



बिहार सरकार

लोक स्वास्थ्य अभियंत्रण विभाग

Booklet

For

“Har Ghar Nal Ka Jal” Schemes



हर घर -
नल का जल

Index

Sr. No.	Name of Components	Page No.
1	High Yield Tube Well	1-15
2	Masonry Chamber	16-17
3	Submersible Pump Set	18-24
4	MS Control Panel	25-28
5	Pipe Earthing	29
6	8 M Steel Staging For 10,000 Litre PVC Tank	30-43
7	Distribution Network	44-53
8	Stand Post	54-57
9	Water Treatment Plant	58-86
10	Chlorinator	87
11	Item wise Description for Repairing/New installation For PRD Transferred "Har Ghar Nal Ka Jal" Scheme	88-94
12	"Har Ghar Nal Ka Jal" Scheme At a Glance	95

1. HIGH YIELD TUBE-WELL

INTRODUCTION:-

- We can't imagine the "Har Ghar Nal Ka Jal" Scheme without this vital component, i.e. boring (HYTW). In practice of construction of any "Har Ghar Nal Ka Jal" Scheme, first of all, we ensure successful boring and its discharge, then only we proceed for construction of other components like pipe laying, HC, etc. Because if the boring is not successful with enough discharge then we can't provide adequate water to beneficiaries.
- So, we should be very vigilant and careful during the construction of boring in the field. We need to pay attention on quality of materials used in boring and also workmanship is highly important to monitor like where to place a screen is one of the most crucial activities in boring construction.
- We provide different types of boring for different soil strata in Bihar.

Usually, we provide three types of boring in Bihar, which are as follows-

- A. 150 mm X 125 M Deep Gravel Packed Tubewell
- B. 150 mm x 100 mm x 125 M Deep HYTW
- C. 200 mm x 150 mm x 125 M Deep Drilled HYTW by DTH Rig Machine

Continued...

POPULATION FORECAST FOR DESIGN

(For Illustration Only)

INPUT POPULATION (Assumed)			
BASE YEAR	2016	POPULATION DATA FOR LAST	
INTERMED. YEAR	2031	3 DECADES	
FINAL YEAR	2046	Year	POPULATION
		1991	35522
		2001	54449
		2011	67339

1st Process Adopted : GEOMETRICAL INCREASE METHOD

Computation of Incremental Difference			
Year	Population	Increase in Population	% Increase In population
1991	35522		
2001	54449	18927	53
2011	67339	12890	24

Continued...

Geometrical Mean $r_g = 0.355$

Population in 2016 = Population in 2011 x $(1 + r_g)^{(2016-2011)/10}$

Population in 2016 = 78390

Increment Factor = $(1 + r_g)^{(Year-2011)/10}$

Projected Population = Population in 2011 x Increment Factor

ESTIMATION OF POPULATION IN DESIGN YEAR

Description of period	Year	Increment Factor	Projected Population
Base Year	2016	1.16	78390
Intermediate Year	2031	1.84	123665
Ultimate year	2046	2.90	195089

Continued...

2nd Process Adopted : AIRTHMATICAL INCREASE METHOD

Computation of Incremental Difference

Year	Population	Increase in Population
1991	35522	
2001	54449	18927
2011	67339	12890

Average increase(Per Decade) in population= $15909 = (12890+18927)/2$

Population for 2016= Population in 2011 + Increase for 0.5 Decade

Hence Population of 2016 = $67339 + (2016-2011)/10 \times 15909 = 75293$

Increment Factor = $(\text{Design Year} - \text{Year 2011})/10$

Estimation of population in the Design Year

Description	Year	Increment Factor	Projected Population
Base Year	2016	0.50	75293
Inter. Year	2031	2.00	99156
Final Year	2046	3.50	123019

3rd Process Adopted : INCREMENTAL INCREASE METHOD

Year	Population	Increase in Population (X)	Incremental Increase (Y)
1991	35522		
2001	54449	18927	
2011	67339	12890	-6037
	Total	31817	-6037
	Average	15909	6037

Continued...

$P_n = P_1 + n X + n(n+1)Y / 2$; Where n = nos. of decade.

$$P_{2016} = P_{2011} + 0.5 \times 15909 + 0.5(0.5+1) \times 6037 / 2$$

Population of 2016 = 77557

Estimation of population in the Design year

Description	Year	n = No of decade	Projected Population
Base Year	2016	0.50	77557
Intermediate	2031	2.00	117267
Ultimate	2046	3.50	170560

CONCLUSION

ADOPTED DESIGN POPULATION

PROCESS ADOPTED	Base Year 2016	Intermediate Year 2031	Final Year 2046
Geometric	78390	123665	195089
Airthmactical	75293	99156	123019
Incremental	77557	117267	170560
DESIGN Population	77080	113363	162889

NOTE:- For better result, average of Geometrical Increase, Airthmactical increase and Incremental Increase is adopted for calculation of the Design Population. Hence, average of above three method is adopted.

CALCULATION FOR WATER DEMAND

POPULATION AND WATER DEMAND			
	in Lpcd	In Mld	
Per capita Demand	70	0.00007	LPCD
UFW (Unaccounted for water loss)	15	15%	%
Existing Water Supply	nil	Nil	LPCD
Hence Total Per capita Demand	80.5	0.0000805	MLD

Period	Year	Design Population	Demand MLD	Demand MGD
Base Year	2016	77080	6.20	1.637
Intermediate Year	2031	113363	9.13	2.411
Ultimate Year	2046	162889	13.11	3.46

DESIGN OF HIGH YIELDING T-WELL (FOR ILLUSTRATION ONLY)

WATER PUMPING DURATION IS	=	6	Hour/Day
Population in Intermediate Year	2033	750	heads considering one tubewells as provided in the contract
Design discharge from the HYT	2033	4.22	Ltr./sec
		0.0042	M ³ /sec
Sizing of tube well based on the discharge as provided in the contract.			
Discharge of Tube-Well is kept 1.5 times of the discharge of pump so as to draw only its			
70% discharge bt the pump for the longer life of the bore.			
Hence discharge required through T/well	=	0.0042	M ³ /sec
Assuming the velocity of flow in the tube	=	1.2	m/s
Area of Tube-well= Discharge/Velocity	=	0.00352	M
Diameter of the Tube = $\sqrt{(4xA)/\pi}$	=	0.0669	M
	Say	0.100	M
Hence the size of single tube well no. 150 mm x 100 mm size T/well is proposed.			

DESIGN OF SCREEN LENGTH FOR HYDT (ILLUSTRATION ONLY)

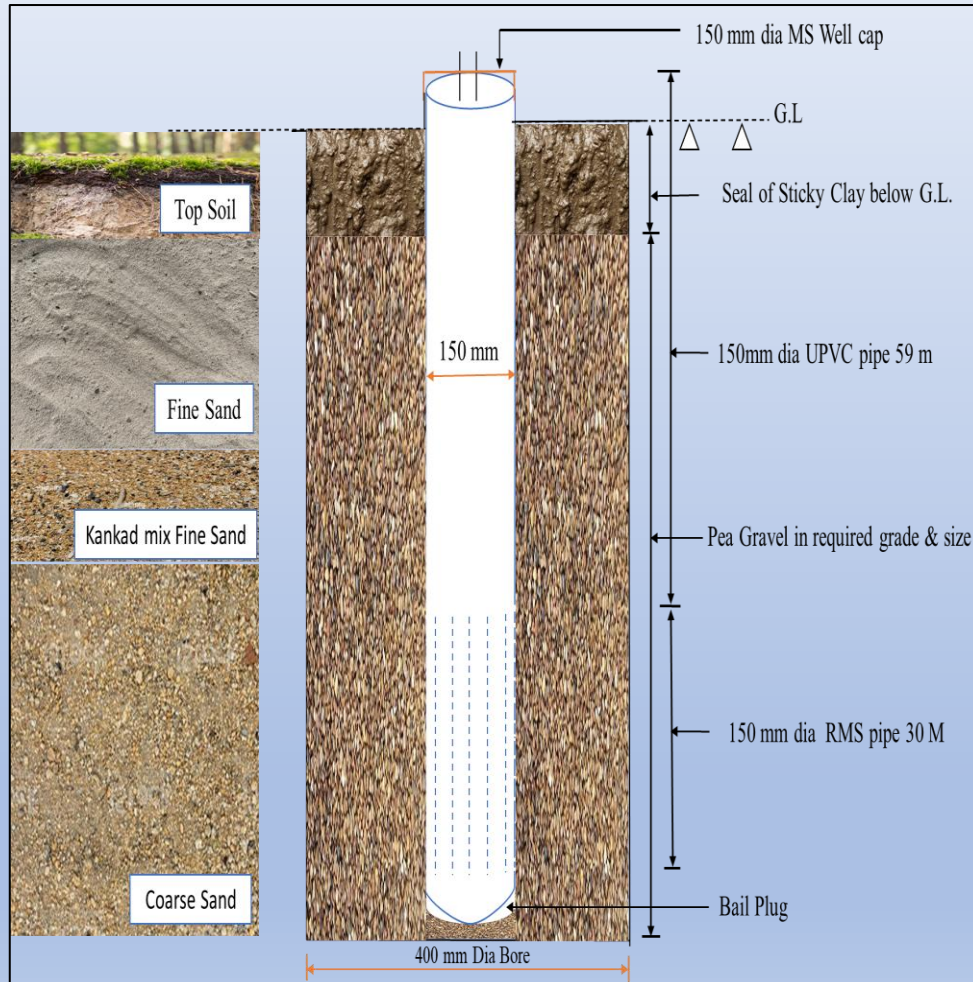
Length of strainer				
Discharge of T/well	Q =		0.0042	m ³ /s
Radius of the cone of influence	R =		400	m
Radius of the T/well	r =		0.05	m
Depression Head (Draw Down)	S =		1	m
Permeability coefficient of Sand	K =		0.0003	m/s
Length of Strainer	H =	=	$\frac{2.3 * Q * \log_{10}(R/r)}{2 * \pi * K * S}$	
		=	20.01	
			Say 30 m	
Checking for safe entrance velocity in Strainer screen				
Entrance velocity	v =	=	$\frac{Q}{2 * \pi * r * n * H}$	
		=	0.00297 m/s	< 5 m/s
			Hence, it is safe	
Details of design of T/well				
(1) Dia of Housing Pipe	=		0.15	m
(2) Dia of Casing & screen pipe	=		0.1	m
(3) Length of Housing pipe	=		30	m
(4) Length of screen pipe	=		30	m
(5) Percentage of the opening of area of screen	=		15 % of total screen area	

Continued...

TYPES OF HYTW

(A) 150 mm X 125 M Deep Gravel Packed Tubewell

DRAWING:-

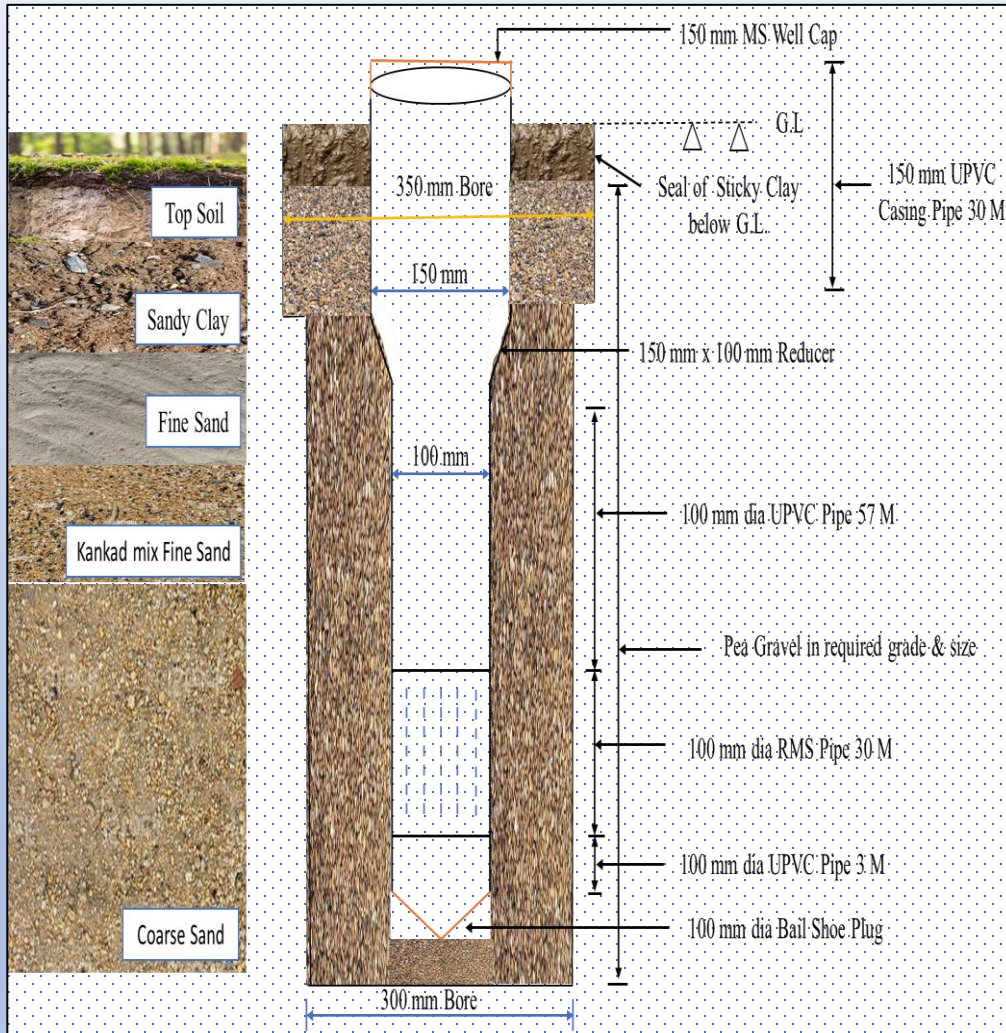


1. Boring/Drilling borewell (method prescribed in IS: 2800 part-I)
2. UPVC medium well casing (CM) pipe conforming to IS: 12818.
3. UPVC medium well screen (RMS) pipes with Ribs, conforming to IS:12818.
4. Fitting of approved make and specification.
5. Pea gravel in required grade and size conforming to IS: 4097.

Continued...

