



PUBLIC HEALTH ENGINEERING DIRECTORATE
GOVERNMENT OF WEST BENGAL

**SCHEDULE AND GUIDELINES
FOR PREPARATION OF PIPED WATER SUPPLY SCHEMES**



EFFECTIVE FROM JULY, 2013

The rates and guidelines mentioned in this schedule will be used only for the purpose of formulation, planning & design of water supply schemes by PHE Dte. and will not be used for the purpose of any tender, quotation, payment, reference of rates in case of dispute etc. by the executing Divisions/Circles.

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P R E F A C E

Guidelines and Schedule of Rates for Preparation of Piped Water Supply Schemes under Public Health Engineering Directorate was last published in July 2012 by the Superintending Engineers, Planning Circle-I and Planning Circle-II.

In the meantime, Ministry of Drinking Water & Sanitation, Government of India has made Paradigm changes in NRDWP guide lines. The basic prices of some of the materials used in implementation of Piped Water Supply Schemes have escalated and the PWD schedule of rates has also undergone small revision by this time. Further BIS codes especially for analysis of Seismic load, water retaining structures, etc. has changed significantly during last few years, inviting corrections to standard designs available with the Planning wing. Accordingly, the Planning Wing of PHE Dte. has changed the designs of commonly used PHE related structures incorporating latest norms and guidelines as and where applicable. In OHR Ductile detailing has been incorporated. The Chief Engineer, Planning & Water Quality Management, P. H. Engg Dte also asserted the immediate need of the revision of Guideline and Schedule of rates to be followed by Planning Circles for the purpose of preparation of Piped Water Supply Schemes.

Accordingly, the guidelines, rates of different items of work have been revised taking into account of current PWD Schedule of Rates, rates of Resources Division, P.H.E. Dte., prevailing DGS&D rates and current market rates etc. The present "**Guidelines and Schedule of Rates**" has been prepared to cover various items of works under civil as well as Mechanical/Electrical wing of PHE Dte., Govt. of West Bengal, for preparation of piped water supply schemes.

Minimum diameter of pipe for rural w/s scheme has been recommended as 80 mm (ID) or nearby to accommodate future extension of pipes as well as facilitating the provision of 100% house connection as per policy of Govt. of West Bengal in this regard.

Rates of Arsenic/Chloride treatment units, solar power stations etc. are also included in this schedule.

The schedule of rates for Mechanical/Electrical components has been prepared by the Mechanical/Electrical planning wing and duly vetted by the Superintending Engineers, Mechanical Circle -I, P.H.E.Dte.

This Guideline and Schedule of Rates will be effective from July, 2013.



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GUIDELINES FOR PREPARATION OF PIPED WATER SUPPLY SCHEMES UNDER PUBLIC HEALTH ENGINEERING DIRECTORATE

(EFFECTIVE FROM 1ST JULY, 2013)

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DESIGN NORMS OF WATER SUPPLY SCHEMES (CIVIL)

(Applicable for both Rural and Urban water supply schemes)

Sl. No.	Parameters	Descriptions
1.	Design Period	Projected population shall be calculated considering a period of 25 years for Ground Water based PWSS and 30 years for surface & sub-surface water based PWSS including execution time for all components since the year of preparation. However pumping and other machineries with allied components will be installed on two phases 15 years after commissioning the scheme. Execution period will be considered as 1 / 2 / 3 years for a capital cost up to 1 crore / above 1 crore up to 10 crore / above 10 crore up to 30 crore respectively. Execution period of project having capital cost more than 30 crore to be recommended by the concerned planning circle during preparation of DPR.
2.	Population	Population of 2011 Census data to be adopted as the baseline value. However, in absence of 2011 Census data upto village level 2001 Census data shall be used.
3.	Population growth rate	Design Population is calculated based on decadal growth rate of the district as per census report (2011) (Annexure-XI) subject to a maximum of 20% and minimum 10% per decade.
4.	Rate of Water Supply	A. <u>Domestic Demand:</u> i) 40 LPCD for supply through street stand posts and ii) 70 LPCD for house connections. iii) Minimum 10 LPCD in areas having acute water quality problems and the cost of alternate safe drinking water will entail huge capital cost. The balance domestic requirements may be met from other nearby source(s). <i>Unless otherwise directed, house connection to be considered for 100% population.</i> B. <u>Institution/ Industries Demand:</u> Institutional and other demand has been considered as 5% of the domestic demand as per NRDWP guide line.

C. Fire Fighting Demand: Fire fighting demand to be calculated as 100çP kLD as per NRDWP guideline, (where P is the Population in thousand) subject to a minimum of 5% of domestic demand and the quantity of water for fire fighting will be available at Head Work Site through spout.

D. Total demand :Total demand shall be summation of Domestic demand, Institutions demand, Industries demand and losses due to treatment and distribution.

Remarks:

In terms of Memo. No. 1788/MC/40/2006 dated 01/02/07 of CE, Planning & WQM, water supply schemes under Non Municipal Urban area (NM) which is under the administrative control of PRI, norms of per capita supply etc. as applicable to rural area shall be followed. Command areas shall be formulated in consultation with the VWSC/local authority as usual. Priority will be given for No Source/Quality affected villages. However, inclusion of adjoining mouzas may be made considering technical viability and if any NC/PC/Quality affected habitations are present. Due consideration to final site of scheme & other technical parameters is to be given. This has the reference of memo no. 992/MC/40/05 dated 22-01-2007 of CE, Planning & WQM.

5.	Transmission and Distribution loss	10%
6.	Treatment Plant Loss	5%
7.	Minimum Terminal Pressure	7 m.
8.	Water Source	
	a) Ground Water	i) Design of tube well should have a co-relation with supporting incorporated data in respect of water quality (report shall not be more than 6 months old), lithology and performance of reference tube well.
	Housing pipe	iia) Housing pipe should be 300 mm dia. for discharge greater than 70 m ³ /hr and/or when well pipe is 200 mm dia. Length of housing pipe should generally be not less than 30 m. In the districts where static water level is reported to be lower down drastically especially in the lean period Housing pipe of length 40 m or more may be considered. (Vide letter no 1727/80/E/2004 dated 30.01.2006 of CE, Planning & WQM).
	Tubewell material	<i>ii) Tubewell material shall be selected on the basis of nature of soil, nature of aquifer, economy etc.</i> <i>ii) As regard housing pipe, well pipe and strainer of big dia. tube well, non-metallic pipes as per relevant BIS code should also be considered for a depth of tube well up to 250 m depending on cost economy.</i>
	Cement sealing	iii) For areas having water quality problems, provision of geo-physical logging and cement sealing in tube well are to be considered.

Radial distance	iv) Radial distance between two adjacent tube wells shall be at least 500 m as per directive from State Level Scheme Sanctioning Committee (SLSSC). However, distance may be reduced with proper technical justification in D.P.R. Length of rising main should not exceed 800 m in general. However in compelling situation rising main of above 800 m length may be considered with proper justification.
Stand by	v) When the requirement can be met up from only one tube well a second tube well as stand by source may be provided. vi) When the requirement is more than one, no stand by source shall be provided.
Pumping Hours	vii) Tube well is to be designed considering normal working period of 8 hours in a day. However working period of tube well should be 16 hours per day when there is provision of IEP or ARP and where overhead reservoir is provided. (Vide letter no 1727/80/E/2004 dated 30.01.2006 of CE, Planning & WQM).
Quality problem areas	viii) In case of arsenic/chloride/fluoride prone areas and in areas having very fine grained aquifer, drawal of water from a tube well should be limited to 45 m ³ per hour or near about. However, in compelling situation 10% increase over the recommended abstraction (45m ³ /hr) may be considered. ix) Provision shall be made for an arrangement to monitor discharge and draw down of a tube well at regular interval. For this purpose the tube well delivery pipeline should be provided with a Tee connection having one Sluice valve.
b)Sub-surface Source	ix) In case of river-bed tube wells, 50% stand by provision shall be made. River-bed tube wells with horizontal strainers shall be preferred, wherever feasible.
c) Surface Source	To be guided by the provisions of Manual on Water Supply & Treatment published by CPHEEO, latest version.
9. Provision of water treatment plant	Provision of water treatment unit has to be kept in the design estimate as per BIS/CPHEEO guidelines. However, in case of excess iron above limit will be 0.30 mg/l as per decision taken during 19 th SLSSC meeting held on 18 th June, 2013.
10. Distribution System and Rising Mains	Distribution system and Rising main(s) will be designed using software provided by the Govt. of India or using renowned reliable software available in the market as approved by the Planning Wing of the P.H.E. Dte. The design of Distribution system and Rising main(s) shall be done as per latest CPHEEO Manual.
a) Distribution System	i) Minimum Pipe size shall be 80 mm dia. (ID) for AC pipes and 90 mm dia. (OD) for UPVC/HDPE pipes for Rural W/S Schemes.
Minimum Pipe Dia.	For Urban W/S Schemes provision of Manual on Water Supply and Treatment published by CPHEEO shall be followed. ii) All connection to street taps for public distribution has to be done through ferrule of size not exceeding 6 mm.

