsor year: 2018)

Sl.No	Description	No	L	B	D	CF	Quantity	Remark
1Working Charges (Cost Index:35.59 %)								
1	od357211/2021_2022 Supplying & fitting of new power factor improvement in electrical system investing for 50KVAR inline capacitor across motors and transformer.							
		1					1.000	
							Total Quantity	1.000 No
							Total Deducted Quantity	0.000 No
							Net Total Quantity	1.000 No
							Say 1.000 No @ Rs 48875.00 / No	Rs 48875.00
2	od357212/2021_2022 Supplying & fitting of new M.S. Fabricated capacitor fitting bracket suitable for the above capacitor. 							
		1					1.000	
							Total Quantity	1.000 No
							Total Deducted Quantity	0.000 No
							Net Total Quantity	1.000 No
							Say 1.000 No @ Rs 8280.00 / No	Rs 8280.00
3	od357213/2021_2022 Supplying & laying of 50SQ.MM copper cable with copper sockets							
		15					15.000	
							Total Quantity	15.000 metre
							Total Deducted Quantity	0.000 metre
							Net Total Quantity	15.000 metre
							Say 15.000 metre @ Rs 977.50 / metre	Rs 14662.50
							Total	71817.50
							Centage @	0.0%
							Centage Amount	0.00

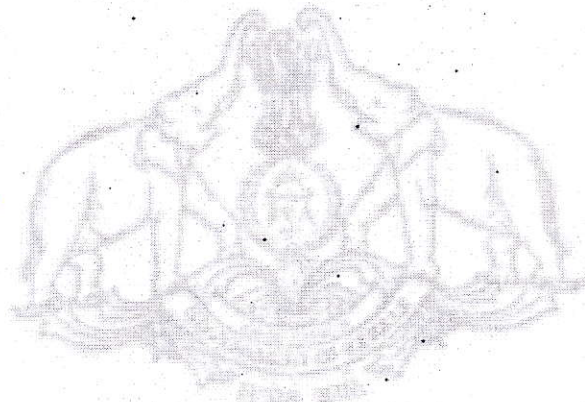


PRICE

EST NO:2022/4201

Provision for GST payments (in %) @	18.0%
Amount reserved for GST payments	12927.15
Total & Centage	84744.65
Lumpsum for round off	0.00
GRAND TOTAL Rs	84744.65
Rounded Grand Total Rs 84,745	
Rupees Eighty Four Thousand Seven Hundred and Forty Five Only	

[Signature]
Assistant Executive Engineer
Kerala Water Authority
P.H. Sub Division, Mala
P.O. Ashtamichira



[Signature]
അസിസ്റ്റന്റ് എഞ്ചിനീയർ
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പി ഒ അഷ്ടമിചിര

Kerala Water Authority

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[Signature]
EXECUTIVE ENGINEER
Kerala Water Authority
P.H. DIVISION
IRINJALAKUDA



Working Charges

1 Specification Code: od357211/2021_2022

od357211/2021_2022 :Supplying & fitting of new power factor improvement in electrical system investing for 50KVAR inline capacitor across motors and transformer.

Code	Description	Unit	Quantity	Rate	Amount	Remarks
MR	Supplying & fitting of new power factor improvement in electrical system investing for 50KVAR inline capacitor across motors and transformer.	No	1.00000	42500.00	42500.00	
TOTAL					42500.00	
Add CPOH @ 15%					6375.00	
cost for one No					48875.00	
say					48875.00	

Cost index 35.59 %	.00
Total with Cost index	48875.0

2 Specification Code: od357212/2021_2022 General Water Authority

od357212/2021_2022 :Supplying & fitting of new M.S. Fabricated capacitor fitting bracket suitable for the above capacitor.

Code	Description	Unit	Quantity	Rate	Amount	Remarks
MR	Supplying & fitting of new M.S. Fabricated capacitor fitting bracket suitable for the above capacitor. 	No	1.00000	7200.00	7200.00	
TOTAL					7200.00	
Add CPOH @ 15%					1080.00	
cost for one No					8280.00	
say					8280.00	

Cost index 35.59 %	.00
Total with Cost index	8280.0



3. Specification Code: od357213/2021_2022

od357213/2021_2022 :Supplying & laying of 50SQ.MM copper cable with copper sockets

Code	Description	Unit	Quantity	Rate	Amount	Remarks
MR	Supplying & laying of 50SQ.MM copper cable with copper sockets	No	1.00000	850.00	850.00	
TOTAL					850.00	
Add CPOH @ 15%					127.50	
cost for one metre					977.50	
say					977.50	
Cost index 35.59 %					.00	
Total with Cost index					977.5	

Kerala Water Authority
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പി ഒ അഷ്ടമിചിറ

Assistant Executive Engineer
Kerala Water Authority
P.H. Sub Division, Mala
P O. Ashtamichira

EXECUTIVE ENGINEER
Kerala Water Authority
P.H. DIVISION
IRINJALAKUDA



PRICE

Detailed Estimate

Name of work: Mace of CWSS to Mala and adjoining panchayaths - 26.1 MLD WTP at Vynthala - Energy Auditing - Downward revision of Contract Demand To 750 kVA from 1560 kVA by investing towards CT at the 11 KV incomer side.

(Dsr year: 2018)

SI No	Description	No	L	B	D	CF	Quantity	Remark
1 Working Charges (Cost Index:35.59 %)								
1	od358422/2021_2022 HT side- Supply ,installation ,testing and commissioning Charges for CT,PT from TMR Division and erecting the same.(Including transport, Labour charges & other charges except statutory charges) 	1					1.000	
							Total Quantity	1.000 No
							Total Deducted Quantity	0.000 No
							Net Total Quantity	1.000 No
							Say 1.000 No @ Rs 110000.00 / No	Rs 110000.00
2	od358442/2021_2022 MV SIDE Panel Board Fabrication APFC panel Design fabrication, installation, erection, testing and commissioning of the following cubicle type fully compartmentalized dust tight, vermine proof L.T Switch Boards fabricated out of 16 swg thickness CRCA sheet for panel powder coated as per standards and having appropriate rating busbar & earth bus and of approved shade. The busbar should be of suitably of rated TPN aluminium having the specified normal and short circuit capacities and should be insulated with heat shrinkable colour coded PVC sleeves and supported by DMC/SMC pillar/finger type busbar supports. The switch boards should be fabricated as per the standards of State Electrical inspectorate ,KSEB etc. the fabrication should be completed with earth bus of adequate capacity and double earthed to all switches. internal rigid connection etc. It also complete with hinged doors ,name plates,heavy duty rubber gaskets,removable gland plates.	1					1.000	
							Total Quantity	1.000 No
							Total Deducted Quantity	0.000 No
							Net Total Quantity	1.000 No
							Say 1.000 No @ Rs 83500.00 / No	Rs 83500.00
3	od358467/2021_2022 Cable laying Supply and Laying of aluminum conductor XLPE armored power cables for working voltage upto 1100V 3.5 x 70 sq.mm 	1					1.000	
							Total Quantity	1.000 metre



PRICE


EST NO:2022/4390

							Total Deducted Quantity	0.000 metre
							Net Total Quantity	1.000 metre
							Say 1.000 metre @ Rs 6800.00 / metre	Rs 6800.00
4	od358469/2021_2022	Cable End Termination Supply and fixing cable glands for the cables mentioned above and giving termination, gland earthing etc. complete 3.5 x 70 sq.mm						
		1						1.000
							Total Quantity	1.000 No
							Total Deducted Quantity	0.000 No
							Net Total Quantity	1.000 No
							Say 1.000 No @ Rs 1290.00 / No	Rs 1290.00
5	od358482/2021_2022	Supply, laying and give termination to the following Cu strips for effective earthing of the system 25 x 3mm Cu strip						
		1						1.000
							Total Quantity	1.000 metre
							Total Deducted Quantity	0.000 metre
							Net Total Quantity	1.000 metre
							Say 1.000 metre @ Rs 7350.00 / metre	Rs 7350.00
6	od358478/2021_2022	Preperation, submission of drawings to Electrical Inspectorate and obtaining approval for asbuilt drawing, arranging inspection for entire installation including TFR, obtaining sanction orders for the electrical installation, complete. (Including all incidental and excluding statutory charges) 						
		1						1.000
							Total Quantity	1.000 L.S
							Total Deducted Quantity	0.000 L.S
							Net Total Quantity	1.000 L.S
							Say 1.000 L.S @ Rs 40000.00 / L.S	Rs 40000.00
7	od358470/2021_2022	Preparation, submission and execution of completion report for obtaining demand reduction and tessting report from KSEB. (Excluding all statutory charges). 						
		1						1.000
							Total Quantity	1.000 L.S
							Total Deducted Quantity	0.000 L.S
							Net Total Quantity	1.000 L.S
							Say 1.000 L.S @ Rs 20000.00 / L.S	Rs 20000.00

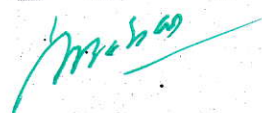



PRICE

Total	268940.00
Centage @	0.0%
Centage Amount	0.00
Provision for GST payments (in %) @	18.0%
Amount reserved for GST payments	48409.20
Total & Centage	317349.20
Lumpsum for round off	0.00
GRAND TOTAL Rs	317349.20
Rounded Grand Total Rs 3,17,349	
Rupees Three Lakh Seventeen Thousand Three Hundred and Forty Nine Only	


 Assistant Executive Engineer
 Kerala Water Authority
 P.H. Sub Division, Mala
 P.O. Ashtamichira

Kerala Water Authority
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 EXECUTIVE ENGINEER
 Kerala Water Authority
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 IRINJALAKUDA


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 പി.ഒ. അഷ്ടമിചിറ



Working Charges

1 Specification Code: od358422/2021_2022

od358422/2021_2022 :HT side- Supply ,installation ,testing and commissioning Charges for CT,PT from TMR Division and erecting the same.(Including transport, Labour charges & other charges except statutory charges)

Code	Description	Unit	Quantity	Rate	Amount	Remarks
MR	Supply ,installation ,testing and commissioning Charges for CT,PT from TMR Division and erecting the same.(Including transport, Labour charges & other charges except statutory charges) 	Nos	1.00000	110000.00	110000.00	
TOTAL					110000.00	
cost for one No					110000.00	
say					110000.00	

Cost index	35.59 %	.00
Total with Cost index		110000.0

2 Specification Code: od358442/2021_2022

od358442/2021_2022 :MV SIDE
Panel Board Fabrication
APFC panel
Design fabrication, installation, erection, testing and commissioning of the following cubicle type fully compartmentalized dust tight, vermine proof L.T Switch Boards fabricated out of 16 swg thickness CRCA sheet for panel powder coated as per standards and having appropriate rating busbar & earth bus and of approved shade. The busbar should be of suitably of rated TPN aluminium having the specified normal and short circuit capacities and should be insulated with heat shrinkable colour coded PVC sleeves and supported by DMC/SMC pillar/finger type busbar supports. The switch boards should be fabricated as per the standards of State Electrical inspectorate ,KSEB etc. the fabrication should be completed with earth bus of adequate capacity and double earthed to all switches. internal rigid connection etc. It also complete with hinged doors ,name plates,heavy duty rubber gaskets,removable gland plates.

Code	Description	Unit	Quantity	Rate	Amount	Remarks
MR	50 Kvar APFC Panel:-Fabrication, erection, testing and commissioning of 100A LT panel board with the following:Incomers :-100A Isolator DMFM with 100/5A CT -3nos and RYB indicator setout going :50kvar panel with capacitor duty contactors and mcbs & rela	Nos	1.00000	83500.00	83500.00	
TOTAL					83500.00	



PRICE

EST NO:2022/4390

cost for one No	83500.00
say	83500.00

Cost index 35.59 %	.00
Total with Cost index	83500.0

3 Specification Code: od358467/2021_2022

od358467/2021_2022 :Cable laying
Supply and Laying of aluminum conductor XLPE armored power cables for working voltage upto 1100V
3.5 x 70 sq.mm

Code	Description	Unit	Quantity	Rate	Amount	Remarks
MR	Cable laying Supply and Laying of aluminum conductor XLPE armored power cables for working voltage upto 1100V 3.5 x 70 sq.mm 	metre	10.00000	680.00	6800.00	
TOTAL					6800.00	
cost for one metre					6800.00	
say					6800.00	

Cost index 35.59 %	.00
Total with Cost index	6800.0

4 Specification Code: od358469/2021_2022

od358469/2021_2022 :Cable End Termination Supply and fixing cable glands for the cables mentioned above and giving termination, gland earthing etc. complete 3.5 x 70 sq.mm

Code	Description	Unit	Quantity	Rate	Amount	Remarks
MR	Supply and fixing cable glands for the cables mentioned above and giving termination, gland earthing etc. complete 3.5 x 70	Nos	2.00000	645.00	1290.00	



TOTAL	1290.00
cost for one No	1290.00
say	1290.00

Cost index 35.59 %	.00
Total with Cost index	1290.0

5 Specification Code: od358482/2021_2022

od358482/2021_2022 :Supply, laying and give termination to the following Cu strips for effective earthing of the system
25 x 3mm Cu strip

Code	Description	Unit	Quantity	Rate	Amount	Remarks
MR	Supply, laying and give termination to the following Cu strips for effective earthing of the system 25 x 3mm Cu strip	metre	10.00000	735.00	7350.00	
TOTAL					7350.00	
cost for one metre					7350.00	
say					7350.00	

Cost index 35.59 %	.00
Total with Cost index	7350.0

6 Specification Code: od358478/2021_2022

od358478/2021_2022 :Preperation, submission of drawings to Electrical Inspectorate and obtaining approval for asbuilt drawing, arranging inspection for entire installation including TFR, obtaining sanction orders for the electrical installation, complete. (Including all incidental and excluding statutory charges)

Code	Description	Unit	Quantity	Rate	Amount	Remarks
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MR	Preperation, submission of drawings to Electrical Inspectorate and obtaining approval for asbuilt drawing, arranging inspection for entire installation including TFR, obtaining sanction orders for the electrical installation, complete. (Including all incidental and excluding statutory charges) 	L.S	1.00000	40000.00	40000.00	
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TOTAL					40000.00
cost for one L.S					40000.00
say					40000.00

Cost index 35.59 %					.00
Total with Cost index					40000.0

7 Specification Code: od358470/2021_2022

od358470/2021_2022 :Preparation, submission and execution of completion report for obtaining demand reduction and tessting report from KSEB. (Excluding all statutory charges).