(B) 150 mm x 100 mm x 125 M Deep HYTW

DRAWING:-

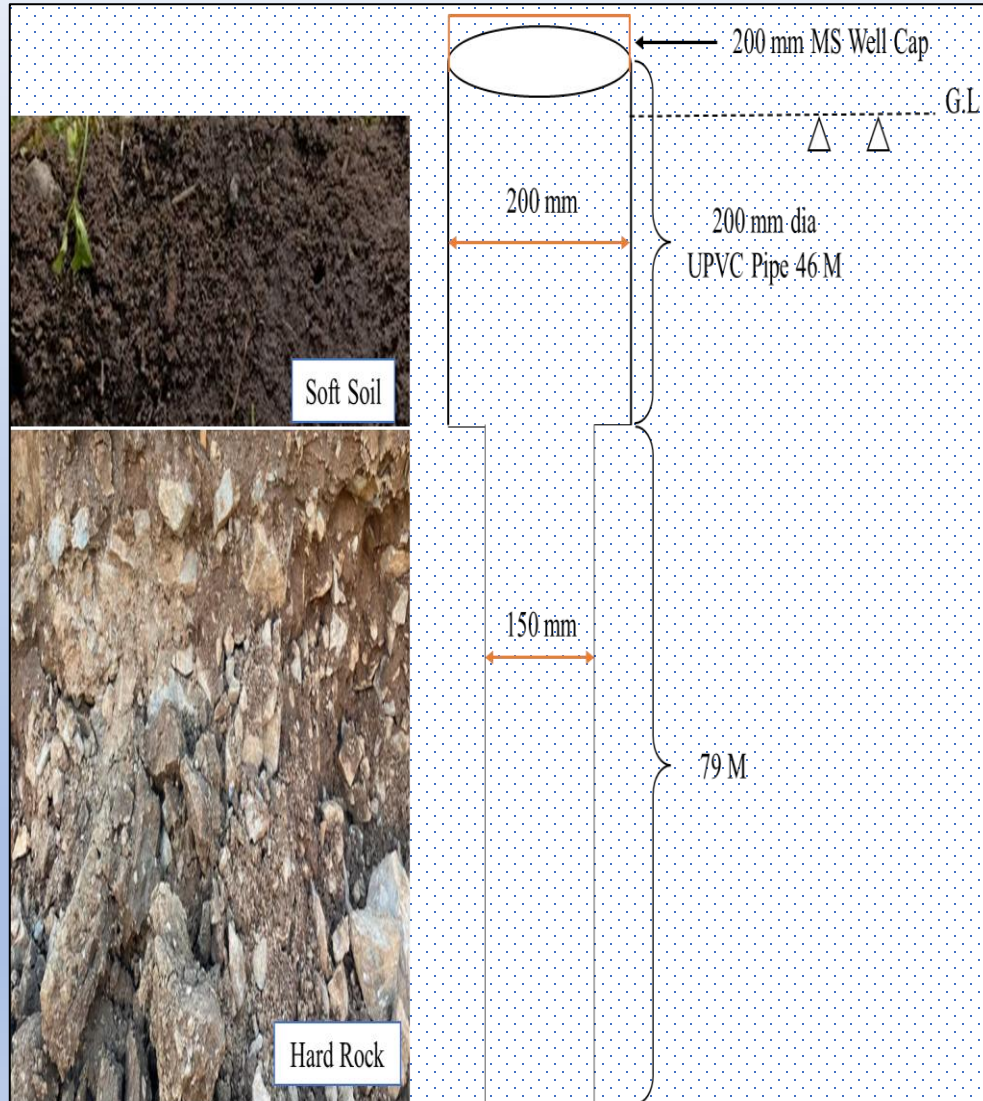


1. Boring/Drilling borewell (method prescribed in IS: 2800 part-I)
2. UPVC medium well casing (CM) pipe conforming to IS: 12818.
3. UPVC medium well screen (RMS) pipes with Ribs, conforming to IS:12818.
4. Fitting of approved make and specification.
5. Pea gravel in required grade and size conforming to IS: 4097.
6. Development of tubewell in accordance with IS:2800 part-I.

Continued...

(C) 200 mm x 150 mm x 125 M Deep Drilled HYTW by DTH Rig Machine

DRAWING:-



1. Boring/Drilling borewell with DT Rig Machine in all kind of soil and rock.
2. UPVC medium well casing (CM) pipe conforming to IS: 12818 (200 dia) @ 46 M.
3. Development of tubewell in accordance with IS:2800 part-I.
4. 200 mm dia MS Cap over the casing – 1 no.

SPECIFICATIONS AND KEY POINTS

Equipment and Accessories:

- The equipment and accessories for drilling and construction of tubewells, consisting of derrick (crane type structure), suitable cables and reels for handling the tools and lowering the well pipes in the boreholes, a rotary table for rotating the drill pipe and bit, pumps for handling mud fluid etc.
- Bentonite should be used for the stabilisation of the borehole during the construction of the tubewell.

Strata Chart:

- Strata Chart for HYTW is very important so, it must be created after taking soil samples at every 3 m depth and accordingly slotted pipes can be lowered in boring at proper depth.

Design and lowering of pipe supply:

- Tubewell should be designed in respect of size and length of housing pipe, blank pipe, pea gravel shrouded slotted or perforated pipes, and bail plugs etc.
- The sizes of perforation or slots for pea gravel shrouded strainer pipe shall be so designed that the total opening available is adequate to pass the water in filtering from the aquifer without exceeding the critical velocity.

GRAVEL PACKING (AS PER IS:-4097)

- All gravel shall consist of hard well rounded particles reasonably uniform in diameter and shall be of a size determined after analyzing the character of the water bearing formation to be packed.
- The minimum thickness of 100mm of the pea gravel shroud around the strainer pipes shall be provided to prevent inflow of sand from the aquifer under normal operating conditions.
- The feeding of gravel shall be done in such a manner that there should not be any bridging in annular space.
- All gravel to be used as packing in tubewell construction shall be as specified in IS 4097 : 1967.
- The gravel for use as pack shall be free from impurities, such as shale, mica, felspar, clay, sand, dirt, loam, haematite and organic materials.

The gravel conforming to this standard shall be of the following grades:

Sl. No.	Grade	Pack	Particle Size Range (mm)	IS Sieves (see IS:460-1962*) MM
1	C	Medium Gravel	Over 4.75 to 6.3	4.75, 6.3
2	D	Medium Gravel	Over 6.3 to 8.0	6.3, 8.0
3.	E	Coarse Gravel	Over 8.0 to 12.5	8.0, 12.5

Pack Aquifer Ratio

- The pack aquifer ratio (P/A ratio) is defined as the ratio of 50 percent size (D30) of the gravel pack to the 50 percent size of the aquifer. The size of gravel when used as pack in tubewells shall be decided in accordance with the size of the aquifer material proposed to be tapped. The gravel size shall be limited as below:

- a) Uniform aquifer with uniform gravel pack.

Pack aquifer ratio 9 to 12.5

- b) Non-uniform aquifer with uniform gravel pack.

Pack aquifer ratio 11 to 15.5

- The thickness of gravel pack shall be limited to 13 to 18 cm.
- However, artificial gravel pack may not be necessary if the effective size (D10) of the aquifer is greater than 0.3 mm and its uniformity coefficient is greater than 5.

Plumbness and Alignment:

- The verticality shall be checked immediately after housing pipe are installed but prior to commencing the gravel filling.
- For tubewells encased with pipes less than 350mm diameter, the verticality of the tubewell shall have deviation not exceeding 5cm per 30m of depth of tubewell and the deviation shall be in one direction and in one plane only.

DEVELOPMENT OF TUBEWELL (AS PER IS:-2800 PART-1)

1. The development of the tubewell by over pumping should be done at 15 percent to 25 percent higher discharge than the expected discharge from the tubewell.
2. Initial development of tubewell shall be carried out by means of compressed air. The compressor to be used for this purpose shall have minimum capacity of 10 cu.m/minute under a pressure of 7.5kg/cm².
3. The final discharge should be free from sand with a maximum tolerance of 20 parts of sand in one million parts of water by volume after 20 minutes of starting the pump.
4. In case of tubewells for drinking water, the discharge shall be totally sand free. If the discharge is not sand free after 20 minutes of starting the pump, the well shall be redeveloped. In case the discharge is still not sand free even after re-development, the pump sets of lesser discharge capacity may be installed to get sand free water suitable for drinking.

DISINFECTION (AS PER IS:-2800 PART-1)

- The well shall be disinfected after completion of test for yield. All the exterior parts of the pump coming in contact with the water shall be thoroughly cleaned and dusted with powdered chlorine compound. In fact it should be disinfected every time a new pump is installed or the one replaced after repair.
- A stock solution of chlorine may be prepared by dissolving free chlorinated lime.
- For obtaining an applied standard concentration of 50 ppm. One litre of the stock solution should be used to treat 300 litres of water.

GROUTING AND SEALING (AS PER IS:-2800 PART-1):

- To ensure that the grout will provide a satisfactory seal, it should be applied in one continuous operation. Sealing of the tubewell may be done by grouting the annular space between bore and the housing pipe, thickness of grouting depending upon the quality of water. In case of tubewells for drinking purposes, grouting and sealing shall always be done to ensure safe sanitary conditions.
- The depth to be grouted varies with geologic and site conditions but a depth of 3 to 4.5 m from the surface is generally adequate.

SCREEN PIPES (AS PER IS:-12818):

1. Casing pipes needs to be used is CM Pipe: Medium well casing pipes suitable for wells.
2. Ribbed Screen Pipe - Pipe with external longitudinal ribs and transverse (perpendicular to pipe axis) slots. This shall be designated as RMS pipe and RDS pipe.
3. Ribs
4. Minimum number of ribs provided shall be 2.5 ribs/cm on the circumference.
5. Minimum height, h , of the rib shall be 2 mm. The ribs should not have sharp edges.

Table 5 Dimensions of Medium Well Casing (CM) Pipes
(Clause 7.2.1)

All dimensions in millimetres.

Sl No.	Nominal Size <i>DN</i>	Mean Outer Diameter d_{em}		Outer Diameter at Any Point, d_c		Mean Outer Diameter Over Connection d_s	Wall Thickness e	
		<i>Min</i>	<i>Max</i>	<i>Min</i>	<i>Max</i>		<i>Min</i>	<i>Max</i>
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
i)	35	42.0	42.2	41.9	42.3	46.0	3.5	4.0
ii)	40	48.0	48.2	47.9	48.3	52.0	3.5	4.0
iii)	50	60.0	60.2	59.9	60.3	65.0	4.0	4.6
iv)	80	88.0	88.3	87.9	88.4	94.0	4.0	4.6
v)	100	113.0	113.3	112.9	113.4	120.0	5.0	5.7
vi)	115	125.0	125.3	124.9	125.4	132.0	5.0	5.7
vii)	125	140.0	140.4	139.9	140.5	150.0	6.5	7.3
viii)	150	165.0	165.4	164.6	165.6	178.0	7.5	8.5
ix)	175	200.0	200.5	199.6	200.6	215.0	8.8	9.8
x)	200	225.0	225.5	224.5	225.8	243.0	10.0	11.2
xi)	250	280.0	280.5	279.4	280.8	298.0	12.5	14.0
xii)	300	330.0	330.6	329.3	331.0	352.0	14.5	16.2
xiii)	350	400.0	400.7	399.2	401.2	428.0	17.5	19.5
xiv)	400	450.0	450.8	449.1	451.3	479.0	19.5	21.7

ESTIMATE

(A) 150 mm X 125 M Deep Gravel Packed Tubewell

S. No.	Particulars	Quantity	Unit	Rate	Amount	
1	Boring/drilling bore well of required dia for casing/strainer pipe, by suitable method prescribed in IS: 2800 (part I), including collecting samples from different strata, preparing and submitting strata chart/ bore log, including hire & running charges of all equipments, tools, plants & machineries required for the job, all complete as per direction of Engineer -in-charge, upto 90 metre depth below ground level. (All types of soil)					
24.1.1.3	400mm dia bore from GL to 90.0M	90	M	P/M	Rs.681.50	Rs.61,335.00
24.2.1.3	(b) 400mm dia bore from 90.0 m to 125.0M	35	M	P/M	Rs.896.50	Rs.31,377.50
2	Supplying, assembling, lowering and fixing in vertical position in bore well, unplasticized PVC (UPVC) medium well casing (CM) pipe of required dia, conforming to IS: 12818, including required hire and labour charges, fittings & accessories etc. all complete, for all depths, as per direction of Engineer -in-charge.					
24.3.2	(a) 150 mm nominal size dia	90	M	P/M	Rs.660.10	Rs.59,409.00
2A	Supplying, assembling, lowering and fixing in vertical position in bore well unplasticized PVC (UPVC) medium well screen (RMS) pipes with ribs, conforming to IS: 12818, including hire & labour charges, fittings & accessories etc. all complete, for all depths, as per direction of Engineer-in-charge.					
24.4.2	150 mm nominal size dia	30.0	M	P/M	Rs.673.50	Rs.20,205.00
3	Supplying fitting & fixing the following Fitting of approved make and specification at work site complete job.					
	(a) 150mm center guide Nos. in each T/W	12	Nos.	Each	Rs.150.00	Rs.1,800.00
24.15.2	(b) 150 mm dia well plug	1	No	Each	Rs.281.80	Rs.281.80
24.14.2	(c) 150 mm dia M.S. Clamp 1.6 M long (one Pair)	1	No	Each	Rs.1,531.40	Rs.1,531.40
24.13.2	(d) 150 mm dia P.V.C. well cap	1	No.	Each	Rs.210.70	Rs.210.70

Continued...

S. No.	Particulars	Quantity		Unit	Rate	Amount
4 24.8	Gravel packing in tubewell construction in accordance with IS:4097,including providing gravel fine/ medium/ coarse, in required grading & sizes as per actual requirement, all complete as per direction of Engineer-in-charge.	11	M ³	P/M ³	Rs.1,343.20	Rs.14,775.20
5	Carriage of Pea Gravel from Dhalbhumigarh (taken distance 480km.Pakka+5Km unsurface road) (1.6*(480*11.20+5*13.50)+195.10)=8904.70+1% L.Cess+12%-GST)=Rs.10,062.31	11.0	M ³	P/M ³	Rs.10,062.31	Rs.1,10,685.41
6 24.12	Development of tube well in accordance with IS : 2800 (part I) and IS: 11189, to establish maximum rate of usable water yield without sand content (beyond permissible limit), with required capacity air compressor, running the compressor for required time till well is fully developed, measuring yield of well by "V" notch method or any other approved method, measuring static level & draw down etc. by step draw down method, collecting water sample & getting tested in approved laboratory, disinfection of tubewell, all complete, including hire & labour charges of air compressor, tools & accessories etc., all as per requirement and direction of Engineer-in-charge.	24	Hrs.	P / Hrs.	Rs.916.80	Rs.22,003.20
7	Transportation of drilling plants, developing equipments & all other required tools and M/c by and suitable mechanical means including all cost of loading, unloading, placing at work site and back after completion of work as per S/D of E/I	1	No.	Each	Rs.9,200.00	Rs.9,200.00
8	Supplying all materials and labours for arrangement for additional water required during the drilling period for 70 Hrs & site clearance & leveling etc. And providing the soap duster etc. to staff engaged in drilling etc. all complete work as per specification & direction of E.I.	1	No.	Each	Rs.7,000.00	Rs.7,000.00
TOTAL						Rs.3,39,814.21
Say						Rs.3,39,814.00
Add 5.36 % (For GST Difference (18%-12%))						Rs.18,214.04
Grand Total=						Rs. 358,028.25
Say						Rs. 358,028.00

(B) 150 mm x 100 mm x 125 M Deep HYTW

S.No.	Description	Qty.	Unit	Rate	Amount	
1	Boring/drilling bore well of required dia for casing/strainer pipe, by suitable method prescribed in IS: 2800 (part I), including collecting samples from different strata, preparing and submitting strata chart/bore log, including hire & running charges of all equipments, tools, plants & machineries required for the job, all complete as per direction of Engineer -in-charge, upto 150 metre depth below ground level. (All types of soil)					
24.1.1.2	(a) 350mm dia bore from G.L. to 30.0M	30.0	M	P/M	Rs.532.40	Rs.15,972.00
24.1.1.1	(b) 300mm dia bore from 30.0 m to 60.0M	30.0	M	P/M	Rs.486.80	Rs.14,604.00
	(c) 300mm dia bore from 60M to 90.0M	30.0	M	P/M	Rs.486.80	Rs.14,604.00
24.2.1.1	(d) 300mm dia bore from 90.0M to 150.0M	35.0	M	P/M	Rs.567.90	Rs.19,876.50
2A	Supplying, assembling, lowering and fixing in vertical position in bore well, unplasticized PVC (UPVC) medium well casing (CM) pipe of required dia, conforming to IS: 12818, including required hire and labour charges, fittings & accessories etc. all complete, for all depths, as per direction of Engineer -in-charge.					
24.3.2	(a) 150 mm nominal size dia	30.0	M	P/M	Rs.660.10	Rs.19,803.00
24.3.1	(b) 100 mm nominal size dia	60.0	M	P/M	Rs.546.10	Rs.32,766.00
2B	Supplying, assembling, lowering and fixing in vertical position in bore well unplasticized PVC (UPVC) medium well screen (RMS) pipes with ribs, conforming to IS: 12818, including hire & labour charges, fittings & accessories etc. all complete, for all depths, as per direction of Engineer-in-charge.					
24.4.1	100 mm nominal size dia	30.0	M	P/M	Rs.573.10	Rs.17,193.00