	<p>iii) All distribution systems are to be designed using appropriate software. The $\delta C\delta$ value should be taken as specified in CPHEEO's current manual. (Vide letter no 1727/80/E/2004 dated 30.01.2006 of CE, Planning & WQM).</p>
Selection of pipe materials	<p>iv) Cost economics will be the primary criterion for selecting pipe materials for distribution system. In addition following points also need to be considered.</p> <ul style="list-style-type: none"> * The nature of soil, particularly in hard strata of undulating zone & soft strata of the delta region. * Accessibility of the area. * Social behavior of the beneficiaries, particularly towards illegal drawal of water for supply not meant for drinking purpose * Traffic load of concerned roads and prospect of urbanization of the particular mouza and
Pipe dia. upto 200 mm	<p>v) Both metallic and non metallic pipes may be considered for pipe dia. up to 200 mm, the selection being guided by the considerations indicated at 10 (iv) above. The respective BIS code for different types of pipes should also be consulted for this purpose.</p>
Pipe dia. above 200 mm	<p>vi) For diameter above 200 mm, use of metallic pipes and/ or HDPE pipes shall be preferred. But choice shall primarily be governed by capital cost economics, suitability and market availability.</p> <p>vii) For Saline areas use of UPVC/HDPE pipe is preferred.</p> <p>viii) For rocky areas use of HDPE/ DI K7 pipe is preferred.</p>
Road/Culvert crossings	<p>ix) For Road/Culvert crossings, heavy vehicular area use of metallic pipe with proper rapping/coating where applicable or HDPE pipe of suitable class may be used.</p>
Furthest end of the distribution system	<p>x) Furthest end of the distribution system from the reservoir should normally be within 3.0 km to 3.5 km. If necessary the area may be split up into zones to maintain it. However availability of minimum residual pressure at the furthest end will be the guiding factor.</p> <p>Headwork site should normally be in central position of the settlement area of the zone.</p>
Loss at Bends and Specials	<p>xi) The software available for design of distribution system does not account for losses in bends and specials. An allowance of 1.5 m to 2.5 m shall be considered for such losses while estimating staging height of overhead reservoir.</p>
Allowance for level difference	<p>xii) In case of undulating topography, levels have to be ascertained through actual survey work and the same should be considered in design of distribution system. However, in case of generally flat topography an allowance of 1m to 2 m may be considered depending</p>

	upon site condition to account for local depression.
Small offsets	xiii) For small offset up to 25 m in the distribution system length should not be considered.
House connections and Street Stand Posts	xiv) As per State Government's policy 100% house connection provision up to ultimate stage on design population has been kept in the DPR. Cost of individual house connection upto the premises of the owner with 1 (one) tap including cost of 6 mm Ferrule, 15 mm dia. PVC pipe of 30 m length (average) including cost of domestic meter, supporting arrangement all labour, valve etc. to be kept in the DPR. Provision of public distribution points shall be considered for 20% of the design population. One such point is to be provided for every 250 persons or part thereof. At least 1 Street Tap shall have to be provided for each habitations. Installation, provision for some public distribution points in prominent places like market, bus stand, religious congregation etc. has to be kept to utilise the project more effectively.
Provisions for Schools, Anganwadis, Health Centers	xv) One community tank with multiple faucet has to be provided to all source less schools, Anganwadis, Health Centers etc. (where the building is a Govt. property).
Hand wash facilities	xvi) Hand wash facilities with multiple tap to be provided in every schools where Mid-day meal is provided to the students. xvii) No proposal for operation and maintenance staff should be given in the DPR/PR.
b) Rising Main	xviii) Minimum Pipe size of Rising Main shall be 100 mm dia. (ID) in general. ix) For Urban W/S Schemes provision of Manual on Water Supply and Treatment published by CPHEEO shall be followed.
Economic Rising Main	x) Cost economics will be the primary criterion for selecting pipe materials for Rising Main and design of Economic Rising Main as per CPHEEO Manual shall be preferred.
Pipe materials	xi) Pipe material shall be DI K9 or HDPE PN 10 (PE 80) for normal rural PWSS. For large project MS pipe with proper rapping/coating shall be preferred. However, selection of material need be guided by design of Economic Rising Main and other technical parameters like water hammer, aggressiveness of soil, water table, buyout force etc.
11. Water Meter	Under present Govt. policy, water is in general supplied free of cost in rural areas and there is hardly any use of water meter. No provision of installation of water meter should be kept except in very big schemes where substantial part of water is transmitted for bulk supply/commercial uses. <i>Rates of one such type of meter (Turbine type PN-10, class B) for different dia. of pipes have been provided in annexure IX. Size of the water meters may be reduced suitably from the pipe diameter by using</i>

appropriate appurtenances.

This has the reference to memo no 8456/80/D/12 dated 17/04/2012 of the Chief Engineer, Planning & WQM, PHE Dte.

Reduction of the size of water meter should be made in conformity with latest version of IS:2373.

12. Pump
In view of the recent improvement in quality of submersible pumps, ease in maintenance and cost economics it has been decided that all tube wells shall be provided with submersible pumps.
13. Switch Room
Switch room shall be provided with space for chlorination with necessary other requirements. Sanitary & water supply arrangement to be provided in all TW sites and Headworks site(s). Size of switch room with water supply and sanitary arrangement should be 5.4 m x 3.6 m.

For without water supply and sanitary arrangements, size of switch room should be 3.6 m x 3 m. For smaller schemes use of Kiosk may be thought of to reduce the capital cost of the scheme.
14. Provision of Office-cum-Godown
For schemes with multiple number of zones, office-cum-godown to be provided in a single zone located centrally as far as practicable. However, if the number of zones exceeds 3 (three), more than one office-cum-godown may be provided at the discretion of the designer with techno-economical justification. In general, plinth area of office-cum-godown for each zone shall not be less than 60 m².
15. a) Selection of OHR
The storage capacity of the OHR(s) to be calculated on the basis of 1/3 rd of the ultimate water demand or Fire Fighting demand whichever is more rounded to nearest available size with the Dte. The OHR should not be kept in empty condition at any time.
Staging height of OHR will normally be considered as 20 m If less staging height is required due to topography of the command area, staging height may be reduced in accordance with available drawing of OHR lying with this directorate. There is no need for reduction of rate for OHR on account of reduction of staging height at the stage of preparation of DPR.

b) Provision of Pile foundation for OHR
Soil testing at heads work site(s) need to be done after acquisition of land in order to ascertain the type of foundation actually to be adopted for the OHR. But, for expeditious preparation of the scheme, the cost of pile foundation above 300 cum OHR may be considered in the DPR for all the cases under districts of Murshidabad, Nadia, South & North 24 Parganas, Howrah, Hooghly, lower part of Barddhaman, Maldah and Purba Midnapore.
In the left out districts the provision of pile foundation for OHRs shall not be considered normally upto the size of 750 cum until and unless an exceptional situation comes up.
However, in all cases pile foundation should be avoided as far as practicable.
16. Land
The requirement of land for Head Works Site for scheme with IEP and OHR facility ranges from 20-25 Cottah. In other cases where IEP is not required, land requirement for Head Works Site shall be within 15-20 Cottah. Land requirement for each additional site for tube well with

switch room is from 2-4 Cottah. However, requirement may vary due to various local factors e.g. the shape of the available land, approach facility, requirement of additional structures, seller's preference, etc. For big W/S schemes mainly surface water based or where ARP/FRP etc required to be constructed, requirement of land need to be assessed on case to case basis.

For PWSS based on river bed tubewell two sets of land of minimum 15 cottah each is required. One land is required near river bank for treatment etc. and the other at central position of the scheme for Headworks site.

Moreover, for expeditious preparation of the scheme, the land for Head Works may be identified considering technical requirement and the scheme prepared considering the identified site only. After the scheme is sanctioned, the proposed land may be acquired following the usual procedure of acquisition of land in vogue. **This has a reference of memo no PHE/1848/S dated 07.05.07 of E-in- C & Ex- Officio Secretary, PHE Dept. and memo. no. 10020 / MC / 3 / 07 dated 02-05-2007 of the Chief Engineer, Planning & WQM, PHE Dte.** In all cases longitude/latitude of all land proposal need to be incorporated.

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|--|---|
| 17. Provision of boundary wall/fencing | For calculation of length for boundary wall/fencing, length to breadth ratio of the land may be considered as 1.5:1 unless otherwise specified in the Final Investigation Report/Survey report. |
| 18. Power | As per Mechanical / Electrical schedule and guidelines. |
| 19. Cost estimate | <p>i) Unit cost of each item should be checked in the month of June of each year and if necessary, it should be revised. Uniform rates for all districts should be used except in special cases such as hills and riverine areas where enhanced provision as per PWD schedule of rates and that of Mechanical/Electrical works may be furnished separately.</p> <p>ii) Item on staff quarters shall be omitted except for surface water based water supply schemes. In general, plinth area of staff quarter shall not be less than 110 m².</p> <p>iii) In addition to all provision of the following items shall be kept in the DPR as per latest NRDWP guideline:</p> <p style="margin-left: 20px;">a) Cost of IEC & HRD activities @ 0.5% of the capital cost subject to a minimum of Rs 2 (two) lac and maximum 5 (five) lac including the cost of formal inauguration.</p> <p style="margin-left: 20px;">b) For command area falls within critical/ semi-critical blocks of the state departmental type ground water recharge/check dams/ other source sustainable structures. List of such critical/ semi-critical blocks are given in Annexure-XII.</p> <p style="margin-left: 20px;">c) Safe waste water disposal from the SSP to public drain.</p> <p style="margin-left: 20px;">d) 5 year Operation and Maintenance cost @ 2.5% for 1st & 2nd year, 3.5% for 3rd & 4th year and 5% per annum for 5th year (excluding cost of electricity but including the cost of all manpower, chemicals and day to day maintenance etc.).</p> <p style="margin-left: 20px;">e) Provision of SCADA shall be kept only for very large projects.</p> |
| Staff quarters | |
| IEC & HRD activities | |
| Critical/ semi-critical blocks | |
| 5 year O&M | |

- iii) Total capital cost shall be rounded off to the nearest thousand.
- Distribution Lump Sum cost iv) Project to which DPR cannot be prepared for time constrain, cost of distribution system may be considered as Rs. 800 per capita of design population in moderately populated (population density > 8 person per Ha) command areas in all the district of the state except Bankura, Purulia, Paschim Medinipur and Darjeeling district. For the above districts, same may be considered as Rs. 1000 per capita over design population.
- Appropriate weightage may be given for considering per capita cost of distribution system having lesser population density over the cost stated above.
- In case of existing schemes for remodeling of distribution system, the same may be considered as 60% in maximum of the above.
20. Contingency i) 3% on all items (both Civil & Mechanical/Electrical) except land cost.
21. Clearance of State Level Scheme Sanctioning Committee (SLSSC) Relevant details in support of the proposed source of a scheme along with index map, projected population and water demand of each scheme should be prepared observing the design norms and the same will be placed to the Scheme Sanctioning Committee for clearance of the source. Detailed estimate of the scheme shall be prepared thereafter for obtaining approval by the said committee. Reference of clearance of source may be incorporated in the Scheme Report / Scheme preface.
- In case of clearance of both Source and Scheme simultaneously by the State Level Scheme Sanctioning Committee, urgency of scheme preparation in anticipation of approval of SLSSC shall be stated clearly in the D.P.R / Scheme preface.
22. General While investigating & collecting data for piped water supply schemes, the Chairman of the Village Water Sanitation Committee (VWSC), wherever it exists, shall be discussed about their willingness to implement the distribution system, per-capita demand and maintenance of the same. All contact details and VWSC's opinion shall be recorded in a separate page with signature.
- While preparing the DPR the following data need to be provided:
- a) Rainfall Data upto Block level.
 - b) Topography detail including climatic condition, natural resources etc.
 - c) Existing water supply and sanitation details.
 - d) Details of Schools/ Anganwadis/ Health Centers/ ICDS Centers/ SSK/ MSK etc. on the basis of water supply and sanitary arrangements.
 - e) VWSC details.
 - f) Habitation details indicating 0-25%, 25-50%, 50-75% coverage and PC/FC/No Source/ Quality affected/ Slipped back etc.
 - g) Co-ordinates of all Habitations.
 - h) Co-ordinates of existing institutions.
 - i) Life Cycle cost approach for big projects.