Code	Description	Unit	Quantity	Rate	Amount	Remarks
MR	Preparation, submission and execution of completion report for obtaining demand reduction and tessting report from KSEB. (Excluding all statutory charges). 	L.S	1.00000	20000.00	20000.00	
TOTAL					20000.00	
cost for one L.S					20000.00	
say					20000.00	

Cost index 35.59 %					.00
Total with Cost index					20000.0

Assistant Executive Engineer
Kerala Water Authority
P.H. Sub Division, Mala
P.O. Ashtamichira

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EXECUTIVE ENGINEER
Kerala Water Authority
P.H. Sub Division, Mala
IRINJALAKUDA



Detailed Estimate

Name of work : Mace of CWSS to Mala and adjoining panchayths - 26.1 MLD WTP
at Vynthala - Energy Auditing - Optimisation of idle running of Transformer - 1

(Dsr year: 2018)

SI No.	Description	No	L	B	D	CF	Quantity	Remark
1 Working charges (Cost Index:35.59 %)								
1	od358338/2021_2022 Safety Items -Supply and providing the following safety items (Rubber mat required nos,11KV Hand Gloves 2.set,11KV Danger board ,Fire bucket with clamp, Fire Aid Box with medicine , Shock treatment chart, Fire Extinguisher (6kg) ..etc... approved by Kerala Electrical Inspectorate and relevant standards.	1					1.000	
							Total Quantity	1.000 set
							Total Deducted Quantity	0.000 set
							Net Total Quantity	1.000 set
							Say 1.000-set @ Rs 156929.00 / set	Rs 156929.00
2	od359318/2021_2022 Conveying, refilling & testing the existing fire extinguisher to placing in position as per the direction of departmental officers	1					1.000	
							Total Quantity	1.000 No
							Total Deducted Quantity	0.000 No
							Net Total Quantity	1.000 No
							Say 1.000 No @ Rs 1150.00 / No	Rs 1150.00
3	od358375/2021_2022 Charges for link off AB Switch at LT and HT Side after Earthing properly, checking and testing the system, transformer, electrical installations etc by meggar testing, reading etc complete and convincing the defect of oil shortage in transformer to the departmental officers concerned including all labour	1					1.000	
							Total Quantity	1.000 No
							Total Deducted Quantity	0.000 No
							Net Total Quantity	1.000 No
							Say 1.000 No @ Rs 3450.00 / No	Rs 3450.00
4	od358376/2021_2022 Check the OLTC operations, Ratio test, Insulation value, and other pre-commissioning tests and charge							



	the transformer.							
		1					1.000	
							Total Quantity	1.000 No
							Total Deducted Quantity	0.000 No
							Net Total Quantity	1.000 No
							Say 1.000 No @ Rs 5597.05 / No	Rs 5597.05
5	od358377/2021_2022 Clean the transformer tank, radiators, conservator, connection pipes etc with hot oil thoroughly to remove all dirt and moisture content.							
		1					1.000	
							Total Quantity	1.000 No
							Total Deducted Quantity	0.000 No
							Net Total Quantity	1.000 No
							Say 1.000 No @ Rs 2640.40 / No	Rs 2640.40
							Total	169766.45
							Centage @	0.0%
							Centage Amount	0.00
							Provision for GST payments (in %) @	18.0%
							Amount reserved for GST payments	30557.96
							Total & Centage	200324.41
							Lumpsum for round off	0.00
							GRAND TOTAL Rs	200324.41
							Rounded Grand Total Rs 2,00,324	
							Rupees Two Lakh Three Hundred and Twenty Four Only	

Assistant Executive Engineer
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P.H. Sub Division, Mala
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EXECUTIVE ENGINEER
Kerala Water Authority
P.H. DIVISION
IRINJALAKUDA



Working charges

1 Specification Code: od358338/2021_2022

od358338/2021_2022 :Safety Items -Supply and providing the following safety items (Rubber mat required nos,11KV Hand Gloves 2 set,11KV Danger board ,Fire bucket with clamp, Fire Aid Box with medicine , Shock treatment chart, Fire Extinguisher (6kg) ..etc... approved by Kerala Electrical Inspectorate and relevant standards.

Code	Description	Unit	Quantity	Rate	Amount	Remarks	
MR	11KV Rubber mat size of 1800 x1900 x12mm	No	3.00000	4800.00	14400.00		
MR	11KV Hand Gloves	set	4.00000	400.00	1600.00		
MR	11KV Danger board	No	4.00000	800.00	3200.00		
MR	Fire bucket with clamp	set	4.00000	800.00	3200.00		
MR	Fire Aid Box with medicine	set	1.00000	2000.00	2000.00		
MR	Shock treatment chart	set	2.00000	750.00	1500.00		
MR	Fire Extinguisher (5kg)	set	2.00000	12000.00	24000.00		
MR	Self contained breathing apparatus (SCBA)	sqm	2.00000	42000.00	84000.00		
MR	hard hat (Safety Helmets),	No	3.00000	420.00	1260.00		
MR	Gumboot	set	2.00000	650.00	1300.00		
Kerala Water Authority					TOTAL	136460.00	
					Add CPOH @ 15%	20469.00	
					cost for one set	156929.00	
					say	156929.00	

Cost index	35.59 %	.00
Total with Cost index		156929.00

2 Specification Code: od359318/2021_2022

od359318/2021_2022 :Conveying, refilling & testing the existing fire extinguisher to placing in position as per the direction of departmental officers

Code	Description	Unit	Quantity	Rate	Amount	Remarks
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PRICE

EST NO:2022/4393

MR	Conveying, refilling & testing the existing fire extinguisher to placing in position as per the direction of departmental officers	No	1.00000	1000.00	1000.00	
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TOTAL					1000.00
Add CPOH @ 15%					150.00
cost for one No					1150.00
say					1150.00

Cost index 35.59 %					.00
Total with Cost index					1150.0

3 Specification Code: od358375/2021_2022

od358375/2021_2022 :Charges for link off AB Switch at LT and HT Side after Earthing properly, checking and testing the system, transformer, electrical installations etc by meggar testing, reading etc complete and convincing the defect of oil shortage in transformer to the departmental officers concerned including all labour

Code	Description	Unit	Quantity	Rate	Amount	Remarks
MR	Charges for link off AB Switch at LT and HT Side after Earthing properly, checking and testing the system, transformer, electrical installations etc by meggar testing, reading etc complete and convincing the defect of oil shortage in transformer to the departmental officers concerned including all labour	No	1.00000	3000.00	3000.00	
TOTAL					3000.00	
: Add CPOH @ 15%					450.00	
cost for one No					3450.00	
say					3450.00	

Cost index 35.59 %					.00
Total with Cost index					3450.0

4 Specification Code: od358376/2021_2022

od358376/2021_2022 :Check the OLTC operations, Ratio test, Insulation value, and other pre-commissioning tests and charge the transformer.

Code	Description	Unit	Quantity	Rate	Amount	Remarks
MR	Check the OLTC operations, Ratio test, Insulation value, and other pre-commissioning tests and charge the transformer.	No	1.00000	4867.00	4867.00	
TOTAL					4867.00	
Add CPOH @ 15%					730.05	
cost for one No					5597.05	
say					5597.05	

Cost index	35.59 %	.00
Total with Cost index		5597.05

5 Specification Code: od358377/2021_2022

Kerala Water Authority

od358377/2021_2022 :Clean the transformer tank, radiators, conservator, connection pipes etc with hot oil thoroughly to remove all dirt and moisture content.

Code	Description	Unit	Quantity	Rate	Amount	Remarks
MR	Clean the transformer tank, radiators, conservator, connection pipes etc with hot oil thoroughly to remove all dirt and moisture content.	No	1.00000	2296.00	2296.00	
TOTAL					2296.00	
Add CPOH @ 15%					344.40	
cost for one No					2640.40	
say					2640.40	

Cost index	35.59 %	.00
Total with Cost index		2640.4

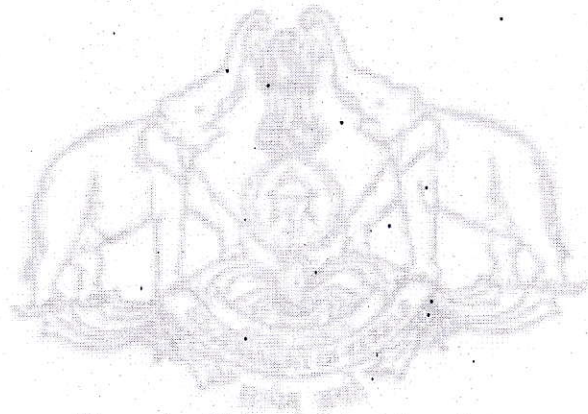
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EXECUTIVE ENGINEER
Kerala Water Authority
P.H. DIVISION
IRINJALAKUDA

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Assistant Executive Engineer
Kerala Water Authority
P.H. Sub Division, Mala
P.O. Ashtamichira





Kerala Water Authority

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Detailed Estimate

ENERGY AUDIT-- Optimization Of Clear Water Sump SuctionHead by installing a U-tube bend in the overflow line of 7Lakh kl tank

(Dsr year: 2018)

SI No	Description	No	L	B	D	CF	Quantity	Remark
1working charges (Cost Index:35.59 %)								
1	od357379/2021_2022 Supplying,fabricating and fixing MS U-tube bend(500mm) in the overflow line of 7lakh kl tank including priming, painting, all cost of materials ,concrete cutting ,lighting, bailing out water and all hire and labour charges , conveyance of tools and equipments as per the direction of Dept. Officers etc. complete.	1					1.000	
							Total Quantity	1.000 No
							Total Deducted Quantity	0.000 No
							Net Total Quantity	1.000 No
							Say 1.000 No @ Rs 51736.45 / No	Rs 51736.45
							Total	51736.45
							Centage @	0.0%
							Centage Amount	0.00
							Provision for GST payments (in %) @	18.0%
							Amount reserved for GST payments	9312.56
							Total & Centage	61049.01
							Lumpsum for round off	50.99
							GRAND TOTAL Rs	61100.00
							Rounded Grand Total Rs	61,100
Rupees Sixty One Thousand One Hundred Only								

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Kerala Water Authority
P.H. Sub Division, Mala
P. O. Ashtamuchira

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കേരള ജല അതോറിറ്റി
പി എച്ച് സെക്ഷൻ, മാള
പി ഒ അഷ്ടമുച്ചിര

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P.H. DIVISION
IRINJALAKUDA



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EST NO:2022/4224

working charges

1 Specification Code: od357379/2021_2022

od357379/2021_2022 :Supplying,fabricating and fixing MS U-tube bend(500mm) in the overflow line of 7lakh kl tank including priming, painting, all cost of materials ,concrete cutting ,lighting, bailing out water and all hire and labour charges , conveyance of tools and equipments as per the direction of Dept. Officers etc. complete.

Code	Description	Unit	Quantity	Rate	Amount	Remarks
MR	MS U-tube bend(500mm)	Day	1.00000	40000.00	40000.00	
MR	Welder	No	1.00000	673.00	673.00	
MR704	Man Mazdoor	Day	2.00000	600.00	1200.00	bialing out water and for valve control
9999	Sundries	L.S	350.00000	2.00	700.00	conveyance of pipes and tools
0131	Painter	Day	1.00000	679.00	679.00	
MR	Paint	Litre	2.00000	400.00	800.00	
TOTAL					44052.00	
Add Water Charges @ 1%					428.52	
Add CPOH @ 15%					6492.08	
cost for one No					51166.40	
say					51166.40	

Cost index 35.59 %	570.05
Total with Cost index	51736.45

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 P O Ashtam...

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 പി ഒ അഷ്ടമ...