S.No.	Description	Qty.	Unit	Rate	Amount	
3	Supplying the following fittings & fixing the same in position as per approved lowering assembly and strata chart including providing all equipments and welding the same on process of lowering the assay etc. all complete as per S/D of E/I.					
24.13.2	(a) 150 mm dia well cap	1	No.	Each	Rs.210.70	Rs.210.70
24.14.2	(b) 150 mm dia M.S. Clamp 1.6 M long (one Pair)	1	No.	Each	Rs.1,531.40	Rs.1,531.40
	(c) 150 mm dia center guide	4	Nos.	Each	Rs.150.00	Rs.600.00
	(d) 100 mm dia center guide	6	Nos.	Each	Rs.100.00	Rs.600.00
	(e) 150 mm x 100 mm dia 6mm wall thickness MS reducer	1	No.	Each	Rs.500.00	Rs.500.00
24.15.1	(f) 100mm dia & 6mm thick M.S. well shoe plug	1	No.	Each	Rs.228.30	Rs.228.30
4a 24.8	Gravel packing in tubewell construction in accordance with IS:4097,including providing gravel fine/ medium/ coarse, in required grading & sizes as per actual requirement, all complete as per direction of Engineer-in-charge.	9.0	M ³	P/M ³	Rs.1,343.20	Rs.12,088.80
4b	Carriage of Pea Gravel from Dalbhumigarh to Construction site	9.0	M ³	P/M ³	Rs.10,092.74	Rs.90,834.66
5 24.12	Development of tube well in accordance with IS : 2800 (part I) and IS: 11189, to establish maximum rate of usable water yield without sand content (beyond permissible limit), with required capacity air compressor, running the compressor for required time till well is fully developed, measuring yield of well by "V" notch method or any other approved method, measuring static level & draw down etc. by step draw down method, collecting water sampl & getting tested in approved laboratory, disinfection of tubewell, all complete,including hire & labour charges of air compressor, tools & accessories etc., all as per requirement and direction of Engineer-in-charge.	24	Hrs.	P/H	Rs.916.80	Rs.22,003.20

S.No.	Description	Qty.		Unit	Rate	Amount
6	Transportation of drilling plants, developing equipments & all other required tools and M/c by and suitable mechanical means including all cost of loading, unloading, placing at work site and back after completion of work as per S/D of E/I	1	No.	Each	Rs.9,200.00	Rs.9,200.00
7	Supplying all materials and labours for arrangement for additional water required during the drilling period for 40 Hrs & site clearance & leveling etc. And providing the soap duster etc. to staff engaged in drilling etc. all complete work as per specification & direction of E.I.	1	No.	Each	Rs.7,000.00	Rs.7,000.00
		Total				Rs.2,79,615.56
		Say				Rs.2,54,375.00
	Grand Total with 18% GST difference (multiplying factor – 1.0633)	Grand Total				Rs. 2,97,315.00

(C) 200 mm x 150 mm x 125 M Deep Drilled HYTW by DTH Rig Machine

Sl. No.	Particulars	Quantity	unit	Rate	Amount
1(A)	Drilling of 200mm X 125 meter deep borewell in all kinds of soll and rock in rural area for installation of pump set with Hydaraulic DTH Rig machine, all complete including supplying all materials, tools, drilling rig, Air Compressor and equipments, as well as fuel, lubricants and cost of transportation of Rig machine and other vehicles up to the site etc all complete as per specification and direction of E/I.				
	(i) 400 mmUp to 50 mtrs depth below GL	50	P/M	Rs.544.20	Rs.27,210.00
	(ii) 400mm Beyond 50 mtrs. Up to 90 Mtrs.	40	P/M	Rs.1,028.90	Rs.41,156.00
	(iii) 300mm Beyond 90 mtrs. Up to 125 Mtrs.	35	P/M	Rs.937.80	Rs.32,823.00
2 24.10	Supplying, assembling, lowering and fixing in vertical position in bore well, ERW (Electric Resistance Welded) FE 410 mild steel screwed and socketed/ plain ended casing pipes of required dia,conforming to IS: 4270, of reputed & approved make, including painted with outside surface with two coats of anticorrosive paint of approved brand and manufacture, including required hire & labour charges, fittings & accessories, all complete, for all depths, as per direction of Engineer-in-charge.				
	150 mm nominal size dia having minimum wall thickness 5 mm	18	P/M	Rs.1,408.10	Rs.25,345.80
	200 mm nominal size dia having minimum wall thickness 5.40 mm	24	P/M	Rs.2,003.70	Rs.48,088.80

Sl. No.	Particulars	Quantity	unit	Rate	Amount
3 24.11	Supplying, assembling, lowering and fixing in vertical position in bore well, ERW (Electric Resistance Welded) FE 410 plain slotted (having slot of size 1.6/3.2 mm) mild steel threaded and socketed / plain bevel ended pipe (type A) of required dia, conforming to IS: 8110, of reputed and approved make, having wall thickness not less than 5.40 mm, including painted with outside surface with two coats of anticorrosive bitumestic paint of approved brand and manufacture, including hire & labour charges, fittings & accessories, all complete, for all depths, as per direction of Engineer -in-charge.				
		6	P/M	Rs.1,727.20	Rs.10,363.20
4	Supplying all tools labors and equipments and doing washing flushing & developing of drilled tube well to give clean and clear water (min. 12 Hours) all complete as per direction of E/I.	24	P/Hr	Rs.916.80	Rs.22,003.20
5	Supplying labors and equipments including 200 mm dia M.S. Cap & Fitting & Fixing over the tube well properly and taking out as per direction of E/I.	1	Each	Rs.256.40	Rs.256.40
				Total=	Rs.2,07,246.40

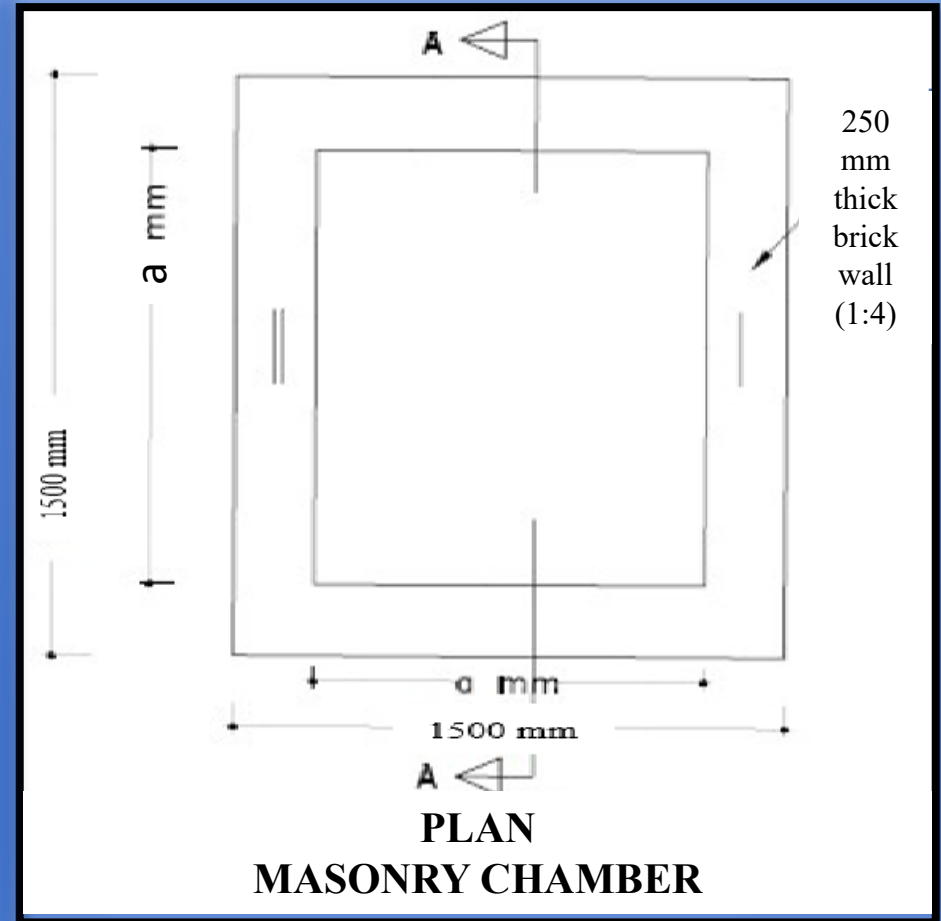
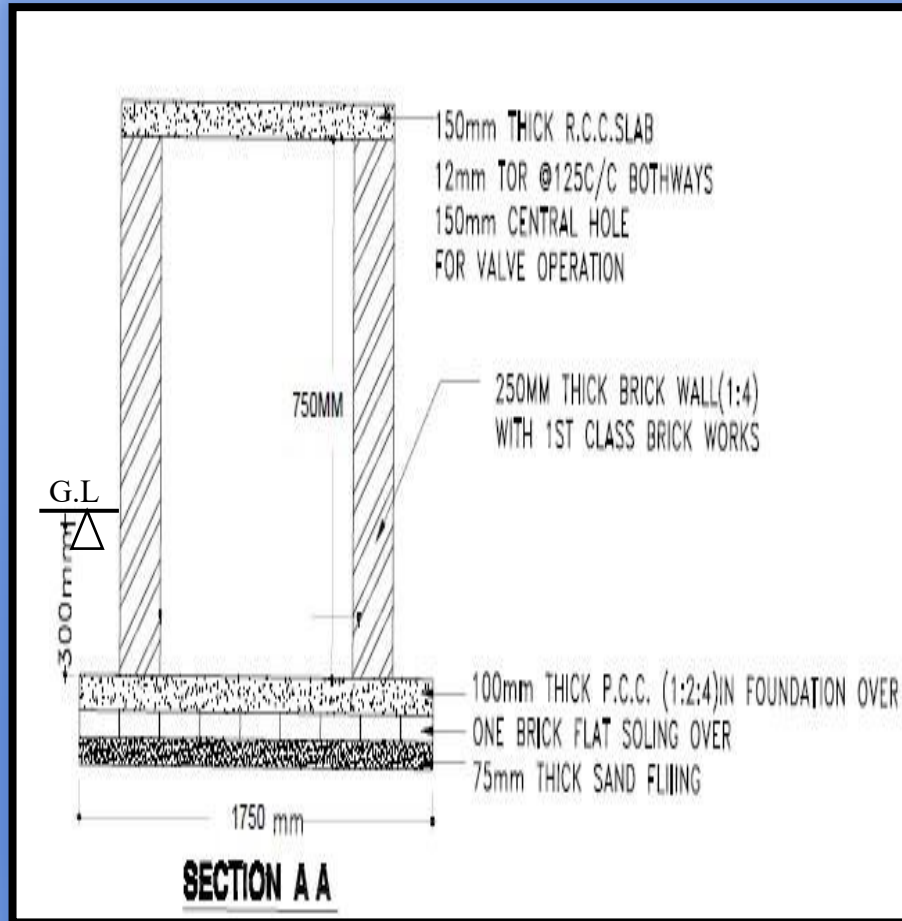
2. MASONRY CHAMBER

INTRODUCTION:-

- Masonry chamber has an important role in “Har Ghar Nal Ka Jal” Scheme as it protects the boring by any damage from outsiders or by any vehicle.
- Masonry chamber’s height protects rain water (surface runoff) to enter into boring and the cover of chamber protects against the pouring of any unwanted material / bad elements into the boring pipe.

DIAGRAM OF MASONRY CHAMBER

Brick Masonry Chamber size-100 x 100 x 75 cm (inside) having 250mm thick brick wall in cement mortar (1:4).



ESTIMATE

Supplying materials, labours and constructing chamber of following dimension having 250mm thick wall in C.M. (1:4) including 12mm C.P. (1:3) with punning inside, R.C.C. cover slab with C.I. Surface box, 20mm dia foot rest at 150mm interval 10mm dia lifting ring etc. all complete.

SIZE-1.00M x 1.00M x 0.75 M deep

S.O.R. No.	Particulars	No.	L	W	H	Qty.	Unit	Rate	Amount
<u>1</u> 2.8	Earth work in excavation	1	1.75	1.75	1.0	3.063M ³	P/M ³	Rs.360.70	Rs.1,104.64
<u>2</u> 2.28	Sand filling	1	1.75	1.75	0.075	0.230M ³	P/M ³	Rs.287.30	Rs.65.99
<u>3</u> 11.72	Brick flat soling	1	1.75	1.75		3.063M ²	P/M ²	Rs.283.30	Rs.867.61
<u>4</u> 4.1.3	P.C.C. (1:2:4) in foundation	1	1.75	1.75	0.10	0.306M ³			
						0.306M ³	P/M ³	Rs.3,998.10	Rs.1,224.42
<u>5</u> 6.1.12/1	B/Work in (1:4) C.M.	2	2.50	0.25	0.75	0.938M ³	P/M ³	Rs.5,017.90	Rs.4,704.28
<u>6</u> 5.2.2 & 5.9.3	R.C.C. Cover slab(1:1.5:3)	1	1.50	1.50	0.15	0.338M ³	P/M ³	Rs.5,670.00	Rs.1,913.63
	shuttering	2	1.50	1.50	0.15	3.15M ²	P/M ²	Rs.437.50	Rs.1,378.13

S.O.R. No.	Particulars	No.	L	W	H	Qty.	Unit	Rate	Amount
<u>7</u>	C.P. (1:3) with 5% Cico & neat cement								
13.17.1	Internal face	2	1.00	1.00	1.00	4.00M ²			
	Bed surface	1	1.00	1.00		1.00M ²			
+13.36.1						5.00M ²	P/M ²	Rs.212.60	Rs.1,063.00
<u>8</u>	C.P. (1:4) out side of wall	2	1.50	1.50	0.75	4.5M ²	P/M ²	Rs.152.90	Rs.688.05
. 13.11.2									
<u>9</u>	8mm dia T.S. Rod								
5.22.7A									
		0.338M ³ x		70Kg/ M3		23.625Kg.	P/Kg	Rs.94.50	Rs.2,232.56
<u>10</u>	Lifting Ring of 10mm dia Rod					4No.	Each	Rs.60.00	Rs.240.00
-								Total	Rs.15,482.30
<u>11</u>	Carriage of materials 5%								Rs.774.12
-								Total	Rs.16,256.42
								Say	Rs.16,256.00

3. SUBMERSIBLE PUMP SET

INTRODUCTION:-

- The submersible Pump set is the heart of “Har Ghar Nal Ka Jal” Scheme. As our body works on pumping action of heart similarly if pump set remains functional then only we can say that “Har Ghar Nal Ka Jal” Scheme can be functional however, other components workability is also important to ensure functionality as a whole scheme.
- Mostly we use two types of submersible pump set in ward level scheme which are 2 HP and 3 HP single phase submersible pump set. Mainly its capacity depends on population to serve.