SCHEDULE OF RATES (CIVIL)

(EFFECTIVE FROM 1ST July 2013)

(The rates and guidelines mentioned in the schedule will be used only for the purpose of formulation, planning & design of water supply schemes by PHE Dte. and will not be used for the purpose of any tender, quotation, payment, reference of rates in case of dispute etc by the executing divisions/circles)

Sl. No.	Description of Items	Rate
1.	<u>SURVEY WORK</u> Conducting route survey on command area map along the road, fixing up alignment, taking levels at every 50 m intervals and at each crossing & junction of road, change of alignment by engaging qualified surveyors and hiring of modern instruments viz. GPS, Total Station, DGPS, Auto levels etc. as necessary and preparation of drawing in Auto CAD or in similar software showing the alignment of road, route of rising main, location of Head Works & other Tube Well sites, important land marks in both side of the roads, habitation by hatch mark and submission of 6 (Six) copies of drawing (Hard Copy) as well as soft copy in (CD or DVD) with geo reference of all landmarks, important road crossings, head Works & other related sites to Department.	Rs. 6,000 per km (Subject to a minimum of 1 km of work)
2.	Estimate for hydro-geological study of sub-surface water flow / storage characteristics for creation of sustainable source on rain fed river of approximate 100 m wide for 10 km stretch in West Bengal.	Rs. 14,32,500.00
3.a)	Provision for 40 mm dia. trial boring up to a depth 300 m below G. L. with cost of labour, hiring of all materials etc. including collection of soil sample at each change of layer and testing of water to ascertain quality of water may be available from the proposed tube wells.	Rs.55,000.00
b)	Provision for 40 mm dia. trial boring up to a depth 30 m either on river bed or at the bank of the river with cost of labour, hiring of all materials etc. including collection of sample of strata and testing of water to ascertain quality of water may be available from the proposed tube wells.	Rs.20,000.00
4.	Cost of tube well may be estimated as per details given in Annexure.	Given in ANNEXURE ó I
5.	Cost of Construction of RCC overhead reservoir as per departmental design with a staging height of 20 m in the soil of safe bearing capacity minimum 75 kN/m ² upto a capacity of 500 cum and 100 kN/m ² above 500 cum capacity with suitable number of riser pipe(s), delivery, overflow etc. founded on solid raft conforming to IS: 3370-2009, IS:1893 and relevant codes considering Seismic Zone ó IV and Importance factor of 1.5 including cost of soil investigation.	Given in ANNEXURE ó II
6. (a)	Cost of construction of 3.6 m × 3.0 m size switch room cum chlorine room without water supply and sanitary arrangement including plinth protection with surface drain.	Rs.3,50,000.00
(b)	Cost of construction of 5.4 m × 3.6 m size switch room cum chlorine room with sanitary and water supply arrangements including plinth protection with surface drain.	Rs.6,00,000.00

<i>Sl. No.</i>	<i>Description of Items</i>	<i>Rate</i>
(c)	Cost of construction of pump house/switch room/ sub-station building for large projects beyond size of 200 m ² .	Rs. 17,000 /m ²
7.	Cost of construction of CWR (M30 grade concrete and conforming to IS: 3370-2009 & other relevant codes) in the soil of safe bearing capacity minimum 75 kN/m ² as per departmental drawing.	
i)	50 cum.	Rs.7.00 lakh.
ii)	100 cum.	Rs.12.80 lakh.
iii)	150 cum.	Rs.17.70 lakh.
iv)	200 cum.	Rs.22.60 lakh.
v)	Above 200 cum. (double compartment)	Rs.22.60 lakh + @ Rs.4.90 lakh for each additional 50 cum of capacity over 200 cum.
8.	a) Cost of construction of street stand post with platform.	Rs.5,000.00 each
	b) Cost of community tank including the cost of platform, waste water channel two no taps, man hole with locking arrangement etc. all complete as per departmental drawing.	Rs 25,000.00/cum.
	c) Cost of house connection with 15 mm dia. HDPE/PVC pipe (average length of 30 m) including the cost of 1 (one) no. 6 mm dia. Brass Ferrule, 1 (one) no. 15 mm dia. bib cock (Alloy iron bib cock with brass spindle tested to 21 kg/cm ²) etc. all complete as per departmental drawing.	Rs.3,340.00 each
	d) Cost of hand washing arrangement to be provided for Mid-day meal to every schools including the cost of platform, waste water channel etc. all complete as per departmental drawing.	Rs.5,870.00 each
9.	Management of waste water as per GOI, requirement from street stand post/community tank by providing connection to the existing sewerage/ drainage network, if any, or by making suitable arrangement (e.g. soak pit etc.) for final disposal of waste water after treatment, if necessary.	Rs.2,500.00 per Street Stand Post/community tank subject to minimum of Rs.15,000.00 per zone/scheme
10.	Cost of pipe connection around Head Works	Rs.3,00,000.00
11.	Unit cost of supplying, laying of Ductile Iron Pipes conforming to IS:8329 - 2000 with latest amendment, if any, including supply of valves, specials, third party inspection charges, hydraulic testing, disinfection etc. complete.	Given in ANNEXURE ó III
12.	Unit cost of supplying, laying of AC Pipes conforming to IS:1592 - 2000 with latest amendment, if any, including supply of valves, specials, third party inspection charges, hydraulic testing, disinfection etc. complete.	Given in ANNEXURE ó III

<i>Sl. No.</i>	<i>Description of Items</i>	<i>Rate</i>
13.	Unit cost of supplying, laying of UPVC pipes conforming to IS:4985 - 2000 with latest amendment, if any, including supply of valves, specials, third party inspection charges, hydraulic testing, disinfection etc. complete..	Given in ANNEXURE ó IV
14.	Unit cost of supplying, laying of HDPE pipes conforming to IS:4984 - 1995 with latest amendment, if any, including supply of valves, specials, third party inspection charges, hydraulic testing, disinfection etc. complete..	Given in ANNEXURE ó IV
15.	Unit cost of construction of sluice valve/wash out chamber.	Given in ANNEXURE ó V
16.	Construction of Office cum godown with internal illumination and sanitary and plumbing.	Rs.19,000.00/ m ² of plinth area
17.	Construction of staff quarter of with internal illumination and Sanitary & Plumbing (not for ARWSP and MNP schemes)	Rs.19,000.00/ m ² of plinth area
18.	<u>CHLORIONATOR</u> :	<i>As per Mechanical /Electrical schedule</i>
19.	Cost of Furniture for office.	Rs.75,000.00 (LS)
20.	<u>TRANSPORTATION COST</u>	
	a) Transportation cost of cement and steel from Central Store at Calcutta to local store.	1% of all civil cost excepting that of distribution system, rising main.
	b) Transportation cost for pipe materials	1.5% of all civil cost towards laying pipelines i.e. distribution system and rising main.
21.	a) Construction of Approach Road, Culvert, Internal Service Road, Drain, Land Development etc. (Subjective assessment to be made sub item wise).	@ 3.5%. of all civil cost excepting that of distribution system, rising main subject to a minimum of Rs.6,00,000/- For surface water based water supply schemes this shall be decided by the concerned planning wing of the Dte.
	b) Boundary Wall excluding cost of gate as per dept. drawing.	Rs.8,500.00/ m
	c) Fencing excluding cost of gate as per dept. drawing.	Rs.750.00/ m
	d) Cost of M.S. ornamental gate as per dept. drawing.	Rs.1,200.00/ m ²

<i>Sl. No.</i>	<i>Description of Items</i>	<i>Rate</i>
22.	Cost of land for Head Works and tube wells sites. (Actual cost of land will be finalized by the executing divisions with the consultation with the respective authority.)	Rs.60,000.00 per cottah provided land cost not available.
23.	<u>RIVER BED TUBEWELLS / GALLERIES FOR SCHEMES OF NORMAL SIZE</u>	
a)	Construction of 150/200 mm dia. tube well with horizontal strainer placed longitudinally with suitable anchorage arrangement and transversely with a depth not more than 5 m below river bed within rock bed, fitted with MS well pipe. Tee/cross, Blank Pipe including cost of labour, materials, dewatering arrangement etc. complete.	
	i) For 200 mm dia.	
	a) with 2 nos. × 2.0 m/2.4 m strainer	Rs.5,10,000.00
	b) with 4 nos. × 2.0 m/2.4 m strainer	Rs.5,40,000.00
	ii) For 150 mm dia.	
	a) with 2 nos. × 2.0m /2.4 m strainer	Rs.4,99,200.00
	b) with 4 nos. × 2.0 m/2.4 m strainer	Rs.5,10,000.00
b)	Sinking of 200 mm dia. tube well with 2 nos. vertical HDPE/L.C.G./PVC/GRP strainer fitted with MS well pipe. Tee, Blank pipe, necessary accessories including labour materials etc. & gravel shrouding up to 1.0 m above screen level.	
	i) up to 15 m depth	Rs.1,15,500.00
	ii) 15 m up to 30 m depth	Rs.1,57,500.00
24.	Laying of G.I. Delivery main connecting the river bed tube well and sump well in river bank including supply and erection of guard piles, cable pipe etc. including cost of cables, M.S. - Bracket, Clamp, U ó Bolt etc.	
	a) 80 mm dia. Pipes	Rs.1,690.00/m
	b) 100 mm dia. Pipes	Rs.2,090.00/m
	c) 150 mm dia. Pipes	Rs.2,780.00/m
25.	COST OF PRESSURE TYPE IRON ELIMINATION PLANT OF DIFFERENT CAPACITY FOR THE PURPOSE OF PREPARATION OF DPR	Given in ANNEXURE ó VI
26.	COST OF WATER TREATMENT PLANT OF DIFFERENT CAPACITY FOR THE PURPOSE OF PREPARATION OF DPR	Given in ANNEXURE ó VII
27.	COSTS OF ARSENIC CUM IRON REMOVAL PLANT FOR THE PURPOSE OF PREPARATION OF DPR	Given in ANNEXURE ó VIII
28.	RATES OF DESALINATION PLANT FOR THE PURPOSE OF PREPARATION OF DPR	Given in ANNEXURE ó IX