Detailed Estimate

Name of work : Mace of CWSS to Mala and adjoining Panchayaths - Energy Auditing - Replacement of Existing Back Wash Motor of 7.5kw (10HP) with IE-3 Energy Efficient Motor for 26.1 MLD WTP at Vynthala -

(Dsr year: 2018)

Sl No	Description	No	L	B	D	CF	Quantity	Remark
1 Working Charges (Cost Index:35.59 %)								
1	od357218/2021_2022 Replacement of back wash motor such as supplying & fitting of new 7.5KW (10HP) with IE-3 Energy Efficient motor with starter and electrical with pipe accessories of same rating.							
		1					1.000	
							Total Quantity	1.000 No
							Total Deducted Quantity	0.000 No
							Net Total Quantity	1.000 No
							Say 1.000 No @-Rs 93150.00 / No	Rs 93150.00
							Total	93150.00
							Kerala Water Authority Centage @	0.0%
							Centage Amount	0.00
							Provision for GST payments (in %) @	18.0%
							Amount reserved for GST payments	16767.00
							Total & Centage	109917.00
							Lumpsum for round off	0.00
							GRAND TOTAL Rs	109917.00
							Rounded Grand Total Rs	1,09,917
Rupees One Lakh Nine Thousand Nine Hundred and Seventeen Only								

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 P O. Ashtamichira

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 IRINJALAKUDA



PRICE

EST NO:2022/4204

Working Charges


1 Specification Code: od357218/2021_2022


od357218/2021_2022 :Replacement of back wash motor such as supplying & fitting of new 7.5KW (10HP) with IE-3 Energy Efficient motor with starter and electrical with pipe accessories of same rating.


Code	Description	Unit	Quantity	Rate	Amount	Remarks
MR	Replacement of back wash motor such as supplying & fitting of new 7.5KW (10HP) with IE-3 Energy-Efficient motor with starter and electrical with pipe accessories of same rating.	No	1.00000	81000.00	81000.00	
TOTAL					81000.00	
Add CPOH @ 15%					12150.00	
cost for one No					93150.00	
say					93150.00	
Cost index 35.59 %					.00	
Total with Cost index					93150.0	

Kerala Water Authority

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 Assistant Executive Engineer
 Kerala Water Authority
 P.H. Sub Division, Mala
 P.O. Ashtamichira


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 EXECUTIVE ENGINEER
 Kerala Water Authority
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Detailed Estimate

Name of work: Mace of CWSS to Mala and adjoining panchayaths - 26.1 MLD WTP at Vynthala - Energy Auditing - Replacement of existing 75 HP (55kw) and 45 HP (33kw) VT Motor pump set at Raw water pump house. with IE3 Energy Efficient Motors of same rating.

(Dsr year: 2018)

SI No	Description	No	L	B	D	CF	Quantity	Remark
1Working Charges (Cost Index:35.59 %)								
1	od357306/2021_2022 Replacement of existing 75 HP (55kw) VT Motor pump set at Raw water pump house. With IE3 Energy Efficient Motors of same rating. Supply, Erection, Testing & Commissioning of Raw Water Vertical Turbine Motor Pumpset of 75 HP (55kw) VT Raw water pump sets- 1 no (195lps and 18.50 m head) 1 no standby	1	75.000				75.000	
							Total Quantity	75.000 Hp
							Total Deducted Quantity	0.000 Hp
							Net Total Quantity	75.000 Hp
							Say 75.000 Hp @ Rs 18773.75 / Hp	Rs 1408031.25
2	od357345/2021_2022 For additional warranty of 1 year @ 5% 75HP (55kw) VT pumpset	1					1.000	
							Total Quantity	1.000 No
							Total Deducted Quantity	0.000 No
							Net Total Quantity	1.000 No
							Say 1.000 No @ Rs 70401.56 / No	Rs 70401.56
3	od357308/2021_2022 Replacement of existing 45 HP (33kw) VT Motor pump set at Raw water pump house. With IE3 Energy Efficient Motors of same rating. Supply, Erection, Testing & Commissioning of Raw Water Vertical Turbine Motor Pumpset of 45 HP (33kw) VT Raw water pump sets- 1 no (129lps and 18.50 m head) 1 no standby	1	45.000				45.000	
							Total Quantity	45.000 Hp
							Total Deducted Quantity	0.000 Hp
							Net Total Quantity	45.000 Hp



PRICE

EST NO:2022/4200

		Say 45.000 Hp @ Rs 18773.75 / Hp					Rs 844818.75
4	od357346/2021_2022 For additional warranty of 1 year @ 5% 45HP (33kw) VT pumpset.						
		1				1.000	
	Total Quantity					1.000 No	
	Total Deducted Quantity					0.000 No	
	Net Total Quantity					1.000 No	
	Say 1.000 No @ Rs 42240.94 / No					Rs 42240.94	
Total					2365492.50		
Centage @					0.0%		
Centage Amount					0.00		
Provision for GST payments (in %) @					18.0%		
Amount reserved for GST payments					425788.65		
Total & Centage					2791281.15		
Lumpsum for round off					0.00		
GRAND TOTAL Rs					2791281.15		
					Rounded Grand Total Rs 27,91,281		
. Rupees Twenty Seven Lakh Ninety One Thousand Two Hundred and Eighty One Only							

PRICE

Omman
Assistant Executive Engineer
 Kerala Water Authority
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 P.O. Ashtamichira

Omman
 അസിസ്റ്റന്റ് എഞ്ചിനീയറുടെ
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 IRINJALAKUR



PRICE

EST NO:2022/4200

Working Charges

1 Specification Code: od357306/2021_2022

od357306/2021_2022 :Replacement of existing 75 HP (55kw) VT Motor pump set at Raw water pump house. With IE3 Energy Efficient Motors of same rating. Supply, Erection, Testing & Commissioning of Raw Water Vertical Turbine Motor Pumpset of 75 HP (55kw) VT Raw water pump sets- 1 no (195lps and 18.50 m head) 1 no standby

Code	Description	Unit	Quantity	Rate	Amount	Remarks
MR	Supply, Erection, Testing & Commissioning of Raw Water Vertical Turbine Motor Pumpset of 75 HP (55kw) VT Raw water pump sets- 1 no (195lps and 18.50 m head) 1 no standby	Hp	1.00000	16325.00	16325.00	
TOTAL					16325.00	
Add CPOH @ 15%					2448.75	
cost for one Hp					18773.75	
say					18773.75	
Cost index 35.59 %					.00	
Total with Cost index					18773.75	

Kerala Water Authority

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2 Specification Code: od357345/2021_2022

od357345/2021_2022 :For additional warranty of 1 year @ 5% 75HP (55kw) VT pumpset

Code	Description	Unit	Quantity	Rate	Amount	Remarks
MR	For additional warranty of 1 year @ 5% 75HP (55kw) VT pumpset (1408031.25*0.05)	No	1.00000	70401.56	70401.56	
TOTAL					70401.56	
cost for one No					70401.56	
say					70401.56	
Cost index 35.59 %					.00	
Total with Cost index					70401.56	



3 Specification Code: od357308/2021_2022

od357308/2021_2022 :Replacement of existing 45 HP (33kw) VT Motor pump set at Raw water pump house. With IE3 Energy Efficient Motors of same rating. Supply, Erection, Testing & Commissioning of Raw Water Vertical Turbine Motor Pumpset of 45 HP (33kw) VT Raw water pump sets- 1 no (129lps and 18.50 m head) 1 no standby

Code	Description	Unit	Quantity	Rate	Amount	Remarks
MR	Supply, Erection, Testing & Commissioning of Raw Water Vertical Turbine Motor Pumpset of 45 HP (33kw) VT Raw water pump sets- 1 no (129lps and 18.50 m head) 1 no standb	Hp	1.00000	16325.00	16325.00	
TOTAL					16325.00	
Add CPOH @ 15%					2448.75	
cost for one Hp					18773.75	
say					18773.75	

Cost index	35.59 %	.00
Total with Cost index		18773.75

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4 Specification Code: od357346/2021_2022


od357346/2021_2022 :For additional warranty of 1 year @ 5% 45HP (33kw) VT pumpset.

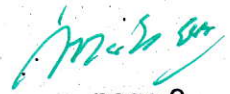
Code	Description	Unit	Quantity	Rate	Amount	Remarks
MR	For additional warranty of 1 year @ 5% 45HP (33kw) VT pumpset (844818.75*0.05)	No	1.00000	42240.94	42240.94	
TOTAL					42240.94	
cost for one No					42240.94	
say					42240.94	

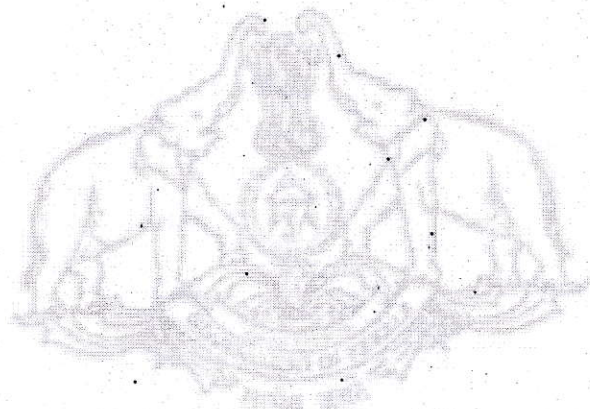
Cost index	35.59 %	.00
Total with Cost index		42240.94




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 page 2
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 IRINJALAKUDA



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Detailed Estimate

Name of work: Mace of CWSS to Mala and adjoining panchayaths and KMWSS to Kodungallur Municipality - 26.1MLD WTP at Vynthala Energy Auditing - Replacement of existing 150 HP (110kw) and 180 HP (132kw) Centrifugal Motor pump set at clear water pump house. with IE3 Energy efficient motors of same rating.


(Dsr year: 2018)


Sl No	Description	No	L	B	D	CF	Quantity	Remark
1 Design, Supply , erection and commissioning of Clear water motor pumpset at Vynthala. (Cost Index:35.59 %)								
1	od356376/2021_2022 Replacement of existing 150 HP (110kw) Centrifugal Motor pump set at clear water pump house. With IE-3 Energy Efficient Motors of same rating. Design, supply, erection and commissioning of 150 HP Centrifugal Motor pump set including all accessories with discharge of 109.95lps and 70m head at Clear Water Pump House 2Nos 1 as standby	1	150.000				150.000	
							Total Quantity	150.000 Hp
							Total Deducted Quantity	0.000 Hp
							Net Total Quantity	150.000 Hp
							Say 150.000 Hp @ Rs 22080.00 / Hp	Rs 3312000.00
2	od357341/2021_2022 150 HP (110kw) Centrifugal Motor pump set - For additional warranty of 1 year @ 5%	1					1.000	
							Total Quantity	1.000 No
							Total Deducted Quantity	0.000 No
							Net Total Quantity	1.000 No
							Say 1.000 No @ Rs 165600.00 / No	Rs 165600.00
3	od357296/2021_2022 Replacement of existing 180 HP (132kw) Centrifugal Motor pump set at clear water pump house. With IE-3 Energy Efficient Motors of same rating. Design, supply, erection and commissioning of 180 HP Centrifugal Motor pump set including all accessories with discharge of 92lps and 100m head at Clear Water Pump House 2Nos 1 as standby	1	180.000				180.000	
							Total Quantity	180.000 Hp
							Total Deducted Quantity	0.000 Hp



						Net Total Quantity	180.000 Hp
						Say 180.000 Hp @ Rs 21958.10 / Hp	Rs 3952458.00
4	od357338/2021_2022 180 HP (132kw) Centrifugal Motor pump set - For additional warranty of 1 year @ 5%						
		1					1.000
	Total Quantity						1.000 No
	Total Deducted Quantity						0.000 No
	Net Total Quantity						1.000 No
	Say 1.000 No @ Rs 197622.90 / No						Rs 197622.90
	Total						7627680.90
	Centage @						0.0%
	Centage Amount						0.00
	Provision for GST payments (in %) @						18.0%
	Amount reserved for GST payments						1372982.56
	Total & Centage						9000663.46
	Lumpsum for round off						0.00
	GRAND TOTAL Rs						9000663.46
Kerala Water Authority							Rounded Grand Total Rs 90,00,663
Rupees Ninety Lakh Six Hundred and Sixty Three Only							

PRICE


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EXECUTIVE ENGINEER
 Kerala Water Authority
 P.H. DIVISION
 IRINJALAKUDA



Design, Supply, erection and commissioning of Clear water motor pumpset at Vynthala

1 Specification Code: od356376/2021_2022

od356376/2021_2022 :Replacement of existing 150 HP (110kw) Centrifugal Motor pump set at clear water pump house. With IE-3 Energy Efficient Motors of same rating. Design, supply, erection and commissioning of 150 HP Centrifugal Motor pump set including all accessories with discharge of 109.95lps and 70m head at Clear Water Pump House 2Nos 1 as standby

Code	Description	Unit	Quantity	Rate	Amount	Remarks
MR	Design, supply, erection and commissioning of 150 HP Centrifugal Motor pump set including all accessories with discharge of 109.95lps and 70m head at Clear Water Pump House 2Nos 1 as standby	Hp	1.00000	19200.00	19200.00	
TOTAL					19200.00	
Add CPOH @ 15%					2880.00	
cost for one Hp					22080.00	
say					22080.00	

Cost index	35.59 %	.00
Total with Cost index		22080.0

2 Specification Code: od357341/2021_2022

od357341/2021_2022 :150 HP (110kw) Centrifugal Motor pump set - For additional warranty of 1 year @ 5%

Code	Description	Unit	Quantity	Rate	Amount	Remarks
MR	150 HP (110kw) Centrifugal Motor pump set - For additional warranty of 1 year @ 5% (3312000*.05)	No	1.00000	165600.00	165600.00	
TOTAL					165600.00	
cost for one No					165600.00	
say					165600.00	

Cost index	35.59 %	.00
Total with Cost index		165600.0



3 Specification Code: od357296/2021_2022

od357296/2021_2022 :Replacement of existing 180 HP (132kw) Centrifugal Motor pump set at clear water pump house. With IE-3 Energy Efficient Motors of same rating. Design, supply, erection and commissioning of 180 HP Centrifugal Motor pump set including all accessories with discharge of 92lps and 100m head at Clear Water Pump House 2Nos 1 as standby

Code	Description	Unit	Quantity	Rate	Amount	Remarks
MR	Design, supply, erection and commissioning of 180 HP Centrifugal Motor pump set including all accessories with discharge of 92lps and 100m head at Clear Water Pump House 2Nos 1 as standby	Hp	1.00000	19094.00	19094.00	
TOTAL					19094.00	
Add CPOH @ 15%					2864.10	
cost for one Hp					21958.10	
say					21958.10.	