DESIGN (Illustration Only)

<u>GENERAL DESIGN OF MOTOR PUMP FOR 750 PERSONS IN INTERMEDIATE YEAR</u>						
Water demand in Intermediate year				60.750		KLD
Duration of Pumping				6		Hrs.
Hence the rate of pumping				10.13		Kl/Hr
				0.0028		Kl/Sec
				2.813		LPS
Now calculation of Head						
(a)	Sub Soil Water Level				12.0	M
(b)	Draw down created during pumping				3.5	M
(c)	Frictional Loss in pipe				0.5	M
(d)	Residual Head required to the pump				23.0	M
					39.0	M
Taking efficiency of Motor Pump --- 60%						
	B.H.P. of Motor Pump		=	$\frac{QH}{75 \eta}$		
			=	$\frac{2.813}{75}$	x	39.0
				$\frac{2.438}{75}$	x	0.60
				2.438		HP
			Say	3.0		HP
Considering life of Motor Pump :-				15 Years		
Hence one no. of Submersible Pump of				3.0		H.P.
For Discharging	2.813		LPS			
Capacity acting against a total head of		39.0		M Head		
will be provide in both the present and intermediate stage.						
Hence we shall provide				3.0H.P. Submersible Pump		

SPECIFICATION

- Vertical wet type submersible pump conforming to IS:8034 (and as amended thereafter) with standard Material of Construction suitable for potable clear cold water directly coupled with a continuous rated 2- pole water cooled wet type vertical squirrel cage copper wound induction motor conforming to IS:9283 (and as amended thereafter), suitable for operation in A-C Single phase 220V, 50HZ (category B motor)
- Component: Material of Construction as per clause 6.2 of IS 8034:2002.
- Pump Shaft: Stainless Steel grade X 04 Cr 12, X 12 Cr 12, or X 20 Cr 13 of IS 6603.
- The submersible cable shall conform to IS 694 having copper conductor should be PVC-insulated and PVC sheathed, flexible, and 3-core flat type with an area of 2.5 sq. mm of required length.
- Column pipe must be GI pipe of medium quality having a blue mark on pipe.
- The pump set may also be marked with BIS standard mark.

Material of Construction

- Pump housing: Stainless Steel
- Motor housing: Stainless Steel
- Motor Shaft: Stainless Steel
- Thrust Bearing: Carbon + Stainless Steel
- Diffuser: Noryl [Polyphenylene oxide (PPO)] as per IS code 8034: 2002.
- NRV: Cast Iron
- Winding Material: Copper

ESTIMATE

Estimate for supply, installation & commissioning of single phase 2 H.P submersible motor pump set with all accessories including extension of L.T.line from nearest source up-to pumping station.(Included GST @ 18%)					
Sl. No.	Particulars	Quantity	Unit	Rate	Amount
1A	Supply Installation, commissioning and testing of single phase 2 H.P. submersible pump set having discharging capacity 3 Ips at a total head of 30 meter(approx) of KSBj Kirloskaror equivalent make with all accessories& fittings etc including loading unloading and transportation of the pump set to the work site with all required labour, materials, tools and tackles installation, testing & (i) 50 mm dia x 3 mtrs long medium classG.I column pipe both end thread and one end socketed- 6(six)nos (ii) 1x3x2,5 mm' flat copper conductor submersible cable -40 (forty) mtrs. (iii) 50 mm dia union socketlIonel no. (iv) 65 mm dia x 250 mm long G.I. nipple- 1(one) no. (v) 50 mm dia G.I Elbow-1(One) no. (vi) 50 mm dia M.S, clamps-2(Two) Pairs. (vii) 50 mmx 250 mm long G.I nipple- lIonel no. (viii) Tube well cap for T/WelllIonel no. (ix) 50 ":-l~ia x 65 mm dia	1	No		
1B	Supply Installation, commissioning and testing of floor mounted outdoor type loT feeder pillar single phasestarter controll pannel operated on 220V, 3 phase, 50 cis for 2 H.P Submersiblepump set made of MSsheet (minimum 2 mm thick) duly spray power coated painting with following accessoriesmade of M.Ssheet (minimum 2mm thick) duly spray powder coated painting with following accessories (i) 90-220 V range single phase7. 5 KVA automatic voltage stabilizer make- Sen& Pandit/ Vertex/ISI marked If any. 1No. (ii) Suitablesinglephasestarter control pannelfor abovemotor of BCH /L& Tmake-1(one) no.	1	No		
1C	Supplying& fitting 2.5 mm' copper service cable from power point from nearest source up-toIpumping station.	20	m		
1D	Providing all materials and labour required lor doing earthing station with G.I earth pipe of 40 mm dia x 4.5 mtrs 20fts. long G.I pipe including accessories excavation of earth , providing masonry enclosure with Coverplate having locking arrangementand watering pipe etc.with salt, charcoal,etc.as per IE & IS specification.	1	No	Each	88,500.00
		2H.P		Total=	88500.00

ESTIMATE

Estimate for supply, installation & commissioning of single phase 3 H.P submersible motor pump set with all accessories including extension of L.T. line from nearest source up-to pumping station.(Included GST @ 18%)

Sl. No.	Particulars	Quantity	Unit	Rate	Amount
1	2	3	4	5	6
1A	<p>Supply Installation, commissioning and testing of single phase 3 H.P. submersible pump set having discharging capacity 3 Ips at a total head of 35 meter(approx) of KSBj Kirloskaror equivalent make with all accessories& fittings etc including loading unloading and transportation of the pump set to the work site with all required labour, materials, tools and tackles installation, testing &</p> <p>(i) 50 mm dia x 3 mtrs long medium classG.I column pipe both end thread and one end socketed- 6(six)nos</p> <p>(ii) 1x3x2,5 mm' flat copper conductor submersible cable -40 (forty) mtrs.</p> <p>(iii) 50 mm dia union socket11onel no.</p> <p>(iv) 65 mm dia x 250 mm long G.!. nipple- 1(one) no.</p> <p>(v) 50 mm dia G.I Elbow-1(One) no.</p> <p>(vi) 50 mm dia M.S, clamps-2(Two) Pairs.</p> <p>(vii) 50 mmx 250 mm long G.I nipple- 11Onel no.</p> <p>(viii) Tube well cap for T/Well11onel no.</p> <p>(ix) 50 "l~ia x 65 mm dia</p>	1	No		
1B	<p>Supply Installation, commissioning and testing of floor mounted outdoor type loT feeder pillar single phasestarter controll pannel operated on 220V, 3 phase, 50 cis for 3 H.P Submersiblepump set made of MSsheet (minimum 2 mm thick) duly spray power coated painting with following accessoriesmade of M.Ssheet (minimum 2mm thick) duly spray powder coated painting with following accessories (i) 90-220 V range single phase7. 5 KVA automatic voltage stabilizer make-Sen& Pandit/ Vertex/ISI marked If any. 1No. (ii) Suitablesinglephasestarter control panelfor abovemotor of BCH /L& Tmake-1(one) no.</p>	1	No		

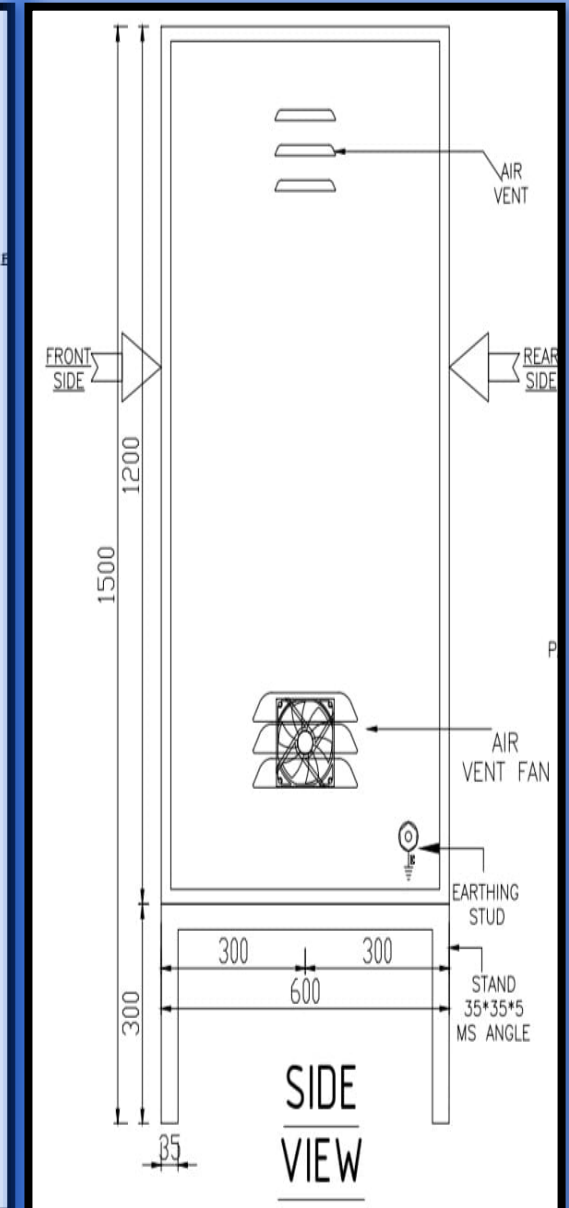
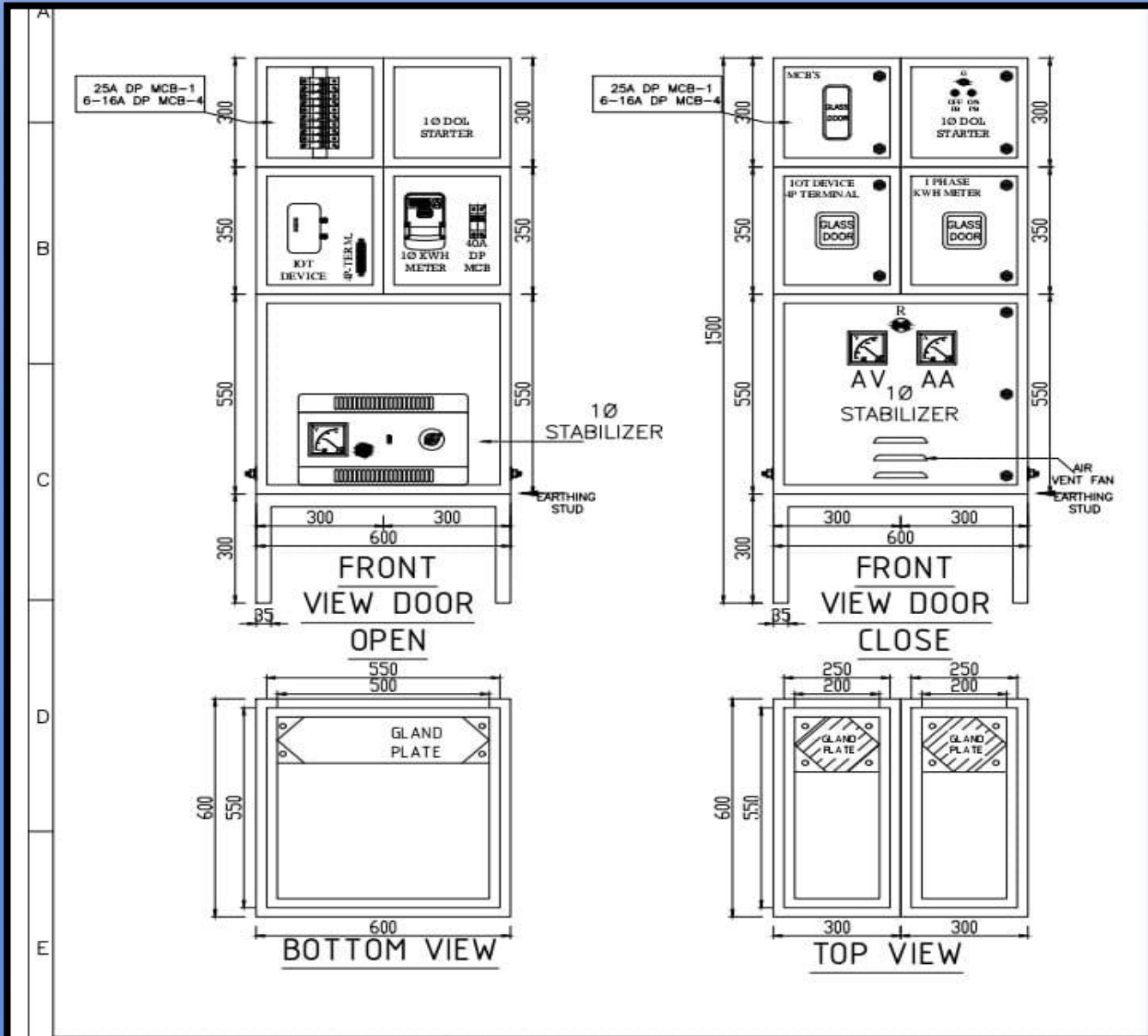
Sl. No.	Particulars	Quantity	Unit	Rate	Amount
1	2	3	4	5	6
1C	Supplying & fitting 2.5 mm' copper service cable from power point from nearest source up-to pumping station.	20m			
1D	Providing all materials and labour required for doing earthing station with G.I earth pipe of 40 mm dia x 4.5 mtrs 20fts. long G.I pipe including accessories excavation of earth , providing masonry enclosure with Cover plate having locking arrangement and watering pipe etc, with salt, charcoal, etc. as per IE & IS specification.	1No	Each	Rs.1,23,900.00	Rs.1,23,900.00
		3H.P		Total=	Rs.1,23,900.00

4. MS CONTROL PANEL

INTRODUCTION

- Control panel has very important role to control the whole system of “Har Ghar Nal Ka Jal” Scheme. As it consists of starter, stabilizer, MCB, IOT etc, which allows to switch on the motor and switch off it along with controlling the voltage by stabilizer and monitoring the functionality by IOT device.
- So, it is very necessary to set up it as per approved design, drawing and estimate to fulfil its all requirements in proper manner.
- Estimate of MS Control Panel is included in estimate of Submersible pump set that can be seen from there.

DRAWING



SPECIFICATION

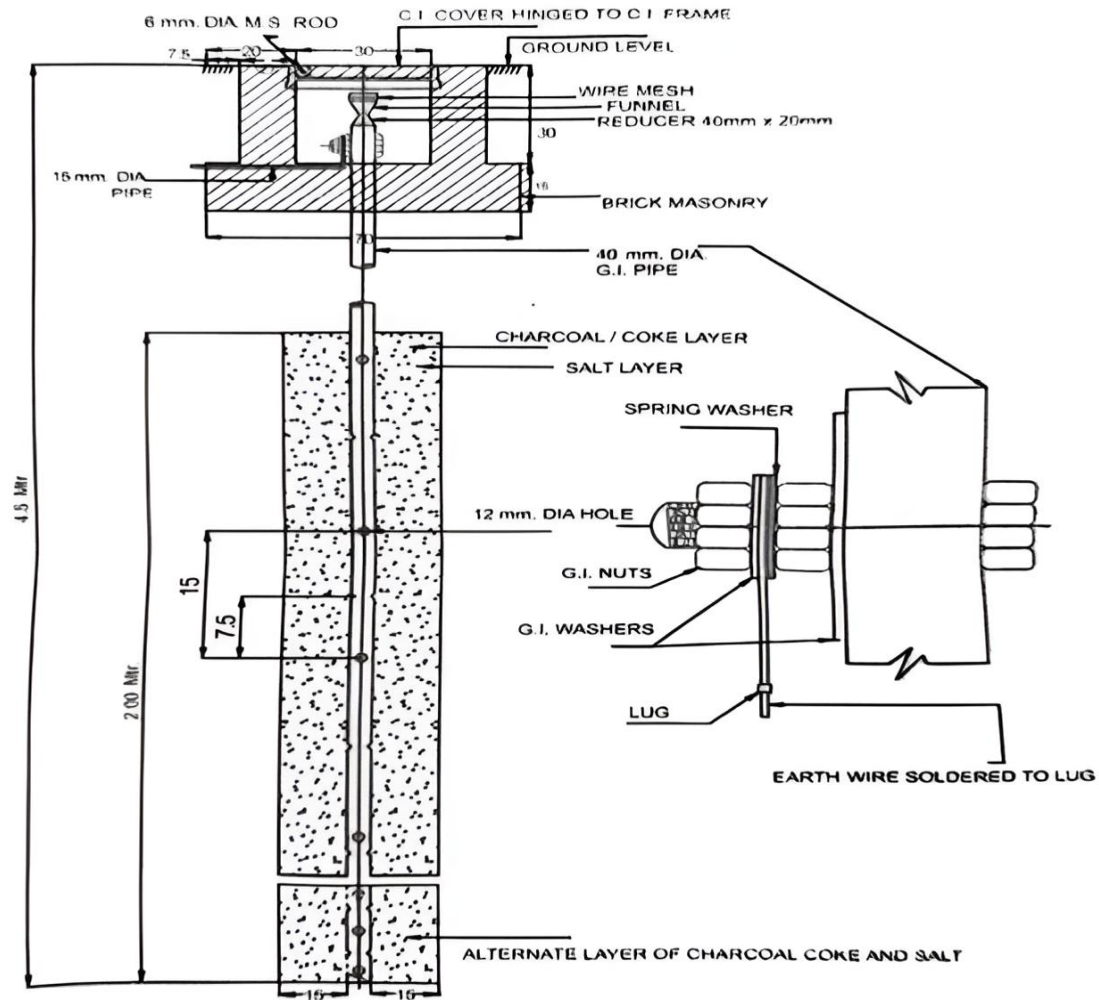


Door Open View of Control Panel

Door Close View of Control Panel

5. PIPE EARTHING

DRAWING:- *It's rate is included in estimate of submersible pump set.*



NOTE:
ALL DIMENSIONS ARE IN CM (OTHER DIMENSIONS SHOWN)

6. 8 M STEEL STAGING FOR 10,000 LTR. PVC TANK

INTRODUCTION:-

- The 8-meter staging with a 10,000-litre PVC tank plays a crucial role in the “Har Ghar Nal Ka Jal” Scheme. It ensures an adequate water head at the terminal point and maintains proper pressure within the distribution network, which minimizes the chances of leakage.
- Additionally, it helps to provide water with proper pressure through storage tank even during power outages.
- It also provides a space closed by GI sheet for keeping control panel, electric meter, chlorinator, WTP & other necessary instruments & appliances.