<i>Sl. No.</i>	<i>Description of Items</i>	<i>Rate</i>
	<u>MISCELLANEOUS</u>	
29.	Cost of energy charge.	Rs 6.00/kW (For WBSEDCL/CESC power supply only)
30.	Cost of pipe line crossing (upto 400 mm dia) by adopting trench less technologies (e.g. Jack Pushing method etc) for railway, National High Way or any other important road of heavy vehicular traffic of minimum 7.5 m carriage way where no other mode of crossing is possible, including the cost of outer most 600 mm dia. Hume Pipe (NP3/NP4) as casing pipe, all labors, material, tools and tackles, clearing of sites etc complete in all respect but excluding the cost of pipe carrying water.	Rs. 38,500.00/m
31.	a) For works in Riverine Area extra rates to be provided in riverine areas connected by river route and / or ferry crossing following extra rates shall be provided.	
	i) Hasnabad and Bhangor P.S.	15.00 %
	ii) Haroa, Canning, Kultuli, Namkhana, Kakdwip P.S.	15.00 %
	iii) Gossaba, Basanti, Sandeshkhali, Hingalganj, Minakhan P.S.	22.50 %
	iv) Pathar Pratima, Sagar P.S.	30.00 %
	v) All other areas under Kakdwip PWD Sub-Division excluding the jurisdiction of Kakdwip P.S. in riverine areas connected by river route and/or Ferry Crossing.	10.00 %
	vi) Bhutni under Manikchak P.S. in Maldah District	15.00%
	b) For works in Hilly region of Ajodhya in the district of Purulia (altitude more than 200 m)	10.00%
	c) For works in Hilly areas like Darjeeling, Kalimpong, and Kurseong extra rate to be provided over the normal rates as stated above.	20.00 %
	d) For works in Boxa hills of Jalpaiguri district	15.00%

ANNEXURE – I

COST ESTIMATE FOR TUBEWELLS

A. LABOUR CHARGE				
Sl. No.	Items	Unit	Rate (Rs.)	
1.	Boring including reaming			
	a) By Drilling Rigs			
	i) Upto 120 m. depth	m		980.00
	ii) Above 120 m. depth and upto 180m.	m		1120.00
	iii) Above 180 m. depth and upto 240 m	m		1260.00
	iv) Beyond 240 m. depth	m		1330.00
	b) By casing boring			
	i) Upto 120 m. depth	m		950.00
	ii) Above 120 m. upto 150 m. depth	m		980.00
2.	Fitting, fixing, jointing by welding or otherwise lowering etc.			
	i) Housing pipe : 350mm. dia.	m		220.00
	300 mm. dia.	m		205.00
	250 mm. dia.	m		180.00
	200 mm. dia.	m		163.00
	150 mm dia.	m		120.00
	100 mm dia.	m		91.00
	ii) Well Pipe: 200 mm. dia.	m		128.00
	150 mm. dia.	m		108.00
	100 mm. dia.	m		84.00
	40 mm dia.	m		56.00
	iii) Slotted pipe strainer (including charges for slotting)			
	200 mm. dia.	m		560.00
	150 mm. dia.	m		450.00
	100 mm. dia.	m		390.00
	iv) Fibre Glass/Brass/HDPE/LCG/SS/UPVC Strainer			
	200 mm. dia.	m		232.00
	150 mm. dia.	m		210.00
	100 mm. dia.	m		167.00
	40 mm dia.	m		126.00
3.	Supplying and fittings (bottom plug, reducer, cap clamp guide etc.)	LS		7,500.00
4.	Washed Gravel/Grit shrouding	m ³		2,500.00
5	Cement Sealing	LS		22,000.00
6.	Surging/Development & Yield Test (for new tube wells)	LS		40,000.00
7.	Transport of tubewell materials from Departmental store	LS		6,500.00
8.	Mobilization and site clearance	LS		8,500.00
9.	Electrical logging in the bore hole	LS		15,000.00
10.	Chemical and bacteriological testing of water sample including the cost of collection, carrying to designated PHE/other laboratories and submission of report in triplicate as per direction of EIC.	LS		5,000.00

B. COST OF MATERIALS				
Sl. No.	Items	Thickness (mm)	Unit	Rate (Rs.)
1.	<u>E.R.W. Pipes</u>			
	i) 100 mm dia.	5.0	m	766.00
		6.0	m	909.00
	ii) 150 mm dia.	5.0	m	1,144.00
		6.0	m	1,364.00
	iii) 200 mm dia.	5.4	m	1,617.00
		7.1	m	2,110.00
	iv) 250 mm dia.	7.1	m	2,640.00
	v) 300 mm dia	7.1	m	3,153.00
2.	<u>P.V.C. Pipes Medium Duty (Schedule 80)</u>			
	i) 100 mm dia.	8.6	m	703.00
	ii) 150 mm dia.	11.0	m	1,342.00
	iii) 200 mm dia.	12.7	m	2,038.00
	iv) 250 mm dia.	15.1	m	3,022.00
	v) 300 mm dia.	18.0	m	4,101.00
3.	<u>F.R.P. Pipes</u>			
	i) 100 mm dia.	5.0	m	928.00
	ii) 150 mm dia.	7.0	m	1,589.00
	iii) 200 mm dia.	7.5	m	2,332.00
	iv) 250 mm dia.	8.0	m	3,510.00
	v) 300 mm dia.	9.0	m	4,187.00
4.	<u>UPVC Casing Pipe (as per IS:12818-2010)</u>			
	i) 40 mm dia.	3.5	m	125.00
	ii) 50 mm dia.	4.0	m	181.00
	iii) 80 mm dia.	4.0	m	272.00
	iv) 100 mm dia.	5.0	m	436.00
	v) 150 mm dia.	7.5	m	952.00
	vi) 200 mm dia.	10.0	m	1723.00
	vii) 250 mm dia.	12.5	m	2721.00
	viii) 300 mm dia.	14.5	m	3719.00
5.	<u>HDPE Jacketed Strainers :</u>			
	i) 200 mm.dia.		m	6,077.00
	ii) 150 mm. dia.		m	3,763.00
6.	<u>UPVC Ribbed Strainer (as per IS:12818-2010)</u>			
	i) 40 mm dia.	12.7	m	180.00
	ii) 50 mm dia.	7.5	m	260.00
	iii) 80 mm dia.	5.0	m	360.00
	iv) 100 mm dia.	4.0	m	528.00
	v) 150 mm dia.	4.0	m	1166.00
	vi) 200 mm dia.	3.5	m	2544.00

<i>Sl. No.</i>	<i>I t e m s</i>	<i>Thickness (mm)</i>	<i>Unit</i>	<i>Rate (Rs.)</i>
7.	<u>Fibre glass reinforced epoxy resin slotted of 1mm slot size with 6.1 m length strainer</u>			
	i) 100 mm dia.	6.0	m	1699.00
	ii) 150 mm dia.	6.0	m	2540.00
	iii) 150 mm dia.	7.0	m	2949.00
	iv) 200 mm dia.	6.0	m	3345.00
	v) 200 mm dia.	7.0	m	3902.00

ANNEXURE - II

COST OF RCC OVERHEAD RESERVOIR

Sl. No.	Capacity (m ³)	Type of OHR	Cost of RCC OHR (in Rs. lakh)		Drawing	
			With RAFT	Add Extra for PILE with PILE CAP	Drawing No.	Revision
1.	100	Non-Intze	38	-	PC-I/OHR/03/2012	
2.	150	Non-Intze	46	-	PC-I/OHR/15/2012	
3.	200	Intze	51	-	PC-I/OHR/09/2012	
4.	250	Intze	55	-	PC-I/OHR/10/2012	
5.	300	Intze	61	-	PC-I/OHR/07/2012	
6.	350	Intze	70	21	PC-I/OHR/12/2012	R1
7.	400	Intze	78	22	PC-I/OHR/11/2012	R1
8.	450	Intze	87	22	PC-I/OHR/04/2012	R1
9.	500	Intze	96	22	PC-I/OHR/05/2012	R1
10.	600	Intze	113	26	PC-I/OHR/13/2012	
11.	700	Intze	127	30	PC-I/OHR/06/2012	R1
12.	750	Intze	131	30	PC-I/OHR/01/2012	R1
13.	900	Intze	146	36	PC-I/OHR/16/2012	
14.	1000	Intze	152	36	PC-I/OHR/17/2012	
15.	1250	Intze	180	42	PC-I/OHR/18/2012	
16.	1500	Intze	192	42	PC-I/OHR/19/2012	

ANNEXURE – III

**UNIT COST OF SUPPLYING, LAYING OF DI & AC PIPES
INCLUDING SUPPLY OF VALVES & SPECIALS**

DIAMETER OF PIPES	RATES OF DI PIPES (Rs./m)		RATES OF AC PIPES (Rs./m)	
	DI K-7	DI K-9	Class 10	Class 15
80 mm	-	-	324.00	-
100 mm	938.00	1082.00	381.00	-
125 mm	-	-	466.00	-
150 mm	1,393.00	1,595.00	553.00	-
200 mm	1,814.00	2,209.00	-	873.00
250 mm	2,390.00	2,948.00	-	1,052.00
300 mm	3,026.00	3,664.00	-	-
350 mm	3,787.00	4,601.00	-	-
400 mm	4,580.00	5,494.00	-	-
450 mm	5,324.00	6,540.00	-	-
500 mm	6,231.00	7,600.00	-	-
600 mm	8,314.00	10,333.00	-	-
700 mm	11,312.00	13,004.00	-	-
750 mm	12,999.00	14,609.00	-	-
800 mm	14,911.00	16,305.00	-	-
900 mm	18,046.00	19,732.00	-	-
1000 mm	22,223.00	24,232.00	-	-

Note :- 1) Latest issue rate of DI pipes (as on 16.05.2013) as well as AC pipes with DT joints (as on 01.04.2013) as received from EE, Resource Division has been adopted.