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Cost index - 35.59 %	.00
Total with Cost index	21958.1

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4 Specification Code: od357338/2021_2022

od357338/2021_2022 :180 HP (132kw) Centrifugal Motor pump set - For additional warranty of 1 year @ 5%

Code	Description	Unit	Quantity	Rate	Amount	Remarks
MR	180 HP (132kw) Centrifugal Motor pump set - For additional warranty of 1 year @ 5% (3952458*.05)	No	1.00000	197622.90	197622.90	
TOTAL					197622.90	
cost for one No					197622.90	
say					197622.90	



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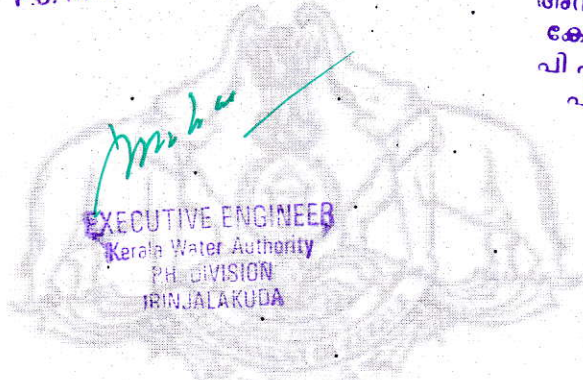
EST NO:2022/4145

Cost index	35.59 %	.00
Total with Cost index		197622.9

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KERALA WATER AUTHORITY



Mace of CWSS to Methala, Eriyad, Edavilangu and Kadukutty Panchayaths - Energy Auditing - Optimisation of idle running of Transformer -1 & Supplying personal protective gadgets to 15MLD WTP at Vynthala.

DETAILED ENGINEERING REPORT



DETAILED REPORT

The comprehensive WS scheme to Methala Eriyad Edaviilangu and Kadukutty pachayths provides drinking water to Methala Eriyad Edaviilangu and Kadukutty pachayths . It is located on the south western boundary of Thrissur district at 37 km southwest of Thrissur town. The total scheme area is 141 km². Source of the scheme is Chalakudy River at Vynthala. The installed capacity of WTP is 15 mld and utilized is 11 mld. treatment capacity. Motorpumpset details of 15 mld WTP are depicted in the following tabulation.

Rawwater pumphouse(at a time 2no.s working)	Clearwater pumphouse(at a time 2no.s working)
75 HP VT ----- 2 no.s	150HP CF --- 2 no.s

Currently, 400 KVA (2 no.s) transformer and electrical system substation installed at WTP. The basic energy details are given below,

KSEBL consumer no	LCN12/5909
Tarif f category	HT I(A) INDUSTRIAL
KSEBL Section Office	Annamanada
Supply Voltage	11kV
Connected load(kW)	5.5
Contract demand(kVA)	235
Average recorded max. demand(kVA)	183
Total Transformer Capacity(kVA)	800
Average Power Factor	0.97
Average Consumption / month	115858

The Energy Audit Wing recommended the following energy conservation measures to be applied at WTP,



1. Reducing the Idle Running of Transformer -1

Direction has given to the operators as transformer -1 shall run in idle condition/in charged condition in alternate days during monsoon and during the summer season, the transformer can be switched off the primary voltage for weekly.

An estimate is prepared for the arrangements of personal protective gadgets to the operators and also included the necessary work for optimization of idle run of transformer 1 amounting Rs.190000/-.

2. Power Factor Improvement in Electrical System - 0.97 To 0.99 by installation of additional 60kVAr capacitors across raw water pumps and transformer


We prepared an estimate for improving the PF to unity by installing parallel capacitor (60kVAr) for the transformer. The estimate amount is Rs.100000/- . By improving PF to near unity electricity consumption will reduce with the reduction in the load loss of transformer.


3. Replacement of Existing Raw Water Motors of 45kW with IE3 Energy Efficient Motors of same rating.

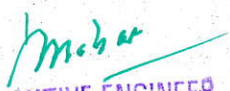
As per the recommendation, prepared an estimate to replace old motors with IE-3 or IE4 energy efficient motors of same rating 60HP. The estimate amount comes to Rs.1400000/-

4. Replacement of Existing Back Wash Motor of 5.5kW with IE-3 Energy Efficient Motor of same rating

As per the recommendation, prepared an estimate to replace old motors with IE-3 or IE4 energy efficient motors of same rating 7.5 Hp. The estimate amount comes to Rs.80000/-


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ABSTRACT ESTIMATE	
Optimisation of idle running of Transformer -1 & Supplying personal protective gadgets	190000.00
15MLD WTP at Vynthala- Supplying & fitting of new 60KVAR power factor improvement heavy duty capacitor	100000.00
Mace of CWSS to Methala, Eriyad, Edavilangu and Kadukutty Panchayaths - Energy Auditing -Replacement of Existing Back Wash Motor pump set with IE-3 Energy Efficient Motor of 5.5kW for 15 MLD WTP at Vynthala.	80000.00
Mace of CWSS to Methala, Eriyad, Edavilangu and Kadukutty Panchayaths - Energy Auditing - Replacement of Existing Raw water VT motor pump set with IE-3 Energy Efficient Motor of 45kW at 15 MLD WTP Vynthala	1400000.00
GRAND TOTAL	1770000.00

(Rupees Seventeen Lakhs Seventy Thousand only)


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 Kerala Water Authority
 P.H. DIVISION
 IRINJALAKUDA



General Abstract

Mace of CWSS to Methala, Eriyad, Edavilangu and Kadukutty Panchayaths -
Energy Auditing - Optimisation of idle running of Transformer -1 & Supplying
personal protective gadgets to 15MLD WTP at Vynthala.

(Dsr year: 2018)

SI No	Heading Description	Amount
1	Cost of Supply	159454.20
	Total	159454.20
	Centage @	0.0%
	Centage Amount	0.00
	Provision for GST payments (in %) @	18.0%
	Amount reserved for GST payments	28701.76
	Total & Centage	188155.96
	Lumpsum for round off	1844.04
	GRAND TOTAL Rs	190000.00
	Rounded Grand Total Rs 1,90,000	
	Rupees One Lakh Ninety Thousand Only	

Kerala Water Authority

PRICE

(Signature)
Assistant Executive Engineer
Kerala Water Authority
P.H. Sub Division, Mala
P O. Ashtamichira

(Signature)
Assistant Engineer
Kerala Water Authority
P.H. Section, Kodungallur
P.O. Pulloot - 680663

(Signature)
EXECUTIVE ENGINEER
Kerala Water Authority
P.H. DIVISION
TRINJALAKUDA



Detailed Estimate

Mace of CWSS to Methala, Eriyad, Edavilangu and Kadukutty Panchayaths -
Energy Auditing - Optimisation of idle running of Transformer -1 & Supplying
personal protective gadgets to 15MLD WTP at Vynthala.

(Dsr year: 2018)

Sl No	Description	No	L	B	D	CF	Quantity	Remark
1 Cost of Supply (Cost Index:35.59 %)								
1	od358687/2021_2022 Supply and providing the following safety items, such as self contained breathing apparatus (SCBA) 2 set , Rubber mat 3mm thick 3sqm, HT Hand Gloves 2 set, 11KV Danger board 4 nos, Fire bucket with clamp 4nos, Fire Aid Box with medicine, Shock treatment chart 2 nos, Fire Extinguisher (5kg) 2nos, hard hat (Safety Helmets) 3 nos, gumboot 2 set. etc... approved by Kerala Electrical Inspectorate and relevant standards.	1					1.000	
							Total Quantity	1.000 set
							Total Deducted Quantity	0.000 set
							Net Total Quantity	1.000 set
							Say 1.000 set @ Rs 145326.88 / set	Rs 145326.88
2	od358494/2021_2022 Conveying, refilling & testing the existing fire extinguisher to placing in position as per the direction of departmental officers. 	2					2.000	
							Total Quantity	2.000 No
							Total Deducted Quantity	0.000 No
							Net Total Quantity	2.000 No
							Say 2.000 No @ Rs 1161.50 / No	Rs 2323.00
3	od358688/2021_2022 Clean the transformer tank, radiators, conservator, connection pipes etc with hot oil thoroughly to remove all dirt and moisture content.	1					1.000	
							Total Quantity	1.000 No
							Total Deducted Quantity	0.000 No
							Net Total Quantity	1.000 No
							Say 1.000 No @ Rs 2666.80 / No	Rs 2666.80



4	od358689/2021_2022 Check the OLTC operations, Ratio test, Insulation value, and other pre-commissioning tests and charge the transformer.	1					1.000	
							Total Quantity	1.000 No
							Total Deducted Quantity	0.000 No
							Net Total Quantity	1.000 No
							Say 1.000 No @ Rs 5653.02 / No	Rs 5653.02
5	od358690/2021_2022 Charges for link off AB Switch at LT and HT Side after Earthing properly, checking and testing the system, transformer, electrical installations etc by megger testing, reading etc complete and convincing the defect of oil shortage in transformer to the departmental officers concerned including all labour	1					1.000	
							Total Quantity	1.000 No
							Total Deducted Quantity	0.000 No
							Net Total Quantity	1.000 No
							Say 1.000 No @ Rs 3484.50 / No	Rs 3484.50
							Total	159454.20
							Centage @	0.0%
							Centage Amount	0.00
							Provision for GST payments (in %) @	18.0%
							-Amount reserved for GST payments	28701.76
							Total & Centage	188155.96
							Lumpsum for round off	1844.04
							GRAND TOTAL Rs	190000.00
							Rounded Grand Total Rs	1,90,000
							Rupees One Lakh Ninety Thousand Only	

Ashtamichira
Assistant Executive Engineer
Kerala Water Authority
P.H. Sub Division, Mala
P.O. Ashtamichira

Mikhan
EXECUTIVE ENGINEER
Kerala Water Authority
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IRINJALAKUDA

n d h d
Assistant Engineer
Kerala Water Authority
P.H. Section, Kodungallur
P.O. Pulloot - 680663



Cost of Supply

1 Specification Code: od358687/2021_2022

od358687/2021_2022 :Supply and providing the following safety items, such as self contained breathing apparatus (SCBA) 2 set , Rubber mat 3mm thick 3sqm, HT Hand Gloves 2 set, 11KV Danger board 4 nos, Fire bucket with clamp 4nos, Fire Aid Box with medicine, Shock treatment chart 2 nos, Fire Extinguisher (5kg) 2nos, hard hat (Safety Helmets) 3 nos, gumboot 2 set..etc... approved by Kerala Electrical Inspectorate and relevant standards.

Code	Description	Unit	Quantity	Rate	Amount	Remarks	
MR	Self contained breathing apparatus (SCBA)	sqm	2.00000	42000.00	84000.00		
MR	Rubber mat 3mm thick	sqm	3.00000	960.00	2880.00		
MR	HT Hand Gloves	set	2.00000	890.00	1780.00		
MR	11KV Danger board	No	4.00000	800.00	3200.00		
MR	Fire bucket with clamp	No	4.00000	800.00	3200.00		
MR	Fire Aid Box with medicine	No	1.00000	2000.00	2000.00		
MR	Shock treatment chart	No	2.00000	750.00	1500.00		
MR	Fire Extinguisher (5kg)	No	2.00000	12000.00	24000.00		
MR	hard hat (Safety Helmets),	No	3.00000	420.00	1260.00		
MR	Gumboot	set	2.00000	650.00	1300.00		
Kerala Water Authority					TOTAL	125120.00	
					Add Water Charges @ 1%	1251.20	
					Add CPOH @ 15%	18955.68	
					cost for one set	145326.88	
					say	145326.88	

Cost index 35.59 % .00

Total with Cost index 145326.88

2 Specification Code: od358494/2021_2022

od358494/2021_2022 :Conveying, refilling & testing the existing fire extinguisher to placing in position as per the direction of departmental officers.

Code	Description	Unit	Quantity	Rate	Amount	Remarks
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MR	Conveying, refilling & testing the existing fire extinguisher to placing in position	No	1.00000	1000.00	1000.00	
----	--	----	---------	---------	---------	--

TOTAL					1000.00
Add Water Charges @ 1%					10.00
Add CPOH @ 15%					151.50
cost for one No					1161.50
say					1161.50

Cost index 35.59 %					.00
Total with Cost index					1161.5

3 Specification Code: od358688/2021_2022

od358688/2021_2022 :Clean the transformer tank, radiators, conservator, connection pipes etc with hot oil thoroughly to remove all dirt and moisture content.