DESIGN

Isolated Footing Design

Let us consider an isolated footing for an RCC column of size 450mm x 450mm. Loads from this column to the foundation are:

Vertical Load $P = 42.611 \text{ kN}$

The safe bearing capacity (SBC) of soil is 60 kN/m². The grade of concrete to be used is M 25 and grade of steel is Fe415.

Step by Step Procedure of Isolated Footing Design:

Step -1: Determining size of footing:

Loads on footing consists of load from column, self weight of footing and weight of soil above footing. For simplicity, self weight of footing and weight of soil on footing is considered as 10 to 15% of the vertical load.

Load on column = 42.611 kN

Extra load at 15% of load due to self weight of soil = 42.611 x 15% = 6.39 kN

Therefore, total load $P = 49.001 \text{ kN}$

Size of footing to be designed can be square, rectangular or circular in plan. Here we will consider square isolated footing.

Therefore, length of footing (L) = Width of footing (B)

Therefore area of footing required = $\frac{P}{\text{SBC}}$

= 0.816 m

But the length and width of footing is Provided = 1.8m

Area of footing = 1.8 x 1.8 = 3.24m²

Now the pressure on isolated footing is calculated as

$$\frac{P}{A} \pm \frac{M_y}{Z_y} \pm \frac{M_z}{Z_z}$$

When calculated, $p_{\text{max}} = 19.89 \text{ kN/m}^2$

$p_{\text{min}} = 5.49 \text{ kN/m}^2$

Now, $p_{\text{max}} = 19.89 \text{ kN/m}^2$ (<60 kN/m² -> OK)

p_{max} is smaller than SBC of soil, so the size of footing provided is safe

and $p_{min} = 5.49 \text{ kN/m}^2 > 0$ (OK)

Hence, factored upward pressure of soil = $q_u = (1.5P/A \times B) = 20.94 \text{ kN/m}^2$

Step 2: Depth of footing

The critical section at a distance "d" from the face of column

V_u = soil pressure of Area from face of footing to critical section

$$= q_u B((B-b/2)-d) = 0.02094 \times 1800((1800-450/2)-d) \\ = 37.692(675-d)$$

Assuming 0.2% steel for M_{25} concrete

$$\Gamma_C = 0.32 \text{ N/mm}^2$$

minimum depth required is

$$\Gamma_C \times B d = V_u$$

$$\text{So } 0.32 \times 1800 \times d = 37.692(675-d)$$

$d = 7 \text{ mm}$ but the effective depth is restricted to minimum of 245 mm and area of footing is 3.24 m^2 so depth is safe and over all depth D is $d + \text{cover} + \text{dia}/2$ of bar

$$\text{So } D = 245 + 50 + 10/2 = 300 \text{ mm OK}$$

Checking for bending

$$M_{ulim} = 0.138 f_{ck} b d^2$$

$$= 0.138 \times 25 \times 1800 \times 245^2 = 372.755 \text{ KN-m}$$

$$M_u = q_u B(B-b)^2/8 = 0.02094 \times 1800 \times 675^2/8 = 2.1466 \text{ KN-m}$$

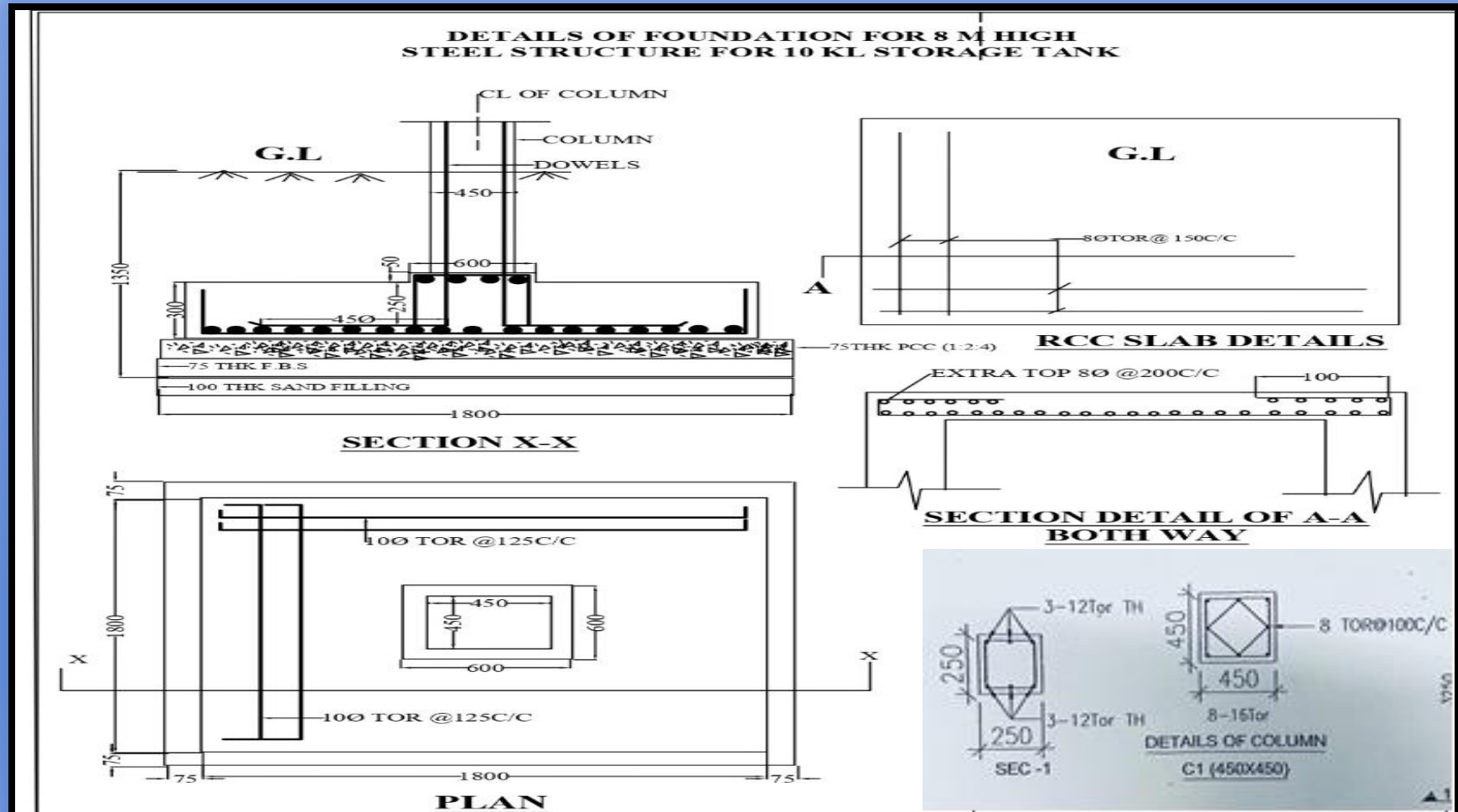
$M_u < M_{ulim}$ Hence OK

The depth provided is sufficient and safe

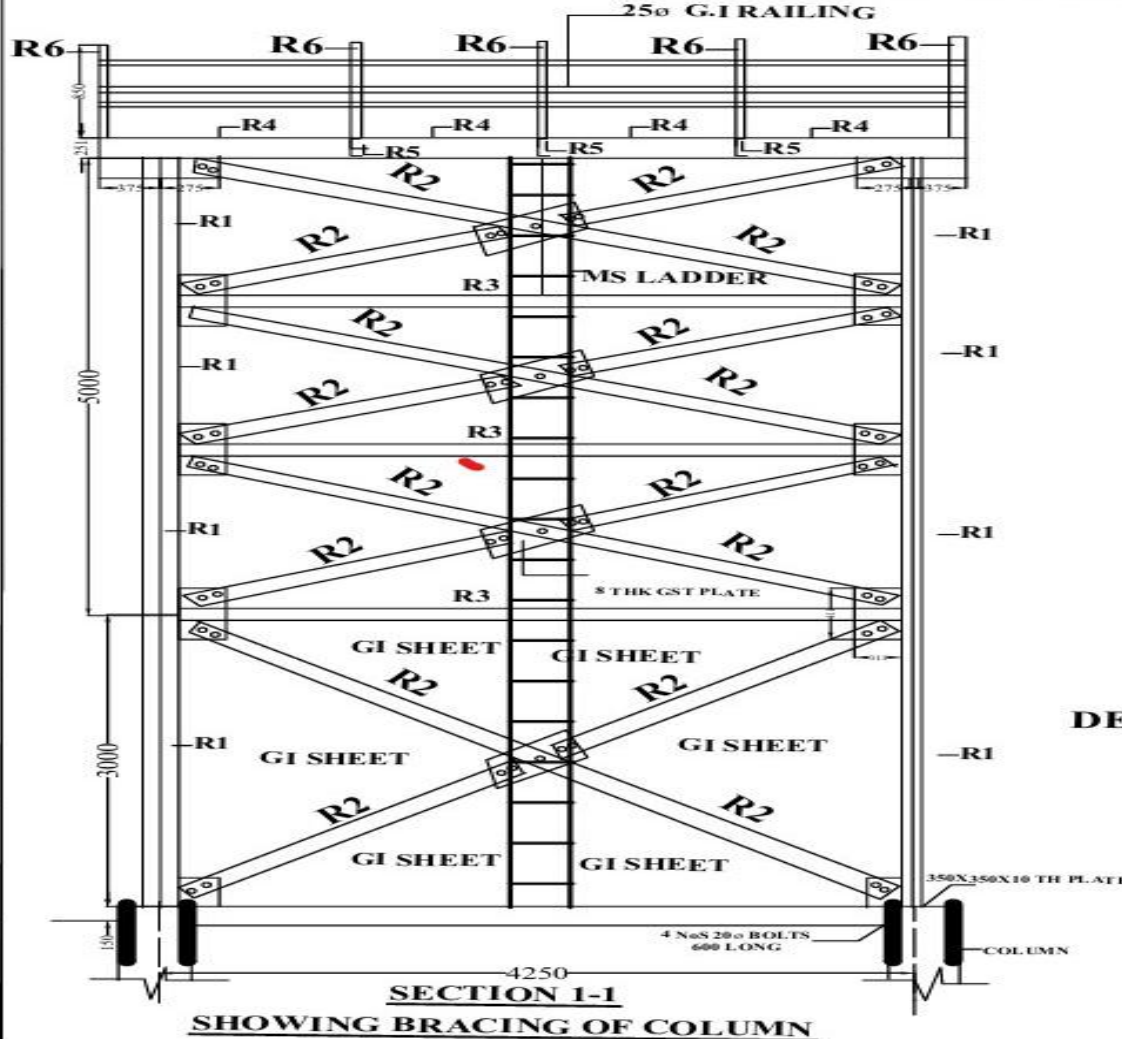
FOUNDATION OF STEEL STAGING

DRAWING:-

- PCC and Concreting in foundation as per specification given in Estimate.
- Reinforcement in footing and column as per design.



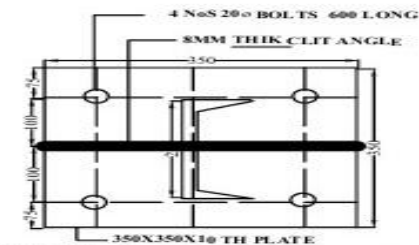
**DETAILS OF 8 M HIGH STEEL STRUCTURE
FOR 10 KL STORAGE TANK**



Back View

MEMBER DETAILS

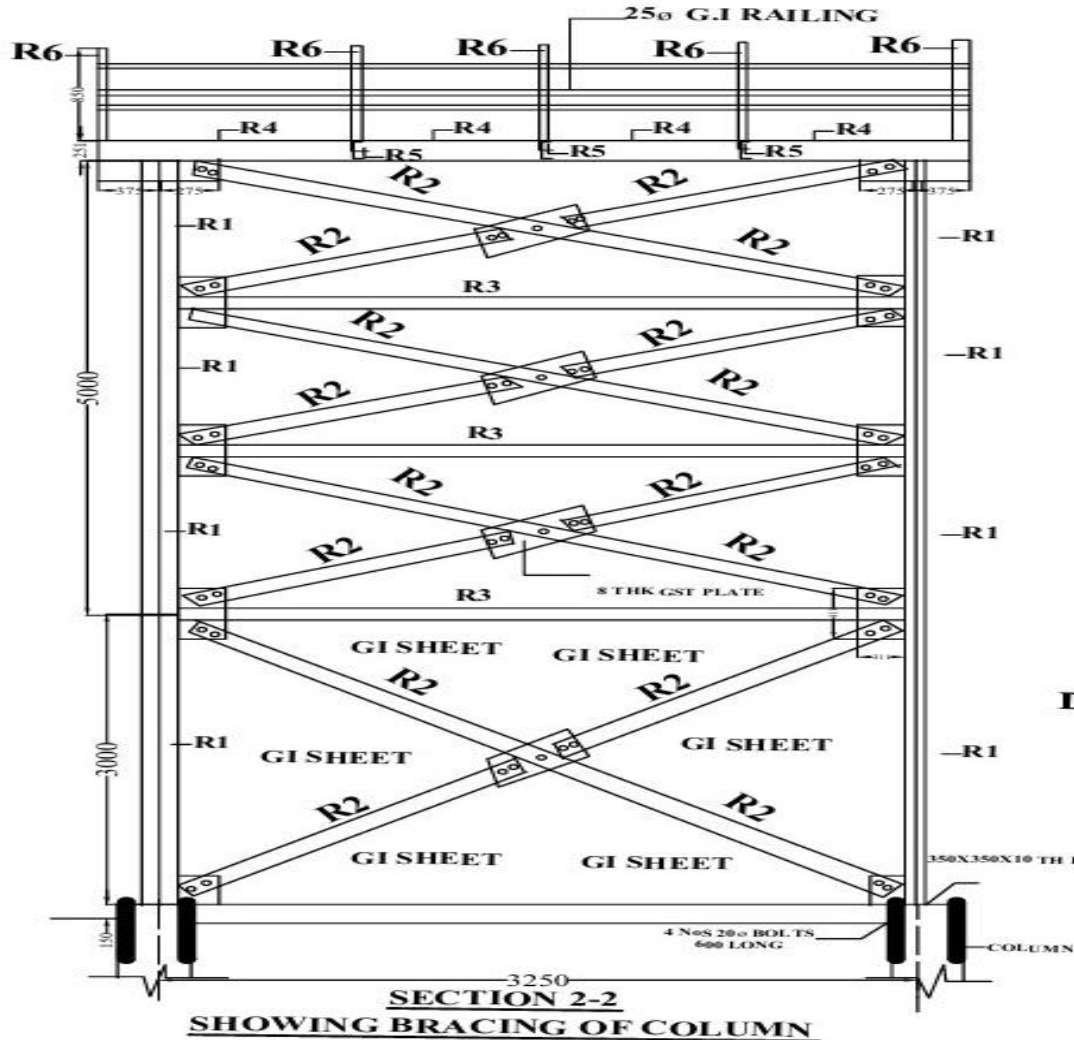
MEMBER	SECTIONS
R1	ISMC-250
R2	ISA-65X65X6
R3	ISA-100X100X6
R4	ISMC-150
R5	ISMC-125
R6	ISA-65X65X6