2) All DI pipes are ED exempted category.

ANNEXURE – IV

**UNIT COST OF SUPPLYING, LAYING OF UPVC & HDPE PIPES
INCLUDING SUPPLY OF VALVES & SPECIALS**

O.D. OF PIPES	RATES OF UPVC PIPES-(CLASS - III)		RATES OF HDPE PIPES GRADE - PE80 (PN-6.0)		RATES OF HDPE PIPES GRADE - PE80 (PN-10.0)	
	I.D. in mm	RATE	I.D. in mm	RATE	I.D. in mm	RATE
50 mm	46.6	177.00	44.2	190.00	40.8	229.00
63 mm	58.6	222.00	55.8	239.00	51.4	296.00
75 mm	69.8	264.00	66.4	293.00	61.2	380.00
90 mm	83.8	331.00	79.8	370.00	73.6	497.00
110 mm	102.6	427.00	97.4	493.00	90.0	681.00
125 mm	116.4	533.00	110.8	599.00	102.2	848.00
140 mm	130.4	618.00	124.0	692.00	114.4	1028.00
160 mm	149.2	767.00	141.8	897.00	130.8	1306.00
180 mm	167.8	932.00	159.6	1,095.00	147.2	1630.00
200 mm	186.4	1,146.00	177.2	1,324.00	163.6	1978.00
225 mm	209.4	1,425.00	199.4	1,632.00	184.0	2468.00
250 mm	233.0	1,733.00	-	-	-	-
280 mm	261.0	2,127.00	-	-	-	-
315 mm	293.6	2,701.00	-	-	-	-

ANNEXURE - V

UNIT COST OF CONSTRUCTION OF SLUICE VALVE, WASH OUT CHAMBER

Sl. No.	Nominal Dia.	Cost of construction of each Sluice Valve / Washout Valve chamber
1.	80 mm.	Rs.9,250.00
2.	100 mm	Rs.9,400.00
3.	125 mm	Rs.9,600.00
4.	150 mm	Rs. 9,600.00
5.	200 mm	Rs.11,000.00
6.	250 mm	Rs.11,250.00
7.	300 mm	Rs.12,800.00
8.	350 mm	Rs.13,100.00
9.	400 mm	Rs.13,500.00
10.	450 mm	Rs.14,000.00
11.	500 mm	Rs.14,000.00
12.	600 mm	Rs.14,000.00

ANNEXURE - VI

RATES OF PRESSURE TYPE IRON ELIMINATION PLANT

SL NO.	DESCRIPTION	RATE Rs.	UNIT
1	Designing, Supplying, fabrication, erection on suitable RCC foundation, commissioning with 3 (three) months trial run (including cost of routine testing of water sample for performance evaluation) of pressure type Iron removal plant as per design norms of the P.H.E. Dte with necessary accessories viz. MS fabricated shell with minimum 10 mm thick MS plate with 2(two) coats of anticorrosive paint & minimum 12 mm thick MS media supporting plate fitted with required no. of pot strainer, MS fabricated oxidation chamber with minimum 10 mm thick plate with necessary pipe connection, valves, Gauges & other instruments as required as per approved design & drawing including cost of filter media, Air compressor & Air blower with motor, starter, main switch etc. of required capacity & approved specification including power connection from main line etc., all complete, and construction of one compressor room with internal size 3.6 m × 3.0 m.		
	a) 5 cum/hr	Rs. 4.12 lakh	Each
	b) 10 cum/hr	Rs. 5.54 lakh	Each
	c) 15 cum/hr	Rs. 6.28 lakh	Each
	d) 25 cum/hr	Rs. 8.23 lakh	Each
	e) 50 cum/hr	Rs. 16.22 lakh	Each
	f) 75 cum/hr	Rs. 21.82 lakh	Each
	g) 100 cum/hr	Rs. 24.81 lakh	Each
	h) 125 cum/hr	Rs. 29.63 lakh	Each
	i) 150 cum/hr	Rs. 35.65 lakh	Each
	j) 200 cum/hr	Rs. 46.86 lakh	Each

Note: Interpolation may be made suitably to arrive the rates of any capacity in between the above capacities.

ANNEXURE - VII

RATES OF WATER TREATMENT PLANT OF DIFFERENT CAPACITY

SL NO.	DESCRIPTION	RATE Rs.	UNIT
1.	RAW WATER INTAKE		
A	Floating type		
(i)	Providing intake barge (floating) of minimum platform area of 100 sqm with M.S. structure as per latest B.I.S. and following all statutory norms along with G.I. corrugated roof, hand railing for installation of pump sets and other elect/mech. equipment etc. complete, painting of approved shade and make over a coat of anticorrosive paint including installation complete providing anchoring arrangement of barge and necessary accessories and safety equipment. Cost includes submission of detailed design with drawing (both soft and hard copies) showing all necessary arrangements, structural & hydraulic detail etc.	53,500.00	Sqm
ii)	Providing steel bridge with walkway of width 3m suitable to support delivery pipes, electrical cable etc. and the walkway, with suitable railing of M.S. angle complete from barge to bank of the river including suitable foundation on bank of river.	2,38,000.00	m
B	Fixed type		
	Construction of fixed type jetty head for facilitating erection of suction assembly, accommodating pumping machinery, working bay and also act as marine protection to the pump and other assemblies etc in tidal rivers supported on piles of appropriate size with tentative depth of 35m from HFL. Mini mum size 80 square mtr.	75,000.00	Sqm
C	Construction of pipe carriageway minimum 3m width to carry suction/delivery pipe up to the bank of the river with suitable RCC structure supported on column & adequate foundation/piles where necessary.	55,000.00	Sqm
2	TREATMENT UNIT		
i)	<p>Conventional type: Construction of surface water treatment plant consisting of</p> <p>Inlet well minimum 30 seconds detention time</p> <p>Flash mixer with agitator, parshall flume.</p> <p>Clarifloculators with scrapper, bridge, flocculating paddles, sludge breeding arrangement etc.</p> <p>Rapid Gravity Filters with under drainage systems, clear water and back wash water channels, filter media, air scouring and back washing arrangements with compressor & blower, all pipe connection and pneumatic valves and controls.</p> <p>Chemical house with all necessary arrangements for storing and dosing (e.g metering pumps, agitators, crushing machine, H.O.T/ Gantry Crane, Chlorine dozer etc.) of coagulant, coagulant aid, gaseous chlorine (Pre & Post) including automatic chlorine absorption system & other safety equipments, connections, wash water drains etc.</p> <p>Sludge pond with sludge sump & pump house, sludge pipes with recirculation and disposal arrangement.</p> <p>Laboratory building complete with standard laboratory equipments.</p> <p>Other allied works including necessary electro-mechanical works, yard and building lighting. Backwash reservoir with minimum 13 m staging height and a min. capacity to backwash at least one bed at a time after</p>		

	<p>satisfying the peak demand of W.T.P.</p> <p>Clear Water Reservoir (Min. 30 minutes detention time), Substation Building, Transformer & HT Room at Intake & WTP site, High Lift Pump House for CWR and Office Building (Min. 100 sqm) etc. all complete including trial run of 3 (three) months and 3 (three) months of maintenance after completion of the work but excluding SCADA System & Pumping Equipments for raw, clear and sludge water. Cost includes submission of detailed design with drawing (both soft and hard copies) showing all necessary arrangements, structural & hydraulic detail as per latest CPHEEO manual/ B.I.S codes.etc.</p> <p>a) Capacity from 10 MLD and up to 50 MLD</p> <p>b) Capacity greater than 50 MLD</p>	<p>55,50,000.00 per MLD</p> <p>27,75,00,000.0 0+39,00,000.0 0 per each additional MLD over 50 MLD capacity</p>	<p>MLD</p> <p>MLD</p>
ii)	<p>With tube settler: Construction of surface water treatment plant consisting of Inlet well minimum 30 seconds detention time Flash mixer with agitator, parshall flume Horizontal/vertical baffled flocculator with modular type tube settler. Rapid Gravity Filters with under drainage systems, clear water and back wash water channels, filter media, air scouring and back washing arrangements with compressor & blower, all pipe connection and pneumatic valves and controls. Chemical house with all necessary arrangements for storing and dosing (e.g metering pumps, agitators, crushing machine, H.O.T/ Gantry Crane, Chlorine dozer etc.) of coagulant, coagulant aid, gaseous chlorine (Pre & Post) including automatic chlorine absorption system & other safety equipments, connections, wash water drains etc. Sludge pond with sludge sump & pump house, sludge pipes with recirculation and disposal arrangement. Laboratory building complete with standard laboratory equipments, Other allied works including necessary electro-mechanical works, yard and building lighting. Backwash reservoir with minimum 13 m staging height and a min. capacity to backwash atleast one bed at a time after satisfying the peak demand of W.T.P. Clear Water Reservoir (Min. 30 minutes detention time), Substation Building, Transformer & HT Room at Intake & WTP site, High Lift Pump House for CWR and Office Building (Min.100 sqm) etc. all complete including trial run of 3 (three) months and 3 (three) months of maintenance after completion of the work but excluding SCADA System & Pumping Equipments for Raw, clear and sludge water. Cost includes submission of detailed design with drawing (both soft and hard copies) showing all necessary arrangements, structural & hydraulic detail as per latest CPHEEO manual/ B.I.S codes.etc.</p>		
	a) Capacity 5MLD and up to 20 MLD	47,60,000.00	MLD
	b) Capacity greater than 20 MLD & up to 50 MLD	95,20,000.00 + @ 36,30,000.00	MLD

		per MLD for each additional MLD beyond 20 MLD	
3.	Provision for land development, service roads, drains, boundary walls/fencing, gates etc. at WTP site etc. and beautification and arboriculture in headwork's sites including fountain, sculpture, landscape.	660.00	Sqm

Note: Rate for surface water treatment plant of capacity less than 5 MLD to be worked out during preparation of DPR by the concerned planning Circle of PHE Dte on case to case basis.