Code	Description	Unit	Quantity	Rate	Amount	Remarks
MR	Clean the transformer tank, radiators, conservator, connection pipes etc with hot oil thoroughly to remove all dirt and moisture content.	No	1.00000	2296.00	2296.00	
TOTAL					2296.00	
Add Water Charges @ 1%					22.96	
Add CPOH @ 15%					347.84	
cost for one No					2666.80	
say					2666.80	

Cost index 35.59 %					.00
Total with Cost index					2666.8

4 Specification Code: od358689/2021_2022



od358689/2021_2022 :Check the OLTC operations, Ratio test, Insulation value, and other pre-commissioning tests and charge the transformer.

Code	Description	Unit	Quantity	Rate	Amount	Remarks
MR	Check the OLTC operations, Ratio test, Insulation value, and other pre-commissioning tests and charge the transformer.	No	1.00000	4867.00	4867.00	
TOTAL					4867.00	
Add Water Charges @ 1%					48.67	
Add CPOH @ 15%					737.35	
cost for one No					5653.02	
say					5653.02	
Cost index 35.59 %					.00	
Total with Cost index					5653.02	

5 Specification Code: od358690/2021_2022


Kerala Water Authority

od358690/2021_2022 :Charges for link off AB Switch at LT and HT Side after Earthing properly, checking and testing the system, transformer, electrical installations etc by megger testing, reading etc complete and convincing the defect of oil shortage in transformer to the departmental officers concerned including all labour

Code	Description	Unit	Quantity	Rate	Amount	Remarks
MR	Charges for link off AB Switch at LT and HT Side after Earthing properly, checking and testing the system, transformer, electrical installations etc by megger testing, reading etc complete and convincing the defect of oil shortage in transformer to the departmental officers concerned including all labour	No	1.00000	3000.00	3000.00	
TOTAL					3000.00	
Add Water Charges @ 1%					30.00	
Add CPOH @ 15%					454.50	
cost for one No					3484.50	
say					3484.50	



Cost index	35.59 %	.00
Total with Cost index		3484.5


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Assistant Engineer
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P.O. Pullool - 680663


EXECUTIVE ENGINEER
Kerala Water Authority
P.H. DIVISION
IRINJALAKUDA

Kerala Water Authority

PRICE



Rate Reasonability Certificate

Name of work Mace of CWSS to Methala, Eriyad, Edavilangu and Kadukutty Panchayaths - Energy Auditing - Optimisation of idle running of Transformer -1 & Supplying personal protective gadgets to 15MLD WTP at Vynthala. .

Observed/Arrived Data

1. OD1 Supply and providing the following safety items, such as self contained breathing apparatus (SCBA) 2 set , Rubber mat 3mm thick 3sqm, HT Hand Gloves 2 set, 11KV Danger board 4 nos, Fire bucket with clamp 4nos, Fire Aid Box with medicine, Shock treatment chart 2 nos, Fire Extinguisher (5kg) 2nos, hard hat (Safety Helmets) 3 nos, gumboot 2 set..etc... approved by Kerala Electrical Inspectorate and relevant standards. .
2. OD2 Conveying, refilling & testing the existing fire extinguisher to placing in position as per the direction of departmental officers.
 .
3. OD3 Clean the transformer tank, radiators, conservator, connection pipes etc with hot oil thoroughly to remove all dirt and moisture content. .
4. OD4 Check the OLTC operations, Ratio test, Insulation value, and other pre-commissioning tests and charge the transformer. .
5. OD5 Charges for link off AB Switch at LT and HT Side after Earthing properly, checking and testing the system, transformer, electrical installations etc by megger testing, reading etc complete and convincing the defect of oil shortage in transformer to the departmental officers concerned including all labour .

Certified that the Market rates other than approved market rates adopted in the above Arrived/Observed data are based on the prevailing local market rates and the quantity provisions for material and labour are the lowest requirement for the work observed from similar works.

It is also certified that above non standard items are prepared since there are no approved Observed data are available in PRICE database.

Assistant Engineer Assistant Executive Engineer Executive Engineer Superintending Engineer

Assistant Engineer
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P.H. Section, Kodungallur
P.O. Pulloot - 680663

Assistant Executive Engineer
Kerala Water Authority
P.H. Sub Division. Mala
P O Ashtamichira



PRICE

General Abstract


Mace of CWSS to Methala, Eriyad, Edavilangu and Kadukutty Panchayaths -
Energy Auditing - 15MLD WTP at Vynthala- Supplying & fitting of new 60KVAR
power factor improvememnt heavy duty capacitor. at 15MLD WTP Vynthala.

(Dsr year: 2018)

SI No	Heading Description	Amount
		74910.95
1	Working Charges	
	Total	74910.95
	Centage @	0.0%
	Centage Amount	0.00
	Provision for GST payments (in %) @	18.0%
	Amount reserved for GST payments	13483.97
	Total & Centage	88394.92
	Lumpsum for round off	11605.08
	GRAND TOTAL Rs	100000.00
		Rounded Grand Total Rs 1,00,000
		Rupees One Lakh Only

Kerala Water Authority

PRICE


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P.O. Ashtamichira


Assistant Engineer
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P.H. Section, Kodungallur
P.O. Pulloot - 680663


EXECUTIVE ENGINEER
Kerala Water Authority
P.H. DIVISION
IRINJALAKUDA



Detailed Estimate

Mace of CWSS to Methala, Eriyad, Edavilangu and Kadukutty Panchayaths -
Energy Auditing - 15MLD WTP at Vynthala- Supplying & fitting of new 60KVAR
power factor improvememnt heavy duty capacitor. at 15MLD WTP Vynthala.

(Dsor year: 2018)

SI No	Description	No	L	B	D	CF	Quantity	Remark	
1Working Charges (Cost Index:35.59 %)									
1	od358352/2021_2022 Supplying & fitting of new power factor improvement in electical system investing for heavy duty 60KVAR inline capacitor across Raw water pumps and transformer.								
		1					1.000		
		Total Quantity						1.000 No	
		Total Deducted Quantity						0.000 No	
		Net Total Quantity						1.000 No	
		Say 1.000 No @ Rs 51510.20 / No						Rs 51510.20	
2	od358353/2021_2022 Supplying & laying of 50SQ.MM copper cable with copper sockets								
		1	15.000				15.000		
		Total Quantity						15.000 metre	
		Total Deducted Quantity						0.000 metre	
		Net Total Quantity						15.000 metre	
		Say 15.000 metre @ Rs 858.35 / metre						Rs 12875.25	
3	od358354/2021_2022 Supplying & fitting of new spreader suitable for the MCCB								
		2					2.000		
		Total Quantity						2.000 No	
		Total Deducted Quantity						0.000 No	
		Net Total Quantity						2.000 No	
		Say 2.000 No @ Rs 1273.00 / No						Rs 2546.00	
4	od358355/2021_2022 Supplying & fitting of new 63Amps approved make MCCB								
		2					2.000		
		Total Quantity						2.000 No	



Total Deducted Quantity	0.000 No
Net Total Quantity	2.000 No
Say 2.000 No @ Rs 3989.75 / No	Rs 7979.50
Total	74910.95
Centage @	0.0%
Centage Amount	0.00
Provision for GST payments (in %) @	18.0%
Amount reserved for GST payments	13483.97
Total & Centage	88394.92
Lumpsum for round off	11605.08
GRAND TOTAL Rs	100000.00
Rounded Grand Total Rs 1,00,000	
Rupees One Lakh Only	

09/11/2022
 Assistant Executive Engineer
 Kerala Water Authority
 P.H. Sub Division, Malappuram
 P.O. Ashtamichira

Kerala Water Authority

PRICE

h oth
 Assistant Engineer
 Kerala Water Authority
 P.H. Section, Kodungallur
 P.O. Pulloot - 680663

M. K. M.
 EXECUTIVE ENGINEER
 Kerala Water Authority
 P.H. DIVISION
 IRINJALAKUDA



Working Charges

1 Specification Code: od358352/2021_2022

od358352/2021_2022 :Supplying & fitting of new power factor improvement in electrical system investing for heavy duty 60KVAR inline capacitor across Raw water pumps and transformer.

Code	Description	Unit	Quantity	Rate	Amount	Remarks
MR	Supplying & fitting of new power factor improvement in electrical system investing for heavy duty 60KVAR inline capacitor across Raw water pumps and transformer.	No	1.00000	44348.00	44348.00	
TOTAL					44348.00	
Add Water Charges @ 1%					443.48	
Add CPOH @ 15%					6718.72	
cost for one No					51510.20	
say					51510.20	
Cost index 35.59 %					.00	
Total with Cost index					51510.2	

Kerala Water Authority

2 Specification Code: od358353/2021_2022

PRICE

od358353/2021_2022 :Supplying & laying of 50SQ.MM copper cable with copper sockets

Code	Description	Unit	Quantity	Rate	Amount	Remarks
MR	Supplying & laying of 50SQ.MM copper cable with copper sockets	metre	1.00000	739.00	739.00	
TOTAL					739.00	
Add Water Charges @ 1%					7.39	
Add CPOH @ 15%					111.96	
cost for one metre					858.35	
say					858.35	
Cost index 35.59 %					.00	
Total with Cost index					858.35	



3 Specification Code: od358354/2021_2022

od358354/2021_2022 :Supplying & fitting of new spreader suitable for the MCCB

Code	Description	Unit	Quantity	Rate	Amount	Remarks
MR	Supplying & fitting of new spreader suitable for the MCCB	No	1.00000	1096.00	1096.00	
TOTAL					1096.00	
Add Water Charges @ 1%					10.96	
Add CPOH @ 15%					166.04	
cost for one No					1273.00	
say					1273.00	

Cost index	35.59 %	.00
Total with Cost index		1273.0

Kerala Water Authority

4 Specification Code: od358355/2021_2022

PRICE

od358355/2021_2022 :Supplying & fitting of new 63Amps approved make MCCB

Code	Description	Unit	Quantity	Rate	Amount	Remarks
MR	Supplying & fitting of new 63Amps approved make MCCB	No	1.00000	3435.00	3435.00	
TOTAL					3435.00	
Add Water Charges @ 1%					34.35	
Add CPOH @ 15%					520.40	
cost for one No					3989.75	
say					3989.75	

Cost index	35.59 %	.00
Total with Cost index		3989.75



Rate Reasonability Certificate

Name of work Mace of CWSS to Methala, Eriyad, Edavilangu and Kadukutty Panchayaths - Energy Auditing - 15MLD WTP at Vynthala- Supplying & fitting of new 60KVAR power factor improvememnt heavy duty capacitor. at 15MLD WTP Vynthala. .

Observed/Arrived Data

1. OD1 Supplying & fitting of new power factor improvement in electical system investing for heavy duty 60KVAR inline capacitor across Raw water pumps and transformer. .
2. OD2 Supplying & laying of 50SQ.MM copper cable with copper sockets .
3. OD3 Supplying & fitting of new spreader suitable for the MCCB .
4. OD4 Supplying & fitting of new 63Amps approved make MCCB .

Certified that the Market rates other than approved market rates adopted in the above Arrived/Observed data are based on the prevailing local market rates and the quantity provisions for material and labour are the lowest requirement for the work observed from similar works.

Kerala Water Authority

It is also certified that above non standard items are prepared since there are no approved Observed data are available in PRICE database.



Assistant Engineer Assistant Executive Engineer Executive Engineer Superintending Engineer

Assistant Engineer
Kerala Water Authority
P.H. Section, Kodungallur
P.O. Pulloot - 680663

Assistant Executive Engineer
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P O. Ashtamichira

EXECUTIVE ENGINEER
Kerala Water Authority
P.H. DIVISION
TRINJALAKUDA



PRICE

EST NO:2022/4364

General Abstract

Mace of CWSS to Methala, Eriyad, Edavilangu and Kadukutty Panchayaths -
Energy Auditing - Replacement of Existing Raw water VT motor pump set with IE-3
Energy Efficient Motor of 45kW at 15 MLD WTP Vynthala.

(Dsr year: 2018)

SI No	Heading Description	Amount
1	Working Charges	1182746.25
	Total	1182746.25
	Centage @	0.0%
	Centage Amount	0.00
	Provision for GST payments (in %) @	18.0%
	Amount reserved for GST payments	212894.33
	Total & Centage	1395640.58
	Lumpsum for round off	4359.43
	GRAND TOTAL Rs	1400000.00
		Rounded Grand Total Rs 14,00,000
		Rupees Fourteen Lakh Only

Kerala Water Authority

PRICE

causw
Assistant Executive Engineer
Kerala Water Authority
P.H. Sub Division, Mala
P.O. Ashtamuchira

msk
EXECUTIVE ENGINEER
Kerala Water Authority
P.H. DIVISION
IRINJALAKUDA

hath
Assistant Engineer
Kerala Water Authority
P.H. Section, Kodungalur
P.O. Pulloot - 680602



PRICE

EST NO:2022/4364

Working Charges

1 Specification Code: od358067/2021_2022

od358067/2021_2022 :Replacement of existing 75HP (55kW) VT Motor pump set at Raw water pump house with IE3 Energy Efficient Motors of same rating - Supply, Erection, Testing & Commissioning of Raw Water Vertical Turbine Motor Pumpset of 60HP (45kW) VT Raw water pump sets- 1 no (630cum/hr and 21.19m head)

Code	Description	Unit	Quantity	Rate	Amount	Remarks
MR	Supply, Erection, Testing & Commissioning of Raw Water Vertical Turbine Motor Pumpset of 60HP (45kW) VT Raw water pump sets- 1 no (630cum/hr and 21.19m head)	Hp	1.00000	16325.00	16325.00	
TOTAL					16325.00	
Add CPOH @ 15%					2448.75	
cost for one Hp					18773.75	
say					18773.75	

Cost index	35.59 %	.00
Total with Cost index		18773.75

Kerala Water Authority

2 Specification Code: od358068/2021_2022

od358068/2021_2022 :For additional warranty of 1 year @ 5% 60HP (45kW) VT pumpset

Code	Description	Unit	Quantity	Rate	Amount	Remarks
MR	For additional warranty of 1 year @ 5% 60HP (45kw) VT pumpset (1126425*0.05)	No	1.00000	56321.25	56321.25	
TOTAL					56321.25	
cost for one No					56321.25	
say					56321.25	

Cost index	35.59 %	.00
Total with Cost index		56321.25



PRICE

EST NO:2022/4364

Rate Reasonabilty Certificate

Name of work Mace of CWSS to Methala, Eriyad, Edavilangu and Kadukutty Panchayaths -
Energy Auditing - Replacement of Existing Raw water VT motor pump set
with IE-3 Energy Efficient Motor of 45kW at15 MLD WTP Vynthala. .