DETAILS OF BASE PLATE

PUBLIC HEALTH ENGINEERING DEPARTMENT, BIHAR
STEEL STRUCTURE TOWER FOR 10KL TANK
AGENCY:-
AGREEMENT NO:-
GP:-
BLOCK:-
P.H DIVISION:-
ALL DIMENSIONS ARE IN MM

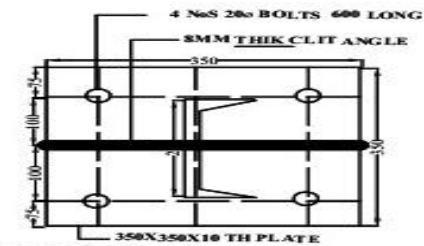
**DETAILS OF 8 M HIGH STEEL STRUCTURE
FOR 10 KL STORAGE TANK**



Both Side View

MEMBER DETAILS

MEMBER	SECTIONS
R1	ISMC-250
R2	ISA-65X65X6
R3	ISA-100X100X6
R4	ISMC-150
R5	ISMC-125
R6	ISA-65X65X6



DETAILS OF BASE PLATE

PUBLIC HEALTH ENGINEERING
DEPARTMENT, BIHAR

STEEL STRUCTURE TOWER FOR 10KL TANK

AGENCY:-

AGREEMENT NO:-

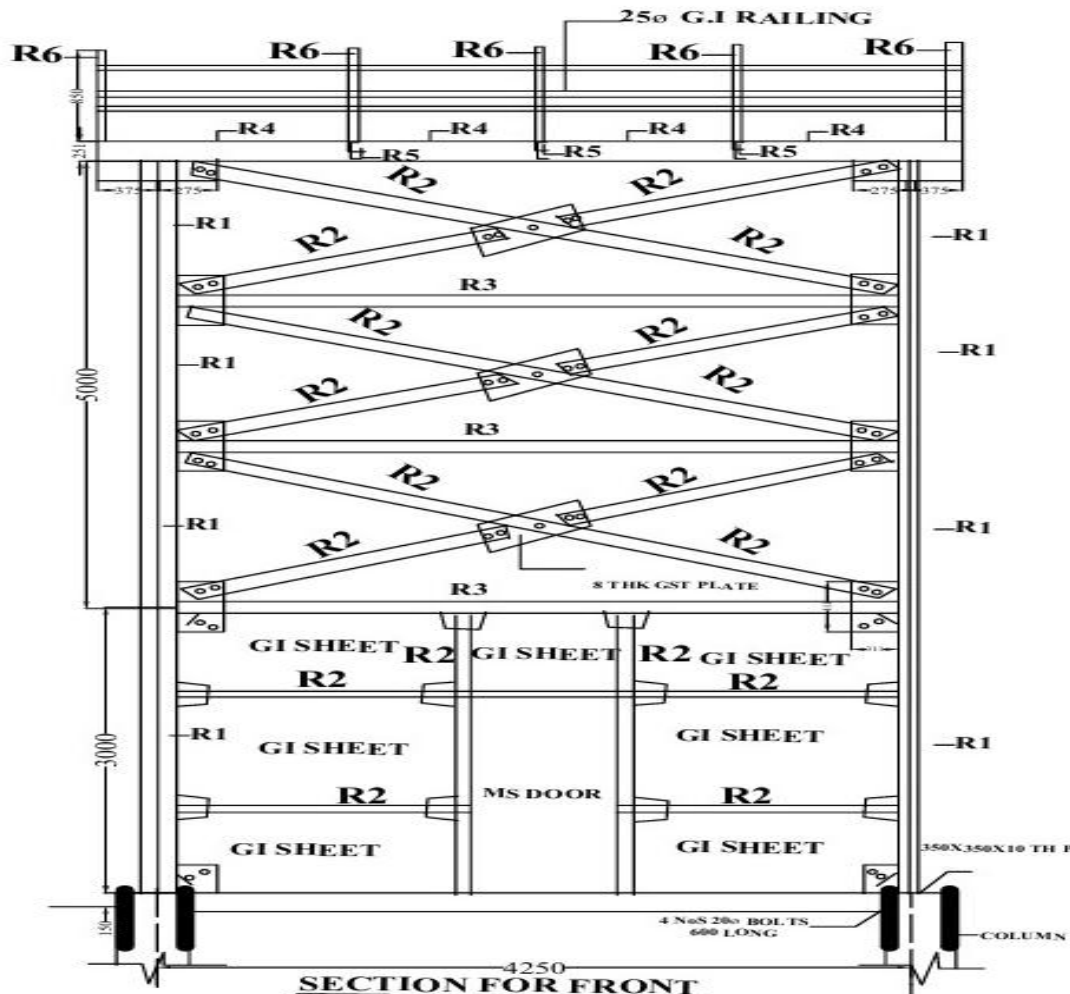
GP:-

BLOCK:-

P.H DIVISION:-

ALL DIMENSIONS ARE IN MM

**DETAILS OF 8 M HIGH STEEL STRUCTURE
FOR 10 KL STORAGE TANK**

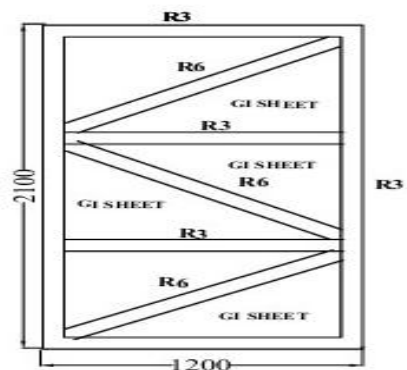


**SECTION FOR FRONT
SHOWING BRACING OF COLUMN**

Front View

MEMBER DETAILS

MEMBER	SECTIONS
R1	ISMC-250
R2	ISA-65X65X6
R3	ISA-100X100X6
R4	ISMC-150
R5	ISMC-125
R6	ISA-65X65X6



DETAILS OF DOOR

PUBLIC HEALTH ENGINEERING DEPARTMENT, BIHAR
STEEL STRUCTURE TOWER FOR 10KL TANK
AGENCY:-
AGREEMENT NO:-
GP:-
BLOCK:-
P.H DIVISION:-
ALL DIMENSIONS ARE IN MM

SPECIFICATION

10 KL Structure Weight Detail 4250 x 3250 mm 8 Meter Height

S.No	Item Name	Description	Depth of Section /Length in mm	Width of Flange /Width in mm	Thickness of Flange /Thickness in mm	Thickness of Web in mm	Length in m	Quantity in Nos	Wt/m (kg)	Total Length in m/No.	Total Weight in kg	
1	Column 1 To 4 Bracing Connecting Plates And Top Bottom Plates	ISMC 250	250	80	14.1	7.1	8	4	30.4	32	972.8	
		Pillar Connecting Flat Plate	300	200	10			32	4.71	32	150.72	
		Butt Flat Plate	275	275	12			16	7.12	16	113.92	
		Foundation Flat Plate	350	350	20			4	19.235	4	76.94	
2	Bracing With Connecting Plate	ISA-65x65x6	65	65	6		5.1	10	5.8	51	295.8	
		ISA-65x65x6	65	65	6		4.244	10	5.8	42.44	246.152	
		Flat Angle Connecting Plate	300	50	10			10	1.18	10	11.8	
3	Horizontal Joist	ISA-100x100x6	100	100	6		4.25	8	9.2	34	312.8	
		ISA-100x100x6	100	100	6		3.25	8	9.2	26	239.2	
4	Top Frame	ISMC-150	150	75	9	5.4	4.5	2	16.4	9	147.6	
		ISMC-150	150	75	9	5.4	3.25	2	16.4	6.5	106.6	
		ISMC-125	125	65	8.1	5	3.35	6	12.7	20.1	255.27	
		Flat Plate	200	100	10			18	1.57	18	28.26	
5	Railing	25 Dia GI Pipe					4.5	6	2.53	27	68.31	
		25 Dia GI Pipe					4.5	6	2.53	27	68.31	
		ISA-65x65x6	65	65	6		0.85	16	5.8	13.6	78.88	
6	Tank Bottom Plate	HR 1250x2500x4	4500	3500	4			1	433.33	1	433.33	
7	Monkey Ladder	Pipe 40 Nb	40	40	3		30	1	104.47	1	104.47	
		Flat	150	50	10			12	0.59	12	7.08	
8	H.T Bolt, Nut Sopring, Washer	M12x50						220	0.095	220	20.9	
9	Door Frame	ISA-100x100x6	100	100	6		9	1	9.2	9	82.8	
		ISA-65x65x6	65	65	6		17.5	1	5.8	17.5	101.5	
10	Enclosure Sheet	Wall	3000	1066	0.5		3.18	18	3.8	57.24	217.512	
		Roof	4267	1066	0.5		4.52	7	3.8	31.64	120.232	
							GROSS TOTAL WEIGHT OF STRUCTURE					52 4261.186

Continued...

ESTIMATE

8 M HIGH STEEL STRUCTURE STAGING FOR 10000 LITER PVC TANK / RCC STAGING

S.N.	Particulars	Quantity	Unit	Rate	Amount				
1 10.32.1	Structural steel work riveted or bolted in built up sections, trusses and framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved primer all complete.								
-	for 8M high staging with ladder of ISA65x65x6 and 16mm dia MS bar as trade @ 400mm c/c and GI enclosure to house electric switch panel & treatment unit (where required) of suitably designed MS section of angle, channel, etc. as per drawing attached.	4240	Kg	P/Kg	Rs.104.00	Rs.4,40,960.00			
2 2.8.1	Earth work in excavation in foundation trenches or drains(not exceeding 1.5 m in width or 10 sqm on plan) including dressing of sides and ramming of bottoms, lift upto 1.5 m . including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m. All Kinds of soil								
	base of footing								
	4 1.95 1.95 1.35 =				20.534				
	Under Tie beam								
	2 2.30 0.25 0.275 =				0.316				
	2 1.30 0.25 0.275 =				0.179				
					21.0285	21.029 M ³	P/M ³	Rs.360.70	Rs.7,584.98
3- 2.28	Supplying and filling in plinth with local sand and under floors including watering, ramming consolidating and dressing complete.								
	base of footing								
	4 1.95 1.95 0.10 =				1.521				
	Under Tie beam								
	2 3.95 0.25 0.10 =				0.198				
	2 2.95 0.25 0.10 =				0.148				
	Floor								
	1 4.00 3.00 0.10 =				1.200				
					3.066	3.066 M ³	P/M ³	Rs.287.30	Rs.880.86

Continued...

S.N.	Particulars					Quantity	Unit	Rate	Amount	
4-11.72	Providing designation of 100A Brick flat Soling joints filled with local sand including cost of watering, taxes & royalty all complete as per specification & direction of E/I.									
	base of footing									
	4	1.95	1.95	=	15.210					
	Under Tie beam									
	2	3.95	0.25	=	1.975					
	2	2.95	0.25	=	1.475					
	Floor									
	1	4.00	3.00	=	12.000					
					30.660	30.660	M ²	P/M ²	Rs.283.30	Rs.8,685.98
5-4.1.2	Providing and laying in position cement concrete of specified grade exluding the cost of centring and shuttering-all work upto plinth level.									
	1:1.5:3(1 Cement :1.5 coarse sand:3 graded stone aggregate 20 mm nominal size)									
	base of footing									
	4	1.95	1.95	0.075	=	1.141				
	Floor									
	1	4.00	3.00	0.10	=	1.200				
					2.341	2.341	M ³	P/M ³	Rs.4,420.80	Rs.10,347.99
6-5.1.2	Providing and laying in position specified grade of reinforced cement concrete excluding the cost of entring,shuttering,finishing and reinforcement-All work upto plinth level									
	1:1:5:3 (1 cement: 1.5 coarse sand:3 graded stone aggregate 20 mm nominal size)									
	Tie beam									
	2	3.80	0.25	0.25	=	0.475				
	2	2.80	0.25	0.25	=	0.350				
	base of footing									
	4	1.80	1.80	0.30	=	3.888				
	4	0.60	0.60	0.15	=	0.216				
	Column below GL									
	4	0.45	0.45	0.65	=	0.527				
	Column above GL									
	4	0.45	0.45	0.15	=	0.122				
					5.577	5.577	M ³	P/M ³	Rs.4,688.30	Rs.26,146.65

Continued...

S.N.	Particulars						Quantity	Unit	Rate	Amount
7- 5.9.1	Centring and shuttering including strutting,propping etc. and removal of form for.									
	4	3.80	0.25		=	3.800				
	4	2.80	0.25		=	2.800				
	16	1.80	0.30		=	8.640				
	16	0.60	0.15		=	1.440				
	16	0.45	0.65		=	4.680				
	16	0.45	0.15		=	1.080				
						22.440	22.440	M ² P/M ²	Rs.211.60	Rs.4,748.30
8- 5.22	Reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete.									
	8 mm to 16 mm tor steel									
	Total Reinforcement. @1.25% of Vol. Of Concrete (Kg/cuM) =						446.24	Kg, P/Kg.	Rs.96.70	Rs.43,151.41
9 2.26	Filling available excavated earth (excluding rock) in trenches, plinth, sides of oundations etc. in layers not exceeding 20 cm in depth: consolidating each deposited layer by ramming and watering lead (50% of E/W in excavation)						10.514	M ³ P/M ³	Rs.123.90	Rs.1,302.72
10 13.26	Neat cement punning									
	1	4.00	3.00		=	12.000	12.000	M ² P/M ²	Rs.40.50	Rs.486.00
11- 10.7.1	Providing and fixing 1mm thick M.S. sheet door with frame of 40x40x6mm angle iron and 3mm M.S. gusset plates at the junctions and corners, all necessary fittings complete, including applying a priming coat of approved steel primer.									
-	Using flats 30x6 mm for diagonal braces and central cross piece.									
-	Door									
	1	0.9	2.10		=	1.890				
-	Window									
	1	1.2	0.90		=	1.080				
				Total	=	2.970	2.970	M ³ P/M ³	Rs.3,653.00	Rs.10,849.41

Continued...