ANNEXURE-VIII

RATES OF ARSENIC-CUM-IRON REMOVAL PLANT (AIRP)

Sl. No.	Description of Item	Rate	Unit
1.	Construction of Arsenic-cum-Iron Removal Plant (AIRP) to reduce Arsenic concentration to 10 ppb (0.01 mg/l) and Iron to 100 ppb (0.1 mg/l) from influent concentration upto 500 ppb (0.5 mg/l) and 3000 ppb (3 mg/l) respectively (single / multi-stage) based on oxidation followed by chemical co-precipitation, filtration etc. and departmental process/hydraulic design consisting of inlet arrangement, oxidation chamber, flash mixer, flocculation and sedimentation unit, filtration unit with Back washing arrangement with air and water, back wash water tank of suitable capacity, and staging height, air compressors, blower etc., with or without activated alumina chamber all with pneumatic valves and control arrangements, clear water reservoir, Solid-liquid sludge separation bed with 100% recirculation facility, including the cost of all accessories & RCC sludge storage tank etc., chemical house-cum-store, administrative building, allied pipeline, integration of total plant etc. all complete with trial run for a period of 3 (three) months after completion of the works and 3 months maintenance after successful trial run including the cost of chemicals showing all necessary arrangements, structural & hydraulic detail based on departmental drawing but excluding the cost of pumping machinery (e.g. Raw water, clear water, sludge and recirculation pump) and electricity charges as per departmental drawing.		
A.	<u>Type-1 - Fully Gravity System with RG Filter</u> – with baffled flocculator, plain sedimentation tank, rapid gravity filter, with or without gravity type activated alumina chamber all complete as per departmental drawing no. PC-I/AIRP/Type-1/Sheet-1 & 2.	<u>As per Chart</u>	Each
B.	<u>Type-2 - Fully Gravity System with Mechanised Clariflocculator</u> – with mechanized clariflocculator, rapid gravity filter, with or without gravity type activated alumina chamber all complete as per departmental drawing no. PC-I/AIRP/Type-2/Sheet-1 & 2.		Each
C.	<u>Type-3 - Partial Gravity System with RG Filter and Pressurized Upflow Polishing Unit</u> – with mechanized clariflocculator, rapid gravity filter, with or without pressurized up-flow activated alumina chamber all complete as per departmental drawing no. PC-I/AIRP/Type-3/Sheet-1 & 2.		Each
D.	<u>Type-4 - Partial Gravity System with Pressure Filter and Pressurized Upflow Polishing Unit</u> – with mechanized clariflocculator, pressure filter, with or without pressurized up-flow activated alumina chamber all complete as per departmental drawing no. PC-I/AIRP/Type-4/Sheet-1 & 2.		Each

RATE CHART

COST OF CONSTRUCTION OF ARSENIC-CUM-IRON ELIMINATION PLANT (AIRP)
(in Rs. Lakh)

CAPACITY	UNIT	WITH ACTIVATED ALUMINA POLISHING UNIT				WITHOUT ACTIVATED ALUMINA POLISHING UNIT			
		TYPE -1	TYPE -2	TYPE -3	TYPE -4	TYPE -1	TYPE -2	TYPE -3	TYPE -4
5 Cum/Hr.	1 Unit	39	-	-	-	-	-	-	-
10 Cum/Hr.	1 Unit	51	-	-	-	-	-	-	-
20 Cum/Hr.	1 Unit	60	-	-	-	-	-	-	-
30 Cum/Hr.	1 Unit	115	110	114	110	101	96	97	93
40 Cum/Hr.	1 Unit	121	114	117	113	104	97	97	93
50 Cum/Hr.	1 Unit	129	120	122	118	108	99	99	95
60 Cum/Hr.	1 Unit	137	127	129	126	113	103	102	99
70 Cum/Hr.	1 Unit	147	135	137	136	119	107	106	105
80 Cum/Hr.	1 Unit	157	143	-	-	125	112	-	-
90 Cum/Hr.	1 Unit	168	153	-	-	133	119	-	-
100 Cum/Hr.	1 Unit	180	163	-	-	141	125	-	-
110 Cum/Hr.	1 Unit	192	173	-	-	149	133	-	-
120 Cum/Hr.	1 Unit	206	192	-	-	158	140	-	-
130 Cum/Hr.	1 Unit	216	193	-	-	168	148	-	-
135 Cum/Hr.	1 Unit	222	203	-	-	173	153	-	-
140 Cum/Hr.	1 Unit	228	203	-	-	178	157	-	-
150 Cum/Hr.	1 Unit	241	215	-	-	189	165	-	-
160 Cum/Hr.	1 Unit	253	221	-	-	199	173	-	-
170 Cum/Hr.	1 Unit	265	230	-	-	210	181	-	-
180 Cum/Hr.	1 Unit	276	249	-	-	221	188	-	-

ANNEXURE - IX

RATES OF DESALINATION PLANT

SL NO.	DESCRIPTION	RATE Rs.	UNIT
1	Design, supply, delivery, installation and commissioning of Desalination plant through Reverse Osmosis of different capacity to treat raw water of maximum TDS of 5000 ppm & iron content upto 5.0 ppm to the desirable limit as per latest CPHEEO/BIS guidelines with necessary pretreatment unit (e.g. Multigrade filter, Activated Carbon filter, Iron removal filter, Softner, Fine filtration, pre-chlorination etc.) including high pressure suction pump, construction of room (5.4 m x 3.6 m) for the R.O Unit, raw & clear water storage tank (upto maxm. capacity of 50cum), foundation, drain, pipe supports, pipe connection , instrumentation, local electrical connection from the main, trial run (3 months) after successful commissioning and Including all taxes, duties & charges etc. all complete with appropriate rejects management conforming to State/Central Pollution norms.		
	a) 5 cum/hr net capacity	Rs. 40.00 lakh	Each
	b) 10 cum/hr net capacity	Rs. 75.00 lakh	Each
	c) 20 cum/hr net capacity	Rs. 104.00 lakh	Each
	d) 25 cum/hr net capacity	Rs. 123.00 lakh	Each

Note: Interpolation may be made suitably to arrive the rates of any capacity in between the above capacities.

ANNEXURE - X**DECADAL GROWTH RATE (REF: CENSUS 2011)
STATE – WEST BENGAL**

District Code	Districts	Population			Percentage Decadal Growth (Persons) 2001 - 2011		
		Total	Rural	Urban	Total	Rural	Urban
1	2	3	4	5	6	7	8
	West Bengal	9,13,47,736	6,22,13,676	2,91,34,060	13.93	7.73	29.90
01	Darjiling	18,42,034	11,23,859	7,18,175	14.47	3.23	38.00
02	Jalpaiguri	38,69,675	28,25,001	10,44,674	13.77	1.10	72.14
03	Koch Bihar	28,22,780	25,33,480	2,89,300	13.86	12.42	28.23
04	Uttar Dinajpur	30,00,849	26,38,662	3,62,187	22.90	22.88	23.01
05	Dakshin Dinajpur	16,70,931	14,34,856	2,36,075	11.16	9.84	19.92
06	Maldah	39,97,970	34,46,056	5,51,914	21.50	13.00	129.07
07	Murshidabad	71,02,430	56,97,224	14,05,206	21.07	10.97	91.78
08	Birbhum	35,02,387	30,54,019	4,48,368	16.15	10.77	73.50
09	Bardhaman	77,23,663	46,44,079	30,79,584	12.01	6.80	20.91
10	Nadia	51,68,488	37,30,897	14,37,591	12.24	2.91	46.76
11	North Twenty Four Parganas	1,00,82,852	42,75,724	58,07,128	12.86	4.71	19.71
12	Hugli	55,20,389	33,88,395	21,31,994	9.49	1.02	26.32
13	Bankura	35,96,292	32,95,613	3,00,679	12.64	11.43	27.81
14	Puruliya	29,27,965	25,54,584	3,73,381	15.43	11.99	46.18
15	Haora	48,41,638	17,76,970	30,64,668	13.31	-16.22	42.41
16	Kolkata	44,86,679	0	44,86,679	-1.88	0.00	-1.88
17	South Twenty Four Parganas	81,53,176	60,65,179	20,87,997	18.05	4.20	92.23
18	Paschim Medinipur	59,43,300	52,28,308	7,14,992	14.44	14.26	15.74
19	Purba Medinipur	50,94,238	45,00,770	5,93,468	15.32	11.10	62.09