Observed/Arrived Data

1. OD1 Replacement of existing 75HP (55kW) VT Motor pump set at Raw water pump house with IE3 Energy Efficient Motors of same rating - Supply, Erection, Testing & Commissioning of Raw Water Vertical Turbine Motor Pumpset of 60HP (45kW) VT Raw water pump sets- 1 no (630cum/hr and 21.19m head) .
2. OD2 For additional warranty of 1 year @ 5% 60HP (45kW) VT pumpset .

Certified that the Market rates other than approved market rates adopted in the above Arrived/Observed data are based on the prevailing local market rates and the quantity provisions for material and labour are the lowest requirement for the work observed from similar works.

It is also certified that above non standard items are prepared since there are no approved Observed data are available in PRICE database.

Assistant Engineer Assistant Executive Engineer Executive Engineer Superintending Engineer

Assistant Engineer
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P.O. Ashtamichira

EXECUTIVE ENGINEER
Kerala Water Authority
P.H. DIVISION
IRINJALAKUDA



PRICE

EST NO:2022/4488

General Abstract


Mace of CWSS to Methala, Eriyad, Edavilangu and Kadukutty Panchayaths -
Energy Auditing -Replacement of Existing Back Wash Motor pump set with IE-3
EnergyEfficient Motor of 5.5kW for 15 MLD WTP at Vynthala.

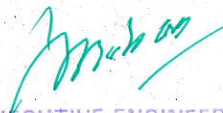
(Dsor year: 2018)


SI No	Heading Description	Amount
1	Working Charges	60950.00
	Total	60950.00
	Centage @	0.0%
	Centage Amount	0.00
	Provision for GST payments (in %) @	18.0%
	Amount reserved for GST payments	10971.00
	Total & Centage	71921.00
	Lumpsum for round off	8079.00
	GRAND TOTAL Rs	80000.00
		Rounded Grand Total Rs 80,000
		Rupees Eighty Thousand Only

Kerala Water Authority

PRICE


Assistant Executive Engineer
Kerala Water Authority
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P.H. DIVISION
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P.O. Pulloot - 680602



PRICE


EST NO:2022/4488


Detailed Estimate

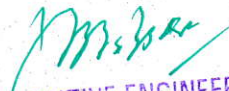
**Mace of CWSS to Methala, Eriyad, Edavilangu and Kadukutty Panchayaths -
Energy Auditing -Replacement of Existing Back Wash Motor pump set with IE-3
EnergyEfficient Motor of 5.5kW for 15 MLD WTP at Vynthala.**

(Dsor year: 2018)

SI No	Description	No	L	B	D	CF	Quantity	Remark
1Working Charges (Cost Index:35.59 %)								
1	od359250/2021_2022 Replacement of existing 7.5HP (5.5kW) Centrifugal Motor pump set at 15MLD WTP at Vynthala with IE3 Energy Efficient Motors of same rating - Supply, Erection, Testing & Commissioning of Centrifugal Motor Pumpset of 7.5HP (5.5kW) with low head for back washing							
		1					1.000	
							Total Quantity	1.000 No
							Total Deducted Quantity	0.000 No
							Net Total Quantity	1.000 No
							Say 1.000 No @ Rs 60950.00 / No	Rs 60950.00
							Total	60950.00
							Centage @	0.0%
							Centage Amount	0.00
							Provision for GST payments (in %) @	18.0%
							Amount reserved for GST payments	10971.00
							Total & Centage	71921.00
							Lumpsum for round off	8079.00
							GRAND TOTAL Rs	80000.00
							Rounded Grand Total Rs 80,000	
							Rupees Eighty Thousand Only	


Assistant Executive Engineer
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EXECUTIVE ENGINEER
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PRICE

EST NO:2022/4488

Rate Reasonability Certificate

Name of work Mace of CWSS to Methala, Eriyad, Edavilangu and Kadukutty Panchayaths - Energy Auditing -Replacement of Existing Back Wash Motor pump set with IE-3 EnergyEfficient Motor of 5.5kW for 15 MLD WTP at Vynthala. .

Observed/Arrived Data

1. OD1

Replacement of existing 7.5HP (5.5kW) Centrifugal Motor pump set at 15MLD WTP at Vynthala with IE3 Energy Efficient Motors of same rating - Supply, Erection, Testing & Commissioning of Centrifugal Motor Pumpset of 7.5HP (5.5kW) with low head for back washing .

Certified that the Market rates other than approved market rates adopted in the above Arrived/Observed data are based on the prevailing local market rates and the quantity provisions for material and labour are the lowest requirement for the work observed from similar works.

It is also certified that above non standard items are prepared since there are no approved Observed data are available in PRICE database.

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IRINJALARUDA



KERALA WATER AUTHORITY



ENERGY CONSERVATION IN FRESH COLAKADAV PUMPHOUSE OF ARWSS TO MULAVOOR ASAMANNUR AND TRIKKARIYOOR VILLAGES

DETAILED ENGINEERING REPORT

FEBRUARY 2022

**P.H DIVISION MUVATTUPUZHA
ERNAKULAM DISTRICT**



CONTENTS

Sl. No.	Contents	Page no.
1	Project at a Glance	1
2	Engineering Report	2
3	Abstract of Estimate	10
4	Detailed Estimate	11
5	Data	16
6	Rate reasonability Certificate	22



PROJECT AT A GLANCE

1	Name of Work	Energy Conservation in Fresh Cola Kadav Pumphouse of ARWSS to Mulavoor Asamannur and Trikkariyoor Villages
2	Name of District	Ernakulam
3	Name of Parliamentary Constituency	Idukki
4	Name of Assembly Constituency	Muvattupuzha
5	Name of Taluk	Muvattupuzha
6	Name of Village	Muvattupuzha
7	Name of Block	Muvattupuzha
8	Name of Municipality	Muvattupuzha
9	Name of Division	P.H. Division, Muvattupuzha
10	Name of Sub Division	P.H.Sub Division, Muvattupuzha
11	Name of Section	P.H.Section, Muvattupuzha
12	Name of Scheme	ARWSS to Mulavoor Asamannur and Trikkariyoor Villages
13	Name of Pump House	RWPH Fresh Cola Kadav
14	Project Cost	53.00 Lakhs
15	SOR	DSR-2018



ENGINEERING REPORT

INTRODUCTION

The Scheme ARWSS to Mulavoor Asamannur and Trikkariyoor villages is for Paipra, Nellikuzhy and Asamannur Panchayaths. The scheme capacity is 7.00 MLD. The benefitted Population is 32500. There are 6817 numbers of domestic consumers and 190 Nos of non domestic consumers under this scheme. The Scheme commissioned in 2012.

The main components of the scheme are

- 1 Raw water pump house at Fresh cola Kadav
- 2 WTP at Mulavoor (SSF) - 7 MLD Capacity
- 3 1.10 LL Capacity OHT at Mulavoor
- 4 6.74 LL Capacity GLT at 314 in Nellikuzhy Panchayath
- 5 1.85 LL Capacity GLT at Asamannur
- 6 0.30 LL Capacity GLT at Thattuparambu

The source of the scheme is Muvattupuzha river. The raw water from Muvattupuzha river is pumped to the WTP at Mulavoor through 300mm DI (K9) pumping main using two numbers of 200 HP Capacity VT Pump set (one standby). The pumping station is a 6.00m diameter well cum pump house at fresh cola Kadav in Muvattupuzha Municipality. The pumping time is 22hours.

The power connection is HT using one 400 KVA outdoor transformer installed in pump house compound. The metering is using TOD meter. The average monthly power charge is Rs 6,44,456 /-. The HT consumer number is 12/5879 . The average power factor measured is 0.94. The contract



demand sanctioned is 160KVA. The transformer yard is very old and damaged and the steel structure is to be renovated and transformer to be overhauled.

NEED FOR THE PROJECT

An energy audit conducted by the Energy Management Centre Kerala in Fresh cola kadav pump house during 2021. The findings of the energy audit are the following.

2. ENERGY CONSERVATION MEASURES - DETAILED

1.ENERGY CONSERVATION MEASURE - 1

POWER FACTOR IMPROVEMENT IN ELECTRICAL SYSTEM Background

1. By referring the last year bills, it is clear that the power factor is in the lagging condition at 0.9 to 0.97 range.
2. Penalty is been paid due to the low power factor condition, which is less than 0.95, for the last 6 months.
3. The installed capacitors to the present working motors were found disconnected during the period of audit and hence the power factor was found to be low. So connect the inline capacitors to the raw water pump motors so as to increase the PF to near unity.
4. In order to satisfy the reactive power caused by the transformer, a parallel capacitor shall install with respect to the rated capacity. The present working transformer require a capacitor of 10 kVAR to cater the reactive power generated by it.



Proposal

1. By improving the PF to unity, the plant will generate sufficient cost savings through incentives at a rate of 0.05% of energy charges for every 0.01 increase PF from the base 0.95.
2. The electricity consumption will also reduce with the reduction in the load loss of transformer by the improvement of PF. The calculation for the saving is based on the BEE Transformer practice manual.
3. Installing parallel capacitors for the transformer and connecting the inline capacitors to motors will generate this saving as mentioned in the table below.

TABLE 25: PF INCENTIVE - CALCULATION	Units	Values
Particulars		
Present PF	0.94	
Proposed PF	0.99	
Present average energy consumption/month	kWh	98,523.00
Present average energy charge/month	Rs	5,66,507.25
Incentives for improving the PF/month	Rs	11,330.15
Annual incentive	Rs	1,35,961.74



Present penalty for the plant	Rs	44,573.50
Annual Savings	Rs	1,80,535.24

2.ENERGY CONSERVATION MEASURE - 2

OPTIMISATION OF CONTRACT DEMAND

Background

The present contract demand of the plant (160 kVA) is lower than the required, as the present maximum registered demand in last 12 months were 179 kVA and the average demand were 178 kVA.

The present maximum demand is 11.8% excess of contract demand and for every excess demand, the charges are levied in the rate of Rs 170 per KVA.

Proposal

Increase the contract demand from 160 kVA to 190 kVA after consultation with KSEBL.

Calculations

Table 28: ECM -02		Units	Present	Proposed
Particulars				
Contract demand	kVA		160	200
Maximum demand - avg	kVA		178	178
Demand charge	Rs/kVA		340	340



Annual demand	Rs	60,520.00	60,520.00
charges			
Excess demand	kVA	18	0
- avg			
Excess demand	Rs/kVA	170.00	170.00
charge			
Excess demand	Rs	3,060.00	-
charges per			
month			
Total demand	Rs	63,580.00	60,520.00
charges -			
avg/month			
Monthly financial	Rs		3,060.00
savings - avg			
Annual financial	Rs		36,720.00
savings			
Investment	Rs		NIL
Payback period	Months		Immediate

3.ENERGY CONSERVATION MEASURE - 3

REPLACEMENT OF EXISTING RAW WATER PUMP MOTOR WITH NEW ENERGY EFFICIENT IE3 MOTOR

Background

Proposal

Replace these old motors with IE-3 energy efficient motors.



The cost of flange motors is 5% more than the normal foot mounted motors of same efficiency.

Change the standby motor with new energy efficient, and keep the present running motors in standby.

Calculations

Table 29 : ECM 03	Unit	Raw water pump -1
Particulars		
Rated power of present motor	kW	150
Existing efficiency of motor	%	93.2
Efficiency of IE3 motor	%	95.5
Measured Power consumption of Motor	kW	146.26
Reduction in power by installation of EE motor	kW	3.52
Annual running hours @ 22 hours & 360 days	Hrs	7920
Annual energy savings	kWh	27,898.14
Unit cost of electricity	Rs/kWh	5.75
Annual Financial savings	Rs	1,60,414.29



Investment cost (motor, installation charges)	Rs	12,00,000.00
Simple payback period	Months	90

PROJECT PROPOSAL

The main findings of the energy audit wing are

1. Inadequate Capacitor for power factor improvement to the 200HP Vertical Turbine pump set
2. Insufficient contract demand for the HT connection
3. Inefficient pump set .

Hence the proposal is to install 75KVAR power capacitor to each of the 200HP pump sets and thereby to enhance the PF from 0.94 to 99. It is also suggested to install one 10KVAR capacitor to the existing 400KVA transformer in order to satisfy the reactive power caused by the transformer. Hence provision for installing one 10 KVAR capacitor to the transformer is also included.