S.N.	Particulars					Quantity	Unit	Rate	Amount	
12-12.1.4	Providing corrugated G.S. sheet roofing fixed with G.I.J. or hooks, bolts and nuts 8 mm diameter with bitumen and G. I. limpet washers or with G.I. limpet washers filled with white lead and including a coat of approved steel primer and two coats of approved paint on over lapping of sheets complete (upto a pitch of 60°) excluding the cost or purlins, rafters and trusses.									
-	0.8mm thick with zinc coating not less than 275 gm/mz									
	Roof									
-	1	4.50	3.50	=	15.750					
	Wall									
-	1	16.00	3.00	=	48.000					
-					63.750					
	Deduct for door & window									
-	1	0.9	2.10	=	1.890					
-	1	1.2	0.90	=	1.080					
-					2.970					
-	Net Qty				=	60.780	60.780	M ² M ²	Rs.1,501.30	Rs.91,249.01
13-10.19	Providing and fixing anchor bolt of 20 mm dia and 0.60 Mtr length (bolt, washer & double nut) embedded in R.C.C pedestal all complete as per direction of Engineer in charge. @4x4x1.60kg					25.60	Kg	P/kg	Rs.82.70	Rs.2,117.12
14-13.82.1	Painting with ready mixed paint of approved brand and manufacture in all shades to give an even shade:									
-	New steel work (two or more coats)									
	Frame work									
-	0.5	16.00	8.00	=	64.000					
-	0.5	5.00	4.00	=	10.000					
	Roof sheet									
-	2	4.50	3.50	=	31.500					
	Top sheet									
-	2	5.00	4.00	=	40.000					
	GI sheet wall									
-	2	16.00	3.00	=	96.000					
-					241.500	241.50	M ² M ²	Rs.83.50	Rs.20,165.25	

Continued...

S.N.	Particulars	Quantity	Unit	Rate	Amount	
<u>15</u>	Carriage of the following materials from quarry to work site including loading, unloading and staking at work site as per specification & direction of E/I.					
	(a) Bricks (7 Km. Pucca & 1 Km. Kaccha lead)	990	No s.	%0 nos.	Rs.1,429.60	Rs.1,415.30
	(b) Coarse sand (44 Km pucca & 1 km kaccha Carriage)	3.110	M ³	P/M ³	Rs.1,015.10	Rs.3,156.96
	(c) Stone Chips (110km pucca Carriage)	6.220	M ³	P/M ³	Rs.1,690.70	Rs.10,516.15
	(d) Local Sand (2 Km. lead & 1km Kachaa lead)	3.530	M ³	P/M ³	Rs.407.10	Rs.1,437.06
TOTAL						Rs.6,85,201.16
					Say Rs.	Rs.6,85,200.00

PART OF STEEL STAGING

PVC STORAGE TANK



- **PVC Tank Conforming to IS Code-12701 (1996).**
- **PVC STORAGE TANK – 5,000 LTR. Capacity having Min. weight (without lid) 180 Kg., over all height may vary from 1.8 m to 2.1 m and min. internal Dia of manhole is 450 mm.**
- **Minimum wall and bottom thickness as per IS code – 12701 (1996) must be 10.7 mm.**

7. DISTRIBUTION NETWORK

INTRODUCTION:-

- Distribution network is the network which provides water in house connection with adequate pressure rather it has been properly designed otherwise some household will not get water with sufficient discharge.
- So, it is just like arteries which connects every points of our body to keep us alive similarly, if distribution network is free from leakages or jamming then only every household will get proper water and live happily.
- In “Har Ghar Nal Ka Jal” Scheme, distribution network consist of HDPE pipeline having diameter ranging from 40 mm to 110 mm. We provide them only if it confirms to IS 4984 & IS 7634 (part – 2).
- Workmanship during laying of pipe line plays a vital role in determining the discharge of water at terminal point because water flows in distribution network by gravity so, its necessary to maintain proper gradient while laying.

DESIGN:- Random design sample by LOOP 4 software.

Echoing Input Variables

Title of the Project	:	RAJIPUR WARD 8
Name of the User	:	PANCHYAT
Number of Pipes	:	29
Number of Nodes	:	27
Type of Pipe Materials Used	:	HD/
Number of Commercial Dia per Material	:	8/
Peak Design Factor	:	3
Newton-Raphson Stopping Criterion lps	:	.001
Minimum Pressure	m	: 5
Maximum Pressure	m	: 25
Design Hydraulic Gradient m in km	:	5
Simulate or Design? (S/D)	:	S
No. of Res. Nodes with Fixed HGL	:	1
No. of Res. Nodes with Variable HGL	:	
No. of Booster Pumps	:	
No. of Pressure Reducing Valves	:	
No. of Check Valves	:	
Type of Formula	:	Hazen's

Pipe Data

Pipe No.	From Node	To Node	Length m	Diameter mm	Hazen's Const	Pipe Material (E/P)	Status
1	100	1	15.00	90.0	145.00000	HD	
2	1	2	52.00	40.0	145.00000	HD	
3	1	3	53.00	90.0	145.00000	HD	
4	3	4	45.00	75.0	145.00000	HD	
5	4	5	14.00	50.0	145.00000	HD	

It is final dia-wise pipe summary result of design including its cost as we feed in input.

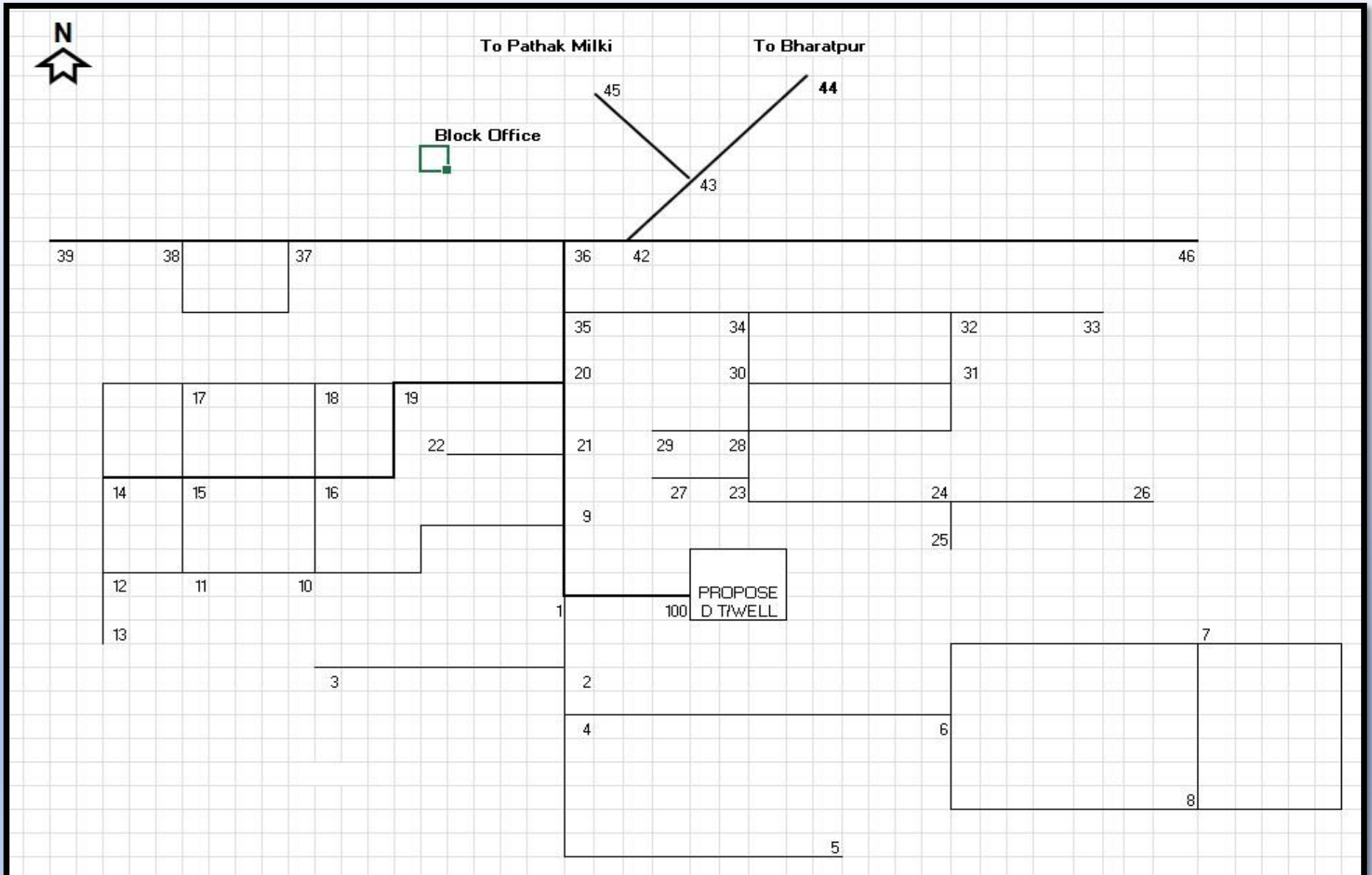
Pipe Cost Summary

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Diameter      Pipe      Length      Cost      Cum. Cost
(mm)          Material  (m )        (1000 Rs ) (1000 Rs )
-----
40.0          HD        391.00      23.37     23.37
50.0          HD        417.00      37.53     60.90
63.0          HD        182.00      30.72     91.62
75.0          HD        45.00       10.79     102.41
90.0          HD        68.00       23.18     125.58
=====

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DRAWING:- Symbolic diagram of Pipe network (Najari Naksha)



SPECIFICATION

HDPE PIPE SPECIFICATION:

- Providing and laying of HDPE pipe of dia from 90 mm, 75 mm, 63 mm (**PE-100-PN 10** rating) & dia 50 mm,40 mm (**PE-100-PN 8** rating) as per **IS 4984/1995 & IS 7634 (part 2) 2012.**
- Pipes shall be classified by nominal pressure (PN) corresponding to the maximum permissible working pressure at 30⁰ C as follows.

Pressure rating of pipe	Maxiumum permissible working presuure
PN 2.5	0.25 MPa
PN 4	0.40 MPa
PN 6	0.60 MPa
PN 10	1.00 MPa
PN 12.5	1.25 MPa
PN 16	1.60 MPa

- The colour of pipe shall be **black**.
- Each pipe shall contain minimum three equispaced longitudinal stripes of width **3 mm (min) in blue colour** and shall not be more than **0.2mm in depth**.
- The minimum and maximum wall thickness of pipes of grade PE 100 & PN 10 shall be as follow.

Nominal Diameter (mm)	Outside Diameter (mm)	Max (mm)	Min (mm)
40	40	3.5	3.0
50	50	4.3	3.7
63	63	5.3	4.7
75	75	6.3	5.6
90	90	7.5	6.7
110	110	9.1	8.1

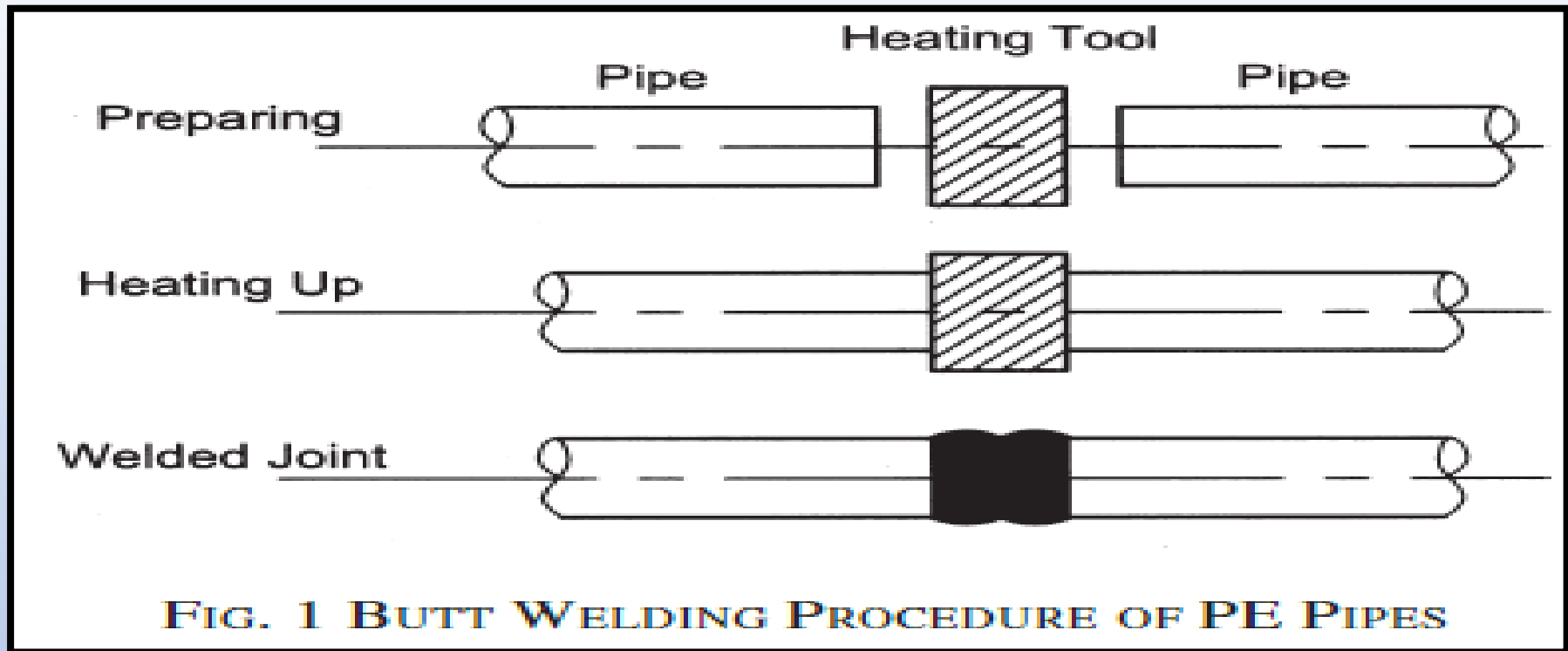
- The outside diameter of the pipe shall be taken as the average of **two measurements** taken at right angles for the pipes up to 110 mm (shall be measured at a distance of at least 300 mm from the end of the pipe).
- Ovality shall be measured as the difference between maximum outside diameter and minimum outside diameter measured at same cross section of the pipe (300 mm away from the cut end)

Nominal Diameter(mm)	Ovality(mm)
40	1.4
50	1.4
63	1.5
75	1.6
90	1.8
110	2.2

- The pipes supplied in coils minimum diameter of **25 times** the nominal diameter of the pipe.
- The specified base density shall be between **940.5 kg/m³** and **946.4 kg/m³**.