ANNEXURE - XI

**CRITICAL & SEMI-CRITICAL BLOCKS (REF: CGWB)
STATE – WEST BENGAL**

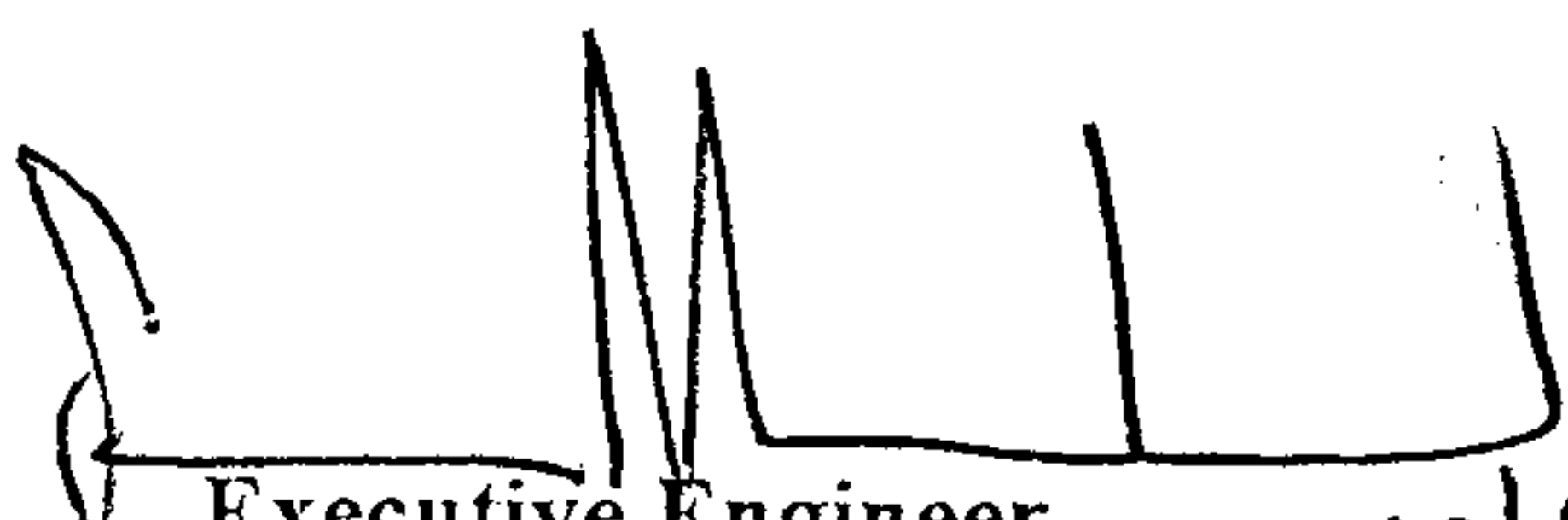
Sl. No.	Districts	Semi-Critical Blocks	Critical Blocks	Remarks
1	Maldah	Harischandrapur-II, Kaliachak-I	-	
2	Murshidabad	Barwan, Berhampur, Bhagawangola ó I, Bhagawangola ó II, Hariharpara, Jalangi, Lalgola, Murshidabad-Jiaganj, Nawda, Raninagar-I, Bharatpur ó I, Suti-II, Sagardighi, Domkal, Nabagram	Bharatpur-II	
3	Birbhum	Nalhati-II, Nanoor, Murarai-II, Rampurhat-II	-	
4	Barddhaman	Bhatar, Ketugram-I, Mangalkote, Memari-II, Monteswar, Purbasthali-II	-	
5	Nadia	Chapra, Hanskhali, Karimpur-I, Karimpur-II, Tehatta-I, Tehatta-II	-	
6	Paschim Medinipur	Daspur-II	-	
7	Purba Medinipur	Moyna	-	
8	Hugli	Goghat-I, Pandua	-	


MECHANICAL/ELECTRICAL WORKS

General Guidelines for preparation of D.P.R. of T/well based Piped Water Supply Schemes:

For Tube well based installations.

1. Generally in all the cases of T/well based installations unmanned operation of pumping machinery to be considered as per departmental guidelines. (Refer Memo No: PHE/1150/S/1(19) dtd. 20/04/2005, PHE/1378/S/2(1-2) dtd. 18/05/2005 & PHE/1500/S dtd. 19/06/2006 of Engineer-in-Chief; P.H.E.D)
2. However in cases of T/well based installation operated through Diesel Generating set manned operation of pumping machinery to be considered.
3. For riverbed T/well based installation involving double stage pumping maximum head of submersible pump in riverbed T/well may preferably be restricted within 25 mtrs range considering increasing length of pump/motor set with higher head which may not be suitable for riverbed T/wells which are generally shallow in nature. Also in such installations discharge of individual pump in the riverbed T/well may preferably be restricted to **6000 GPH (27.5 cu.m/hr)**.
4. In certain cases of riverbed T/well installation in remote areas unmanned operation of pumping machinery may not be suitable. Thus case specific judicious approach to be followed regarding final selection of mode of operation of pumping machinery.
5. Considering common scenario of voltage fluctuation/ prolonged low voltage situation in rural areas, both in cases of both riverbed & ground bore T/well based installation where L&MV service connection is to be effected inclusion of low voltage pump or suitable voltage stabilizer is suggested as per site condition.
6. Injector/ Hydraulic Diaphragm type Automatic Chlorinator (metering pump) for feeding controlled dosage of chlorine solution to be generally considered in both riverbed & ground bore T/Well based depending on the delivery line pressure for installations of small size. However in case of large W/s schemes with 2 stage pumping gaseous chlorination with baby cylinder and similarly for installations above 1.0 MLD capacity general gaseous chlorination may be adopted after considering techno-economic aspects. For Ground Bore T/Wells based scheme with T/Wells in different locations with separate Pump Starter, separate Chlorinator to be considered for effective dosing and synchronization. For injector/ hydraulic diaphragm type automatic chlorination system NADCC Granules/ Powder as per IS-15773 or other BIS approved disinfectants may be used.
7. For Solar Powered T/Well based schemes adequate provision of Shadow Free area and Battery / Power Unit Room in addition to Pump House to be properly considered as per table enclosed. The Battery / Power Unit room shall have an inside partial separation wall between battery bank and power unit. The Height of Battery / Power Unit room will be same as Pump House and adjacent to it with common construction may be considered. Battery/ Power Unit Room will be in the scope of civil work.


Executive Engineer
Mechanical/Electrical Planning Wing
P.H.E. Dte.
19/06/17


Superintending Engineer
Mechanical Circle-I
P.H.E. Dte.
19.6.17

**GOVERNMENT OF WEST BENGAL
OFFICE OF THE EXECUTIVE ENGINEER
MECHANICAL/ELECTRICAL PLANNING WING
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Unit Cost of Mechanical/ Electrical Works (Effective from 01.07.2013)

<i>Sl No.</i>	<i>Description of work</i>	<i>Rate (Rs.)</i>	<i>Unit</i>	<i>Remarks</i>
1	Cost of drawing power transmission line including service connection charges payable at WBSEDCL where A] 11KV power line where installed load is more than 50KVA & upto 1499 KVA. B] 33KV Power line where installed load is 500KVA & above.	12,00,000.00 15,00,000.00	/KM /KM	This includes cost of drawal of power line & service connection charges payable to WBSEDCL for 11/0.433 KV departmental of Sub- Station. This includes cost of drawal of power line & service connection charges payable to WBSEDCL for 33/6.6 KV departmental of Sub- Station.
2	Cost of outdoor type departmentally providing Sub-station A] For 11/0.433KV Pole mounted Transformer up to 100KVA B] For 11/0.433KV Base mounted Transformer above 100KVA & up to 250KVA. C] For 11/0.433KV Base mounted Transformer above 250KVA & up to 500KVA	16,000.00 18,000.00 20,000.00	/KVA /KVA /KVA	This includes the cost of Transformer & other accessories [HT and LT] including AVR arrangement as required. No sub station bldg. will be required for outdoor type substation.
3	Cost of indoor type dept. providing departmentally Sub- station (applicable for 125 KW & above running load incl. cost of Transformer 11/0.433 KV. a) Providing indoor type base mounted Transformer of up to 500 KVA 11/0.433 KV. b) Providing indoor type base mounted v above 500 KVA Upto 750 KVA. c) Providing indoor type base mounted Transformer above 750 KVA upto 1000 KVA.	13,500.00 14,000.00 15,500.00	/KVA /KVA /KVA	This includes the cost of TRF & other accessories as required. Substation bldg. will be required incl. LT panel, Transformer, WBSEDCL metering switch room & other accessories as required. (Substation building should be of minimum size of 13.5 m X 11.25 m.)

Sl No.	Description of work	Rate (Rs.)	Unit	Remarks
4	Cost of S.C. charges payable to WBSEDCL where installed load is less than 50KVA.	7,50,000.00	/KM	Applicable for smaller installation where power line will be executed by WBSEDCL.
5	Cost of permanent electrification which includes internal & external electrification of pump house, chlorination room, compound lighting etc. at pumping station & OHR site.	5,00,000.00	Inst.	Tube well based installation.
6	Panel for unmanned operation with PLC with actuator operated wafer type butterfly valve. a) Up to 5 HP b) From 6 HP To 10 HP c) From 11 HP To 15 HP d) From 16 HP To 20 HP e) From 21 HP To 25 HP f) From 26 HP To 30 HP	3,75,000.00 4,25,000.00 5,00,000.00 5,50,000.00 6,00,000.00 6,50,000.00	Each Each Each Each Each Each	Purely for tube well based water supply schemes.
7	Pumping machinery Submersible pump excluding panel for unmanned operation a) Up to 5 HP b) From 6 HP To 10 HP c) From 11 HP To 15 HP d) From 16 HP To 20 HP e) From 21 HP To 25 HP f) From 26 HP To 30 HP	2,50,000.00 2,75,000.00 3,50,000.00 4,00,000.00 4,50,000.00 5,00,000.00	Each Each Each Each Each Each	The cost is inclusive of column pipe, valves, specials, submersible cable connection from motor to starter & starter to main switch.
8	Horizontal split casing centrifugal pump with corresponding capacity motor set. a) Up to 10 HP b) From 11 HP To 15 HP c) From 16 HP To 20 HP d) From 21 HP To 25 HP e) From 26 HP To 30 HP	4,00,000.00 5,00,000.00 6,00,000.00 7,00,000.00 8,00,000.00	Each Each Each Each Each	

<i>Sl No.</i>	<i>Description of work</i>	<i>Rate (Rs.)</i>	<i>Unit</i>	<i>Remarks</i>
9	H.O.T crane with lift 8 mtr. Travel 12 m. a) 1.5 ton b) 3.0 ton c) 5.0 ton	6,00,000.00 7,25,000.00 10,00,000.00	Each Each Each	Crane with hoisting arrangement.
10	Supply and installation of Injector/ Diaphragm type Automatic Chlorinator for feeding controlled dosages of chlorine solution in pumping delivery line ó i) Capacity 0 ó 100 lph , 10 kg/cm ² Test pressure ii) Capacity 0-200 lph, 10-12 kg./cm ² Test pressure	1,50,000.00 3,50,000.00	Each Each	For deep tube well based water supply schemes. Chlorinator to be properly selected depending on quantum of solution required to maintain desired residual chlorine level as well as delivery line pressure
11	Supply & Delivery of NADCC in Granules/ Powder form as per IS-15773 as disinfectant.	1050.00	/Kg	Apart from NADCC other BIS approved disinfectant may also be used.
12	Chlorination for automatic/ manual gaseous dozing with 2 nos. baby cylinder [100kg], 2 nos. boosting pump, vacuum regulator, auto-change over, hoisting arrangement including supply and installation.	18,50,000.00	Each	For deep Tube Well based water supply schemes where chlorine will used for oxidizing as as well as disinfection both in pre and post chlorination.
13	Chlorination by automatic/ manual gaseous chlorination unit by 2x5 kg/hr. auto cum manual with Chlorinator accessories, toner [1000 kg], chlorine analyzer, safety kit, toner and other allied accessories.	30,00,000.00	Each	For General Guidelines for Chlorination Plants including handling, storage & safety of Chlorine Cylinder & Drums relevant BIS Code No: 10553 (Part-I) to be followed.
14	Electro-chlorination	9,00,000.00	Each	
15	Voltage Stabilizer (3 ph) with accessories and installation. a) Up to 10 KVA b) above 10 KVA to 15 KVA c) above 15 KVA to 20 KVA d) above 20 KVA to 25 KVA e) above 25 KVA to 30 KVA f) above 30 KVA to 50 KVA	3,50,000.00 4,00,000.00 4,50,000.00 5,25,000.00 6,00,000.00 7,50,000.00	Each Each Each Each Each Each	Stabilizer Rating to be suitably selected considering water pump motor and chlorinator/ other load with necessary margin.