The contract demand for the HT connection is 160 KVA. The required average contract demand is 190KVA as per the analysis of audit wing and suggested to enhance contract demand. Hence provision to enhance the contract demand from 160 KVA to 190KVA is also included. For enhancing the contract demand preparation of drawings, by A class electrical contractor submitting to KSEB, replacement of existing CTPT unit and TOD meter etc are also required.



The existing pump sets are very aged and inefficient and it is suggested to install one 200 HP energy efficient motor instead of old existing motor. But on evaluation it is seen that the pump is also inefficient due to age and prolonged usage. Hence provision to supply and erect one new 200HP energy efficient VT pump set with accessories to replace the old inefficient pump set also incorporated in the project.

Also the transformer yard is in damaged condition due to age. The KSEB authorities has given direction to repair the yard. They have submitted estimate for repairing the AB switch DO fuse etc. This included in the estimate. The steel structure of the transformer yard is in rusted stage and hence provision for painting the yard and steel structure also included.

PROJECT COST

The total cost of the project is estimated as **Rs. 53.00 lakhs**


CONCLUSION

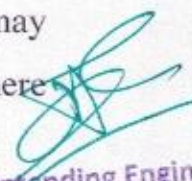
On completion of the project the power factor may be enhanced from 0.94 to 0.99 and hence power factor penalty may be exempted and incentive may be achieved by this an annual savings of Rs. 1,80,535.24/- is expected

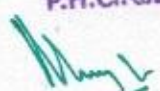
By enhancing the contract demand from 160 KVA to 190KVA penalty may be avoided and an annual savings of Rs.36720 is expected.

By installing an energy efficient pump set, the power consumption may be reduced and an annual savings of Rs. 1,60,414.29/- is expected. Hence there will be considerable savings in pumping cost.


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General Abstract

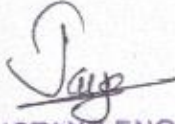
**CARWSS to Mulavoor Asamannur and Trikkariyoor Villages-Energy conservation
measures at Fresh cola Kadav RWPH**


(Dsr year: 2018)


SI No	Heading Description	Amount
1	Supplying and fitting power capacitors for various pumpsets	117512.82
2	Enhancement of contract demand	439047.00
3	Supply erection testing and commissioning of one 200HP VT Pumpset	3370673.00
4	Repairing the Transformer Yard and stucture	486445.28
Total		4413678.10
Centage @		0.0%
Centage Amount		0.00
Provision for GST payments (in %) @		18.0%
Amount reserved for GST payments		794462.06
Total & Centage		5208140.16
Lumpsum for round off		91859.84
GRAND TOTAL Rs		5300000.00
		Rounded Grand Total Rs 53,00,000
		Rupees Fifty Three Lakh Only


Kerala Water Authority

PRICE


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Detailed Estimate

**CARWSS to Mulavoor Asamannur and Trikkariyoor Villages-Energy conservation
measures at Fresh cola Kadav RWPH**

(Dsr year: 2018)

Sl No	Description	No	L	B	D	CF	Quantity	Remark
1 Supplying and fitting power capacitors for various pumpsets (Cost Index:35.59 %)								
1	od357364/2021_2022 Supplying of 75 KVAR, capacity power capacitor for the existing 200 HP motor of VT Pump set to improve Power factor							
		2					2.000	
							Total Quantity	2.000 No
							Total Deducted Quantity	0.000 No
							Net Total Quantity	2.000 No
							Say 2.000 No @ Rs 49133.77 / No	Rs 98267.54
2	od357365/2021_2022 Fitting Power capacitor to the existing 200HP motor of VT pump set including cost of cables, socket ,mountings, casing pipe etc complete as per direction of departmental officers							
		2					2.000	
							Total Quantity	2.000 Day
							Total Deducted Quantity	0.000 Day
							Net Total Quantity	2.000 Day
							Say 2.000 Day @ Rs 2999.75 / Day	Rs 5999.50
3	od358062/2021_2022 Charges for supplying and fitting 10KVAR APP heavy duty power capacitor to the existing 400KVA Transformer as per direction including cost of capacitor,cables,sockets clamp,mountings etc complete							
		1					1.000	
							Total Quantity	1.000 No
							Total Deducted Quantity	0.000 No
							Net Total Quantity	1.000 No
							Say 1.000 No @ Rs 13245.78 / No	Rs 13245.78
Sl No	Description	No	L	B	D	CF	Quantity	Remark
2 Enhancement of contract demand (Cost Index:35.59 %)								



1	od357804/2021_2022 Enhancing the contract demand of HT connection including preparation of drawing by A class electrical contractor, approval from KSEB, payment of fee to KSEB, supply erection testing and commissioning of new CTPT unit of accuracy not less than 0.2 suitable for the HT connection, testing the unit at TMR Angamaly, supplying, testing and installing new TOD meter suitable for the HT connection and commissioning							
		1						1.000
	Total Quantity							1.000 No
	Total Deducted Quantity							0.000 No
	Net Total Quantity							1.000 No
	Say 1.000 No @ Rs 439047.00 / No							Rs 439047.00
SI No	Description	No	L	B	D	CF	Quantity	Remark
3Supply erection testing and commissioning of one 200HP VT Pumpset (Cost Index:35.59 %)								

Kerala Water Authority

PRICE

1	od357867/2021_2022 PUMP-Supply erection ,testing and commissioning of ISI marked KWA approved make water lubricated vertical turbine pump set with bronze impeller, stainless steel shaft supported by anti friction bearing, MS flanged column pipe assembly with strainer (maximum length 1.50m per each and painted with zinc chromate primer and anti corrosive paint two coats.) with necessary non reversible ratchet arrangement water cooling system for bearing assembly and all accessories conform to relevant IS. The pump set shall be coupled with motor specified in item No. 2 given below. The pump shall confirm to the following specifications as given . Discharge 78lps,Total head - 127 m, Type of column joint - Flanged ,Minimum column pipe shell thickness- 8mm. Size and class of pumping main - 300mm DI MOTOR-Supply of Kerala Water Authority approved make screen protected drip proof slow speed squirrel cage induction motor with vertical hollow shaft suitable for operation 415/440 Volts, 3 phase, 50 Hz AC for the above Pump set with necessary non reversible ratchet arrangement. The motor should conform to IS 325 (relevant IS and IE reules).(Motor shall be energy efficient and supporting certificates to prove EF1 or EF2 .Make : - KWA approved. STARTER-Supply , erection, testing and commissioning of 400/440V indoor, totally enclosed,dust tight and vermin proof, dry type soft starter with under voltage and over voltage cut off and single phase preventer suitable for the above pump set as per IE rules . PANEL BOARD- Supply ,erection ,testing and commissioning of suitable dust and vermin proof cubical type panel board 16 swg sheathed and powder coated consisting of suitable size 1 no MCCB for motor circuit incomer and 1 no.400 A or equivalent outgoing change over switch for the above pump set, Voltmeter, Ammeter (both with selector switches), CT, pilot lamps, toggle switches. Necessary bus bar arrangements with internal copper cabling for operating one pump set at a time . cable connecting from panel board to motor should be copper cable EARTHING-Supply of suitable size copper conductor for earthing and all materials and providing plate earthing using C I earth plate buried against at a depth of 3.00m from ground level with alternate layers at charcoal and salt including supplying fixing at 38mm dia perforated GI pipe funnel for water purpose etc. including the construction of masonry trough with man hole cover for motors, starter, capacitor and panel board etc. as per IE rules. CAPACITOR_Supply erection and commissioning of reputed make ISI marked capacitor conforming to IS 2834 (relevant IS) suitable for above motor with suitable KVAR for working with power factor above 0.98.VALVES- Supplying and fitting of suitable size best quality ISI marked heavy duty cast iron double flanged sluice valve PN 1.6 suitable for above pump set .Supplying and fitting of suitable size best quality ISI marked heavy duty cast iron double flanged reflex valve as per PN1.6 suitable for above pump set.Pressure gauge-Supplying and fitting of reputed make 150mm dia pressure gauge with stop cock and all accessories suitable for the above pump set .Erection of the motor pump set , starter panel boards, capacitors etc. on suitable concrete foundation giving power connecting cables to panel board to starters, starter to motor, capacitors, providing end termination, earthing of equipment supply fitting necessary pipes and specials to connect the delivery of pump set to the header pipe by necessary interconnection and fabrication etc. complete taking trial run to the satisfaction of departmental officers including any other works and cost of materials required for the commissioning of the motor pup set as per standards.				
	1				1.000
				Total Quantity	1.000 No
				Total Deducted Quantity	0.000 No
				Net Total Quantity	1.000 No
				Say 1.000 No @ Rs 3370673.00 / No	Rs 3370673.00



Sl No	Description	No	L	B	D	CF	Quantity	Remark
4Repairing the Transformer Yard and stucture (Cost Index:35.59 %)								
1	od357876/2021_2022 Charges for repairing the AB switch,Replacing damaged LA andDO fuse on the KWA HT yard at fresh cola Kadav (Rate as per estimate recieved from KSEB)	1					1.000	
							Total Quantity	1.000 No
							Total Deducted Quantity	0.000 No
							Net Total Quantity	1.000 No
							Say 1.000 No @ Rs 67177.68 / No	Rs 67177.68
2	od358480/2021_2022 supplying and erecting lightning arresters in the Transformer yard including dismantling and removing the damaged lighting arresters, fitting new one as per direction of departmental officers	8					8.000	
							Total Quantity	8.000 No
							Total Deducted Quantity	0.000 No
							Net Total Quantity	8.000 No
							Say 8.000 No @ Rs 1454.40 / No	Rs 11635.20
3	od358481/2021_2022 Charges for repairing/installing Sodium vapor Lamp in the pumphouse compound and transformer yard	8					8.000	
							Total Quantity	8.000 L.S
							Total Deducted Quantity	0.000 L.S
							Net Total Quantity	8.000 L.S
							Say 8.000 L.S @ Rs 40652.50 / L.S	Rs 325220.00
4	13.50.3 Applying priming coat:With ready mixed red oxide zinc chromate primer of approved brand and manufacture on steel galvanised iron /steel works	150					150.000	
							Total Quantity	150.000 sqm
							Total Deducted Quantity	0.000 sqm
							Net Total Quantity	150.000 sqm
							Say 150.000 sqm @ Rs 59.66 / sqm	Rs 8949.00
5	13.52.1 Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete.On							



	steel work							
		150						150.000
						Total Quantity		150.000 sqm
						Total Deducted Quantity		0.000 sqm
						Net Total Quantity		150.000 sqm
						Say 150.000 sqm @ Rs 223.32 / sqm		Rs 33498.00
6	13.43.1 Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface:Water thinnable cement primer							
		180						180.000
						Total Quantity		180.000 sqm
						Total Deducted Quantity		0.000 sqm
						Net Total Quantity		180.000 sqm
						Say 180.000 sqm @ Rs 70.64 / sqm		Rs 12715.20
7	13.60.1 Wall painting with acrylic emulsion paint of approved brand and manufacture to give an even shade:Two or more coats on new work							
		180						180.000
						Total Quantity		180.000 sqm
						Total Deducted Quantity		0.000 sqm
						Net Total Quantity		180.000 sqm
						Say 180.000 sqm @ Rs 151.39 / sqm		Rs 27250.20
						Total		4413678.10
						Centage @		0.0%
						Centage Amount		0.00
						Provision for GST payments (in %) @		18.0%
						Amount reserved for GST payments		794462.06
						Total & Centage		5208140.16
						Lumpsum for round off		91859.84
						GRAND TOTAL Rs		5300000.00
						Rounded Grand Total Rs 53,00,000		
						Rupees Fifty Three Lakh Only		

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Supplying and fitting power capacitors for various pumpsets

1 Specification Code: od357364/2021_2022

od357364/2021_2022 :Supplying of 75 KVAR, capacity power capacitor for the existing 200 HP motor of VT Pump set to improve Power factor

Code	Description	Unit	Quantity	Rate	Amount	Remarks
MR	Supply of capacitor 75 KVAR (APP)	No	1.00000	42302.00	42302.00	
TOTAL					42302.00	
Add Water Charges @ 1%					423.02	
Add CPOH @ 15%					6408.75	
cost for one No					49133.77	
say					49133.77	

Cost index 35.59 %					.00	
Total with Cost index					49133.77	

2 Specification Code: od357365/2021_2022

Kerala Water Authority

od357365/2021_2022 :Fitting Power capacitor to the existing 200HP motor of VT pump set including cost of cables, socket ,mountings, casing pipe etc complete as per direction of departmental officers

Code	Description	Unit	Quantity	Rate	Amount	Remarks
100.98.10 32	Rate as per item number 100.98.1032 of SH: KWA Approved Data	Day	0.50000	900.15	450.08	
100.98.10 09	Rate as per item number 100.98.1009 of SH: KWA Approved Data	Day	1.00000	857.20	857.20	
100.98.10 07	Rate as per item number 100.98.1007 of SH: KWA Approved Data	Day	1.00000	648.10	648.10	
MR	Cost of Cable, Clamp, Casing pipe etc	L.S	1.00000	300.00	300.00	
TOTAL					2255.38	
Add Water Charges @ 1%					3.00	
Add CPOH @ 15%					45.45	
cost for one Day					2303.83	
say					2303.83	



Cost index 35.59 %	695.92
Total with Cost index	2999.75

3 Specification Code: od358062/2021_2022

od358062/2021_2022 :Charges for supplying and fitting 10KVAR APP heavy duty power capacitor to the existing 400KVA Transformer as per direction including cost of capacitor,cables,sockets clamp,mountings etc complete

Code	Description	Unit	Quantity	Rate	Amount	Remarks
MR	10KVAR Powe Capacitor APP Heavy duty	Nos	1.00000	9800.00	9800.00	
100.98.10 32	Rate as per item number 100.98.1032 of SH: KWA Approved Data	Day	0.50000	900.15	450.08	
100.98.10 09	Rate as per item number 100.98.1009 of SH: KWA Approved Data	Day	0.50000	857.20	428.60	
100.98.10 07	Rate as per item number 100.98.1007 of SH: KWA Approved Data	Day	0.50000	648.10	324.05	
MR	Cost of cables,Sockets,mountings etc	L.S	1.00000	300.00	300.00	
TOTAL					11302.73	
Add CPOH @ 15%					1515.00	
cost for one No					12817.73	
say					12817.73	

Cost index 35.59 %	428.05
Total with Cost index	13245.78

Enhancement of contract demand

4 Specification Code: od357804/2021_2022

od357804/2021_2022 :Enhancing the contract demand of HT connection including preparation of drawing by A class electrical contractor, approval from KSEB,payment of fee to KSEB,supply erection testing and commissioning of new CTPT unit of accuracy not less than 0.2 suitable for the HT connection,testing the unit at TMR Angamaly, supplying,testing and installing new TOD meter suitable for the HT connection and commissioning

Code	Description	Unit	Quantity	Rate	Amount	Remarks
MR	Preparation of drawing by A class electrical contractor, approval from KSEB, payment of fee to KSEB,	No	1.00000	65000.00	65000.00	
MR	Supply erection testing and commissioning of new CTPT unit of accuracy not less than 0.2 suitable for the HT connection, testing the unit at TMR Angamaly,	No	1.00000	245000.00	245000.00	
MR	supplying, testing and installing new TOD meter suitable for the HT connection and commissioning	Nos	1.00000	68000.00	68000.00	
TOTAL					378000.00	
Add Water Charges @ 1%					3780.00	
Add CPOH @ 15%					57267.00	
cost for one No					439047.00	
say					439047.00	
Cost index 35.59 %					.00	
Total with Cost index					439047.0	

Supply erection testing and commissioning of one 200HP VT Pumpset

5 Specification Code: od357867/2021_2022

od357867/2021_2022 :PUMP-Supply erection ,testing and commissioning of ISI marked KWA approved make water lubricated vertical turbine pump set with bronze impeller, stainless steel shaft supported by anti friction bearing, MS flanged column pipe assembly with strainer (maximum length 1.50m per each and painted with zinc chromate primer and anti corrosive paint two coats.) with necessary non reversible ratchet arrangement water cooling system for bearing assembly and all accessories conform to relevant IS. The pump set shall be coupled with motor specified in item No. 2 given below. The pump shall confirm to the following specifications as given . Discharge 78lps, Total head - 127 m, Type of column joint - Flanged ,Minimum column pipe shell thickness- 8mm. Size and class of pumping main - 300mm DI MOTOR-Supply of Kerala Water Authority approved make screen protected drip proof slow speed squirrel cage induction motor with vertical hollow shaft suitable for operation 415/440 Volts, 3 phase, 50 Hz AC for the above Pump set with necessary non reversible ratchet arrangement. The motor should conform to IS 325 (relevant IS and IE rules).(Motor shall be energy efficient and supporting certificates to prove EF1 or EF2 .Make : - KWA approved.
STARTER-Supply , erection, testing and commissioning of 400/440V indoor, totally enclosed,dust tight and vermin proof, dry type soft starter with under voltage and over voltage cut off and single phase preventer suitable for the above pump set as per IE rules .
PANEL BOARD- Supply ,erection ,testing and commissioning of suitable
dust and vermin proof cubical type panel board 16 swg sheathed and powder coated



consisting of suitable size 1 no MCCB for motor circuit incomer and 1 no.400 A or equivalent outgoing change over switch for the above pump set, Voltmeter, Ammeter (both with selector switches), CT, pilot lamps, toggle switches. Necessary bus bar arrangements with internal copper cabling for operating one pump set at a time . cable connecting from panel board to motor should be copper cable
EARTHING-Supply of suitable size copper conductor for earthing and all materials and providing plate earthing using C I earth plate buried against at a depth of 3.00m from ground level with alternate layers at charcoal and salt including supplying fixing at 38mm dia perforated GI pipe funnel for water purpose etc. including the construction of masonry trough with man hole cover for motors, starter, capacitor and panel board etc. as per IE rules.
CAPACITOR_Supply erection and commissioning of reputed make ISI marked capacitor conforming to IS 2834 (relevant IS) suitable for above motor with suitable KVAR for working with power factor above 0.98.
VALVES- Supplying and fitting of suitable size best quality ISI marked heavy duty cast iron double flanged sluice valve PN 1.6 suitable for above pump set .Supplying and fitting of suitable size best quality ISI marked heavy duty cast iron double flanged reflex valve as per PN1.6 suitable for above pump set.
Pressure gauge-Supplying and fitting of reputed make 150mm dia pressure gauge with stop cock and all accessories suitable for the above pump set .Erection of the motor pump set , starter panel boards, capacitors etc. on suitable concrete foundation giving power connecting cables to panel board to starters, starter to motor, capacitors, providing end termination, earthing of equipment supply fitting necessary pipes and specials to connect the delivery of pump set to the header pipe by necessary interconnection and fabrication etc.
 complete taking trial run to the satisfaction of departmental officers including any other works and cost of materials required for the commissioning of the motor pup set as per standards.

Code	Description	Unit	Quantity	Rate	Amount	Remarks
MR	VT Pumpset	Nos	200.00000	14510.00	2902000.00	
TOTAL					2902000.00	
Add Water Charges @ 1%					29020.00	
Add CPOH @ 15%					439653.00	
cost for one No					3370673.00	
say					3370673.00	

Cost index 35.59 %	.00
Total with Cost index	3370673.0

Repairing the Transformer Yard and structure

6 Specification Code: od357876/2021_2022

od357876/2021_2022 :Charges for repairing the AB switch,Replacing damaged LA andDO fuse on the KWA HT yard at fresh cola Kadav (Rate as per estimate recieved from KSEB)



Code	Description	Unit	Quantity	Rate	Amount	Remarks
MR	Charges for repairing the AB switch, Replacing damaged LA and DO fuse on the KWA HT yard at fresh cola Kadav (Rate as per estimate received from KSEB)	Nos	1.00000	57837.00	57837.00	
TOTAL					57837.00	
Add Water Charges @ 1%					578.37	
Add CPOH @ 15%					8762.31	
cost for one No					67177.68	
say					67177.68	
Cost index 35.59 %					.00	
Total with Cost index					67177.68	

7 Specification Code: od358480/2021_2022

od358480/2021_2022 :supplying and erecting lightning arresters in the Transformer yard including dismantling and removing the damaged lightning arresters, fitting new one as per direction of departmental officers

Code	Description	Unit	Quantity	Rate	Amount	Remarks
MR	lightning Arresters	Nos	1.00000	625.00	625.00	
0116	Fitter(grade1)	Day	0.30000	738.00	221.40	
0115	Coolie	Day	0.30000	558.00	167.40	
MR	Sundries	L.S	1.00000	100.00	100.00	
TOTAL					1113.80	
Add Water Charges @ 1%					11.14	
Add CPOH @ 15%					168.74	
cost for one No					1293.68	
say					1293.68	
Cost index 35.59 %					160.72	
Total with Cost index					1454.4	





8 Specification Code: od358481/2021_2022


od358481/2021_2022 :Charges for repairing/installing Sodium vapor Lamp in the pumphouse compound and transformer yard

Code	Description	Unit	Quantity	Rate	Amount	Remarks
MR	Charges for repairing/installing Sodium vapor Lamp/fluorescent tubes in the pumphouse compound and transformer yard at appropriate places.	L.S	1.00000	35000.00	35000.00	
TOTAL					35000.00	
Add Water Charges @ 1%					350.00	
Add CPOH @ 15%					5302.50	
cost for one L.S					40652.50	
say					40652.50	
Cost index 35.59 %					.00	
Total with Cost index					40652.5	


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 Kerala Water Authority
 P.H.Circle, Muvattupuzha



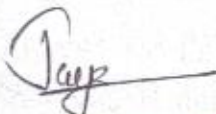
Rate Reasonably Certificate


Name of work CARWSS to Mulavoor Asamannur and Trikkariyoor Villages-Energy conservation measures at Fresh cola Kadav RWPH .

Observed/Arrived Data

1. OD1 Supplying of 75 KVAR, capacity power capacitor for the existing 200 HP motor of VT Pump set to improve Power factor .
2. OD2 Fitting Power capacitor to the existing 200HP motor of VT pump set including cost of cables, socket ,mountings, casing pipe etc complete as per direction of departmental officers .
3. OD3 Charges for supplying and fitting 10KVAR APP heavy duty power capacitor to the existing 400KVA Transformer as per direction including cost of capacitor,cables,sockets clamp,mountings etc complete .
4. OD4 Enhancing the contract demand of HT connection including preparation of drawing by A class electrical contractor, approval from KSEB,payment of fee to KSEB,supply erection testing and commissioning of new CTPT unit of accuracy not less than 0.2 suitable for the HT connection,testing the unit at TMR Angamaly, supplying,testing and installing new TOD meter suitable for the HT connection and commissioning

PRICE


 ASSISTANT ENGINEER
 Public Health Section
 Kerala Water Authority
 Muttupuzha


 Assistant Executive Engineer
 Kerala Water Authority
 Public Health Sub Division
 Muvattupuzha





5. OD5

PUMP-Supply erection ,testing and commissioning of ISI marked KWA approved make water lubricated vertical turbine pump set with bronze impeller, stainless steel shaft supported by anti friction bearing, MS flanged column pipe assembly with strainer (maximum length 1.50m per each and painted with zinc chromate primer and anti corrosive paint two coats.) with necessary non reversible ratchet arrangement water cooling system for bearing assembly and all accessories conform to relevant IS. The pump set shall be coupled with motor specified in item No. 2 given below. The pump shall confirm to the following specifications as given . Discharge 78lps, Total head - 127 m, Type of column joint - Flanged ,Minimum column pipe shell thickness- 8mm. Size and class of pumping main - 300mm DI MOTOR-Supply of Kerala Water Authority approved make screen protected drip proof slow speed squirrel cage induction motor with vertical hollow shaft suitable for operation 415/440 Volts, 3 phase, 50 Hz AC for the above Pump set with necessary non reversible ratchet arrangement. The motor should conform to IS 325 (relevant IS and IE rules)(.Motor shall be energy efficient and supporting certificates to prove EF1 or EF2 .Make : - KWA approved.
STARTER-Supply , erection, testing and commissioning of 400/440V indoor, totally enclosed,dust tight and vermin proof, dry type soft starter with under voltage and over voltage cut off and single phase preventer suitable for the above pump set as per IE rules .
PANEL BOARD- Supply ,erection ,testing and commissioning of suitable
dust and vermin proof cubical type panel board 16 swg sheathed and powder coated consisting of suitable size 1 no MCCB for motor circuit incomer and 1 no.400 A or equivalent outgoing change over switch for the above pump set, Voltmeter, Ammeter (both with selector switches), CT, pilot lamps, toggle switches. Necessary bus bar arrangements with internal copper cabling for operating one pump set at a time . cable connecting from panel board to motor should be copper cable
EARTHING-Supply of suitable size copper conductor for earthing and all materials and providing plate earthing using C-I earth plate buried against at a depth of 3.00m from ground level with alternate layers at charcoal and salt including supplying fixing at 38mm dia perforated GI pipe funnel for water purpose etc. including the construction of masonry trough with man hole cover for motors, starter, capacitor and panel board etc. as per IE rules.
CAPACITOR_ Supply erection and commissioning of reputed make ISI marked capacitor conforming to IS 2834 (relevant IS) suitable for above motor with suitable KVAR for working with power factor above 0.98.VALVES- Supplying and fitting
of suitable size best quality ISI



marked heavy duty cast iron double flanged sluice valve PN 1.6 suitable for above pump set .Supplying and fitting of suitable size best quality ISI marked heavy duty cast iron double flanged reflex valve as per PN1.6 suitable for above pump set.Pressure gauge-Supplying and fitting of reputed make 150mm dia pressure gauge with stop cock and all accessories suitable for the above pump set .Erection of the motor pump set , starter panel boards, capacitors etc. on suitable concrete foundation giving power connecting cables to panel board to starters, starter to motor, capacitors, providing end termination, earthing of equipment supply fitting necessary pipes and specials to connect the delivery of pump set to the header pipe by necessary interconnection and fabrication etc.
complete taking trial run to the satisfaction of departmental officers including any other works and cost of materials required for the commissioning of the motor pup set as per standards. .

6. OD6

Charges for repairing the AB switch,Replacing damaged LA andDO fuse on the KWA HT yard at fresh cola Kadav (Rate as per estimate recieved from KSEB) .

Kerala Water Authority

Certified that the Market rates other than approved market rates adopted in the above Arrived/Observed data are based on the prevailing local market rates and the quantity provisions for material and labour are the lowest requirement for the work observed from similar works.

It is also certified that above non standard items are prepared since there are no approved Observed data are available in PRICE database.


 Assistant Engineer


 Assistant Executive Engineer


 Executive Engineer


 Superintending Engineer

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