<i>Sl No.</i>	<i>Description of work</i>	<i>Rate (Rs.)</i>	<i>Unit</i>	<i>Remarks</i>
16	3 Ph Air-Cooled Weather proof Green Diesel Generating Sets (D.G.) with accessories and including installation.			
	a) 5 KVA (single ph)	4,00,000.00	Each	Generator Rating to be suitably selected considering water pump motor and chlorinator/ other load with necessary margin.
	b) 10 KVA	5,00,000.00	Each	
	c) 15 KVA	5,60,000.00	Each	
	d) 20 KVA	6,60,000.00	Each	
	e) 25 KVA	7,00,000.00	Each	
	f) 30 KVA	8,50,000.00	Each	
	g) 35 KVA	9,00,000.00	Each	
	h) 50 KVA	11,25,000.00	Each	

Single Phase Pump (Up to 3 HP Rating):

<i>Sl No.</i>	<i>Description of work</i>	<i>Rate (Rs.)</i>	<i>Unit</i>	<i>Remarks</i>
1.	Single Phase Submersible Pump with rating upto 3 HP with supply and installation			Rate given for each T/well.
	a) Pumping Machinery, Motor Starter, Panel, other Electrical accessories and all other allied accessories like pipe, pipe specials etc. all complete for manned operation.	3,00,000.00	Each	
	b) i. Pumping Machinery & other allied accessories for unmanned operation	2,50,000.00	Each	
	ii) PLC Panel with actuator and wafer type Butterfly Valve for unmanned operation.	3,75,000.00	Each	
	c) Chlorination arrangement: Metering Pump	1,50,000.00	Each	
	d) Voltage Stabilizer: 5 KVA (1ph)	2,50,000.00	Each	
	e) Indoor/ Outdoor electrification	50,000.00	Each	
	f) Service Connection Charges	3,00,000.00	Each	

TYPICAL LAYOUT OF 11 KV / 0.433 KV, UPTO 500 KVA SUB STATION

SUPPLIER[WBSEDCL] H.T.[11 KV] BREAKER ROOM 5000MM X 5000MM	CONSUMER 11 KV VCB PANEL ROOM 5000MM X 5000 MM	500KVA, 11KV/0.433KV STABILISED TRANSFORMER ROOM 10000MM X 5000MM
OFFICE ROOM 5000MM X 5000MM	STORE ROOM 5000MM X 5000MM	L.T. PANEL ROOM 10000MM X 5000MM

Others :

1. The substation building height should be 4.5 mtr.
2. Supplier H.T. Breaker Room – No ventilation, No window, only shutter of 3.5 mtr. height.
3. Consumer H.T. Breaker Room – 2 nos. exhaust fan for ventilation, No window, Louvers at lower side, Shutter height 3.5 mtr.
4. Transformer Room – 2 nos. exhaust fan for ventilation, shutter height 3.5 mtr.
5. L.T. Panel Room – 2 nos. exhaust fan for ventilation, Shutter height 3.5 mtr.
6. Transformer Room dimension considered for installation of dual transformer.

TYPICAL LAYOUT OF 33 KV / 6.6 KV, ABOVE 500 KVA SUB STATION

<p align="center">SUPPLIER[WBSEDCL] H.T.[33 KV] BREAKER ROOM 5000MM X 8000MM</p>	<p align="center">CONSUMER 33 KV VCB PANEL ROOM 5000MM X 8000 MM</p>	<p align="center">500KVA, 33KV/6.6KV STABILISED TRANSFORMER ROOM 10000MM X 8000MM</p>	
<p align="center">OFFICE ROOM 3000MM X 5000MM</p>	<p align="center">STORE ROOM 3000MM X 5000MM</p>	<p align="center">AUXILLIARY TRANSFORMER ROOM 6.6KV/0.433KV 5000MM X 5000MM</p>	<p align="center">L.T. PANEL ROOM 9000MM X 5000MM</p>

Others :

1. The substation building height should be 5 mtr.
2. Supplier H.T. Breaker Room – No ventilation, No window, only shutter of 4 mtr. height.
3. Consumer H.T. Breaker Room – 2 nos. exhaust fan for ventilation, No window, Louvers at lower side, Shutter height 4 mtr.
4. Transformer Room – 2 nos. exhaust fan for ventilation, shutter height 4 mtr.
5. L.T. Panel Room – 2 nos. exhaust fan for ventilation, Shutter height 4 mtr.
6. Transformer Room dimension considered for installation of dual transformer.

SOLAR POWER PROVISION

<i>Sl No.</i>	<i>Description of work</i>	<i>Rate (Rs.)</i>	<i>Unit</i>	<i>Remarks</i>
1.	<p><u>Independent Solar Power Plant:</u> Cost of providing independent Solar Power Plant capable of delivering steady AC Power 3ph: 415V and or 1ph: 220V; 50Hz frequency, pure sine wave output as per required load for operation of all electro-mechanical accessories in the water supply scheme like submersible pumps of different capacity simultaneously with suitable rating automatic chlorinator for 6 hrs continuous/ staggered operation per day with preferably 2 days (12 hours) autonomy including operation of single phase lighting system at night.</p> <p>The scope of work includes supply of all requisite materials at site like SPV module with cells of mono/ polycrystalline type along with necessary mounting structure (Suitable to for saline weather and SPV Module should be mounted at a minimum height of 5 ft from ground level to avoid flood water) , allied battery bank (Lead Acid/ Maintenance Free Battery with Battery Rack & Connectors), inverter, power conditioning unit including MPPT; necessary cabling work and all other allied accessories including installation at site all complete to provide desired power output as mentioned.</p> <p>All components shall be as per MNRE guided specifications. SPV Module: As per IEC61215, 61730 & 61701 with RFID tag Solar Charge Controller/ MPPT/ Inverter: As per IEC 61683/ IS 61683</p> <p>General Solar Plant Capacity: (Maxm. Running load X Running Hrs/Day)/2.5 (ref enclosed table)</p> <p>Open Shadow free area required: (ref enclosed table)</p> <p>Room area required for Battery Bank/ Power Conditioning Unit etc. (outside the scope of work; client's scope) (ref enclosed table)</p>	4,50,000/-	/KWp	Rate given for per KWp Solar Power Plant of each T/well.

**Table for Pump Load Vs Solar Plant KWp and
Battery Bank/ PCU Area & Open Space requirement**

Sl.No.	Pump Load	Total Maxm. Running Load including Chlorinator/ Lighting Arrangement	Solar Power Plant Capacity (Kwp)	Room Area Required for Battery Bank & Power Conditioning Unit. (Height of Room same as Pump House with partial separation wall inside)	Open Shadow free Area (@ 15.0 sq.mtr per KWp of Solar Plant Capacity)
1	1.0 HP (Single phase)	3.0 KW	8.0 KWp	16.0 sq. mtr.	120 sq mtrs
2	2.0 HP (Single phase)	4.0 KW	10.0 KWp	20.0 sq. mtr.	150 sq mtrs
3	3.0 HP (Single phase)	4.5 KW	11.0 KWp	38.0 sq. mtr.	165 sq mtrs
4	4.0 HP (3ph)	6.0 KW	15.0 KWp	48.0 sq. mtr.	225 sq mtrs
5	5.0 HP (3ph)	6.5 KW	16.0 KWp	48.0 sq. mtr.	240 sq mtrs
6	6.0 HP (3ph)	7.0 KW	17.0 KWp	48.0 sq. mtr.	255 sq mtrs
7	7.5 HP (3ph)	8.5 KW	21.0 KWp	75.0 sq. mtr.	315 sq mtrs
8	10.0 HP (3ph)	10.0 KW	24.0 KWp	85.0 sq. mtr.	360 sq mtrs
9	12.5 HP (3ph)	12.0 KW	29.0 KWp	85.0 sq. mtr.	435 sq mtrs
10	15.0 HP (3ph)	14.0 KW	34.0 KWp	85.0 sq. mtr.	510 sq mtrs

N.B.: The above rates have been formulated for rural water supply schemes with Tube wells having pumping machinery.

Surface water based W/s Scheme:

1. The selection of Pump/ Motor as well as capacity and type of Sub-station in case of surface water based schemes generally with higher discharge & head depends on overall plant design and site condition as well as related distribution system details which in turn influences design of mechanical/ electrical system and sub-station electrical load and accordingly it would not be prudent to arrive at a rough estimated cost based on unit plant capacity for preparation of schedule.
2. Apart from the above considering the options available, various types of auxiliary/ ancillary mechanical/ electrical systems like logic control / SCADA system and others can be adopted in a surface water based plant design depending on practical suitability which influences cost component to a great extent. Technologies in this field are also rapidly advancing in a comparatively short span. It is always advisable to select above components for big surface/sub surface water based water supply schemes only after finalization of all the required parameters to avoid problem of cost fluctuation, synchronization of the total plants etc.

However in general cost of Mechanical/ Electrical components of above category of projects can be assumed as 30% of the project cost for budgetary purpose. Out of that 8-10% can be considered as service connection cost for the said project.

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