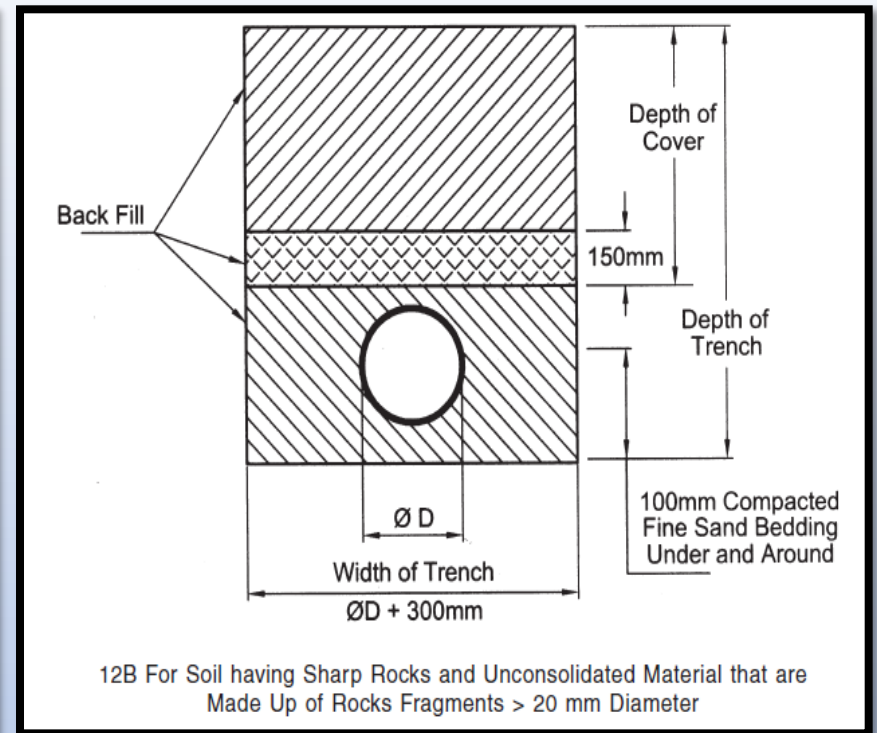
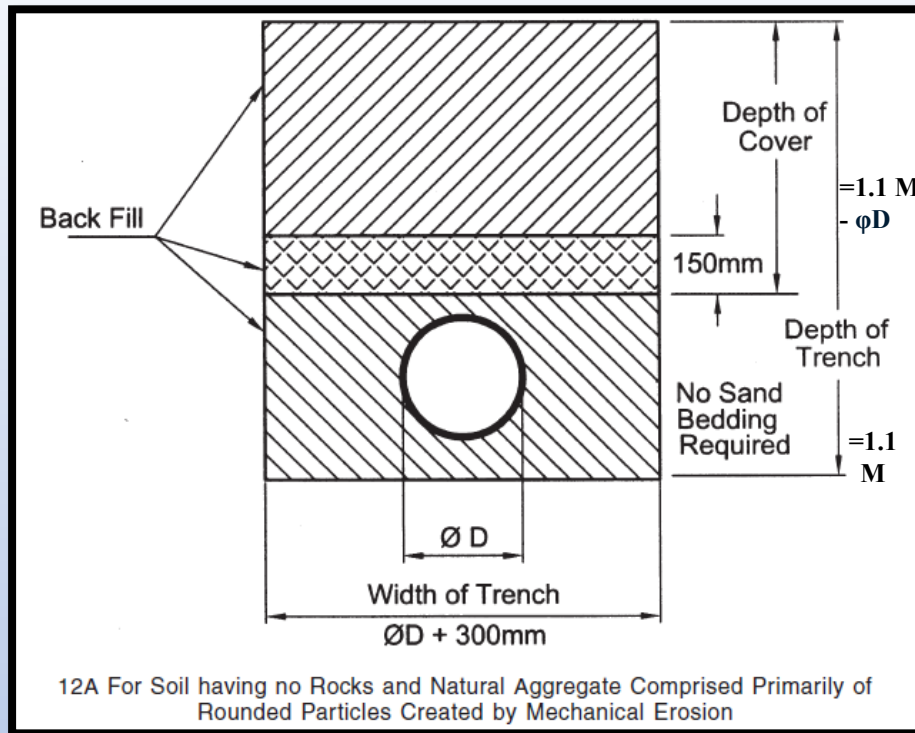
JOINTING:

- Jointing of pipe shall be done by **electrofusion welding**.
- The principle of fusion welding is to heat the two pipe surface to a designated temperature and then fuse them together by application of sufficient force.



LAYING:

- The pipeline shall be laid inside the trench with a slack of up to 2m/100m of pipe line.
- Trench width and depth for the size of pipe 20-110 mm shall be 300mm and (900-1100) mm respectively.
- The initial back fill up to 150 mm above the crown of the pipe should be compacted with screened excavated material free from sharp stones object.



TESTING:

- The trial run shall consist of period of **three months** after completion of job.
- The test pressure shall be 1.5 times the rated pressure of pipes.
- If the test is not completed because of leakage or equipment failures, the test section shall be depressurized and allowed to relax for at least 8h before starting the next testing sequence.

ESTIMATE

WATER SUPPLY DISTRIBUTION SYSTEM									
S.N.	Particulars	Quantity	Unit	Rate	Amount				
Part - I									
1/ 2.8	Earthwork in excavation over areas (exceeding 30 cm in depth 1.5 in width as well as 10 sqm on plan) including disposal of excavated earth lead upto 50m and lift upto 1.5m, disposal earth to be levelled and neatly dressed.								
	110mm dia Pipe	2840.00	0.52	1.10 =	1624.48				
	90mm dia Pipe	3550.00	0.50	1.10 =	1952.50				
	75mm dia Pipe	4140.00	0.45	1.10 =	2049.30				
	63mm dia Pipe	2866.00	0.30	1.10 =	945.78				
	50 mm dia Pipe	2876.00	0.30	1.10 =	949.08				
	40mm dia Pipe	2220.00	0.30	1.10 =	732.60				
	-	<u>18492.00</u>	-	-	8253.74M ³				
	Add 5% extra for fittings =				412.69M ³				
	-	-	-	-	8666.43M ³	P/M ³	Rs.360.70	Rs.31,25,980.22	
2/ 2.26	Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift upto 1.5 m.				6933.14M ³	P/M ³	Rs.123.50	Rs.8,56,242.99	
3/ 15.2.1	Demolishing cement concrete manually/by mechanical means including disposal of material within 50 metres lead as per direction of Engineer - in - charge.								
	1:3:6 or richer mix								
		5547.60	0.30	0.150 =	249.64M ³	P/M ³	Rs.970.90	Rs.2,42,377.42	
4/ 4.1.3	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering all work upto plinth								
	1:2:4 (1 cement: 2 coarse sand : 4 graded stone aggregate 40mm nominal size)				249.64 M ³	P/M ³	Rs.3,998.10	Rs.9,98,093.68	

S.N.	Particulars	Quantity	Unit	Rate	Amount		
5	Carriage of the following materials from quarry to work site including loading, unloading and staking at work site as per specification & direction of E/I.						
	Coarse Sand (100 Km. lead)	112.34	M ³	P/M ³	Rs.1,221.09	Rs.1,37,175.91	
	Stone chips (150Km. Pucca lead)	224.68	M ³	P/M ³	Rs.3,021.01	Rs.6,78,753.88	
6/ 18.12	Providing and fixing G.I.Pipes complete with G.I. Fittings including trenching and refilling etc.						
18.12.6	50mm dia G.I.Pipe from T/well to PVC Tank	98.00	M	P/M	Rs.575.00	Rs.56,350.00	
18.12.8	80mm dia G.I.Pipe from PVC Tank to Distribution main	98.00	M	P/M	Rs.820.00	Rs.80,360.00	
18.12.7	65mm dia G.I.Pipe for wash out	84.00	M	P/M	Rs.670.00	Rs.56,280.00	
7A/ 18.31.1 .1	P/F C.I sluice Valve (with Cap) complete with bolts,nuts,rubber insertions etc						
	110mm dia Pipe	14	Nos	Each	Rs.3,886.60	Rs.54,412.40	
7B/ 18.17.6	Providing and fixing brass gate valve with C.I. wheel of approved quality (screwed end).						
	90mm dia Pipe	14	Nos	Each	Rs.2,227.60	Rs.31,186.40	
18.17.5	75mm dia Pipe	14	Nos	Each	Rs.1,490.70	Rs.20,869.80	
6.1.12		0.298	10.413	M ³	P/M ³	Rs.5,017.90	Rs.52,248.88
13.11.1	Plaster (1:3)						
	8 1.10 0.35	3.08	107.80	M ²	P/M ²	Rs.164.30	Rs.17,711.54

S.N.	Particulars	Quantity	Unit	Rate	Amount		
8/ 18.33	Constructing masonry Chamber 60x60x75 cm inside, in brick work in cement mortar 1:4 (1 cement : 4 coarse sand) for sluice valve,with C.I. surface box 100mm top diameter, 160 mm bottom diameter and 180 mm deep (inside) with chained lid and RCC top slab 1:2:4 mix (1 cement : 2 coarse sand : 4 graded stone aggregate 20mm nominal size) , necessary excavation, foundation concrete 1:5:10(1 cement : 5 fine sand : 10 graded stone aggregate 40 mm nominalsize) and inside plastering with cement mortar 1:3 (1 cement : 3coarse sand) 12 mm thick, finished with a floating coat of neat cement complete as per standard specifications & direction of E/I.	35	Nos.	Each	Rs.7,210.60	Rs.2,52,371.00	
	Work for additional depth						
	Brick work (1:4) in foundation						
	2 1.10 0.25 0.35	0.193					
	2 0.60 0.25 0.35	0.105					
6.1.12		0.298	10.413	M ³	P/M ³	Rs.5,017.90	Rs.52,248.88
13.11.1	Plaster (1:3)						
	8 1.10 0.35	3.08	107.80	M ²	P/M ²	Rs.164.30	Rs.17,711.54
9	Carriage 10% of item 9						Rs.32,233.14
10/ 18.48	Providing and placing on terrace (at all floor levels) polyethylene water storage tank, ISI : 12701 marked, with cover and suitable locking arrangement and making necessary holes for inlet, outlet and overflow pipes but without fittings and the base support for tank.	70000	Ltrs.	P/Ltr.	Rs.9.70	Rs.6,79,000.00	
11A	Supplying all materials labours & fixing 50mm dia. G.I pipe for using as filling station etc. All as per direction of E/I						
	50mm dia. Pipe from distribution main	24.50	M	P/M	489.10	11982.95	
11B	Providing and fixing G.I fittings						
	80mmx80mmx50mm dia Tee	7	No	Each	225.00	1575.00	
	50mm dia bend	21	No	Each	175.00	3675.00	
	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :50mm nominal dia.	7	N	Each	811.40	5679.80	

S.N.	Particulars	Quantity	Unit	Rate	Amount	
11C	Providing designation of 100 A brick Flat soling joints filled with local sand including cost of watering, taxes & royalty all complete as per specification & direction of E/I.					
	2 0.45 0.45	2.835	m2	p/m2	253.80	719.52
12	Providing and fixing PTMT extension nipple for water tank pipe, fittings of approved quality and colour.					
-	50mm dia	14	Nos	each	Rs.300.00	Rs.4,200.00
-	63mm dia	7	No.	each	Rs.350.00	Rs.2,450.00
-	80 mm dia	7	No.	each	Rs.550.00	Rs.3,850.00
Sub Total of Part - I					Rs.74,05,779.53	
Part - II						
13	Included GST@12%, CP&OHC @ 15 %, Labour Cess @ 1% and Cost of Laying (Per Meter) including all taxes CP, OH, Water charges, Labour cess All Complete					
	Providing and laying High Density Polyethylene pipe (HDPE pipe) of 20 mm to 225 mm OD and pressure 6.0 Kg/cm2 and 10 Kg/cm2 suitable for water supply which is available in all standard, like ISI-4984/1995 and various grades like PE-80, PE-100 including required specials. Rates are inclusive of , all taxes and duties (Exise duty @12.50% & CST @2% against Form 'C'), labour cess, contractor profit and overhead charges all complete as per direction of Engineer-in-charge.					
13A	HDPE pipe of materials grade PE100- PN10 (dia in mm)					
	110mm dia Pipe	2840.00	M	P/M	Rs.646.25	Rs.18,35,350.00
	90mm dia Pipe	3550.00	M	P/M	Rs.437.96	Rs.15,54,758.00
	75mm dia Pipe	4140.00	M	P/M	Rs.306.31	Rs.12,68,123.40
	63mm dia Pipe	2866.00	M	P/M	Rs.218.62	Rs.6,26,564.92
13B	HDPE pipe of materials grade PE100- PN8 (dia in mm)					
	50 mm dia Pipe	2876.00	M	P/M	Rs.116.25	Rs.3,34,335.00
	40mm dia Pipe	2220.00	M	P/M	Rs.76.53	Rs.1,69,896.60
Sub Total of Part (II)					Rs.57,89,027.92	
Grand Total of Part (I+II)					Rs.1,31,94,807.00	

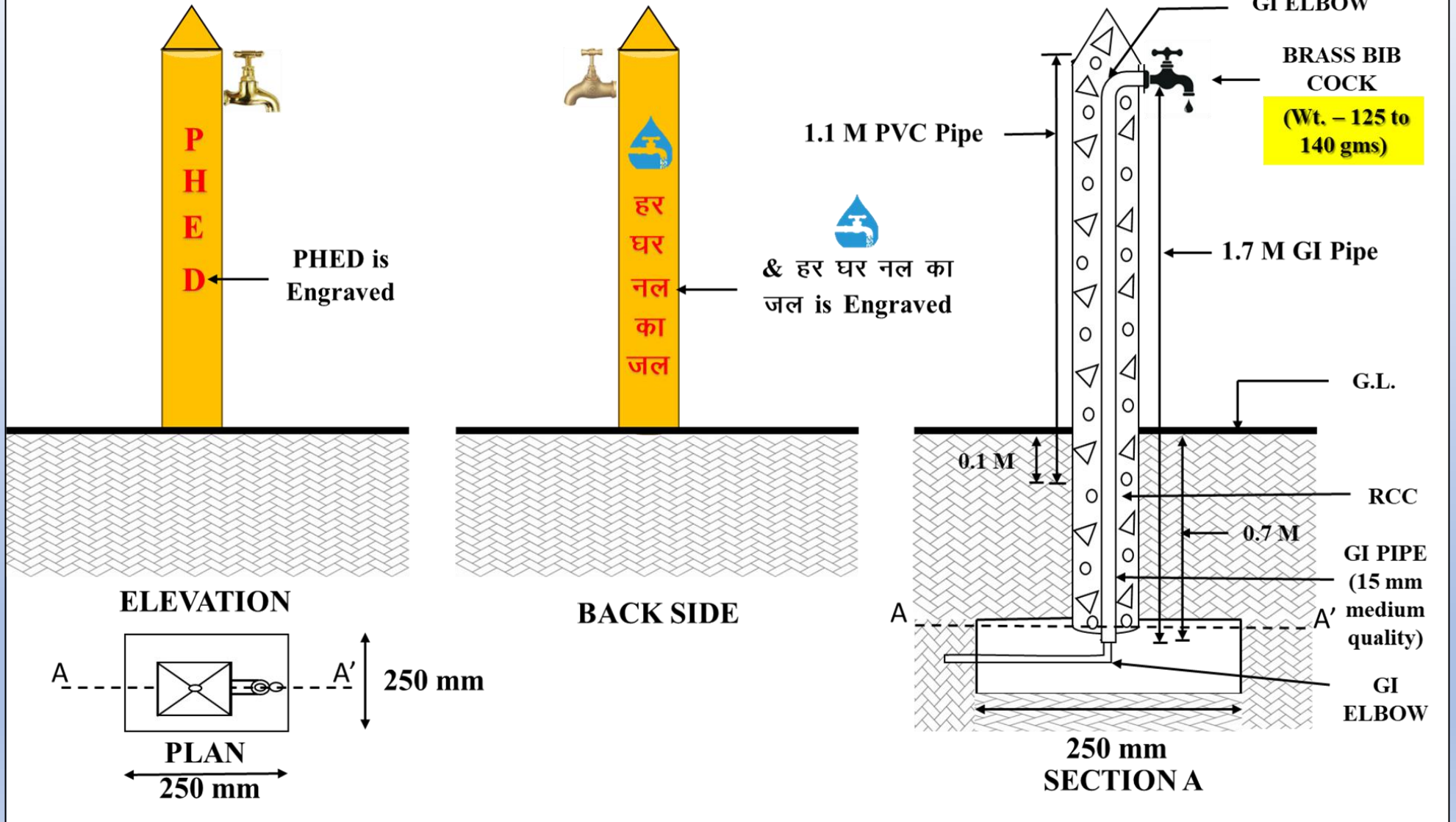
8. STAND POST

INTRODUCTION:-

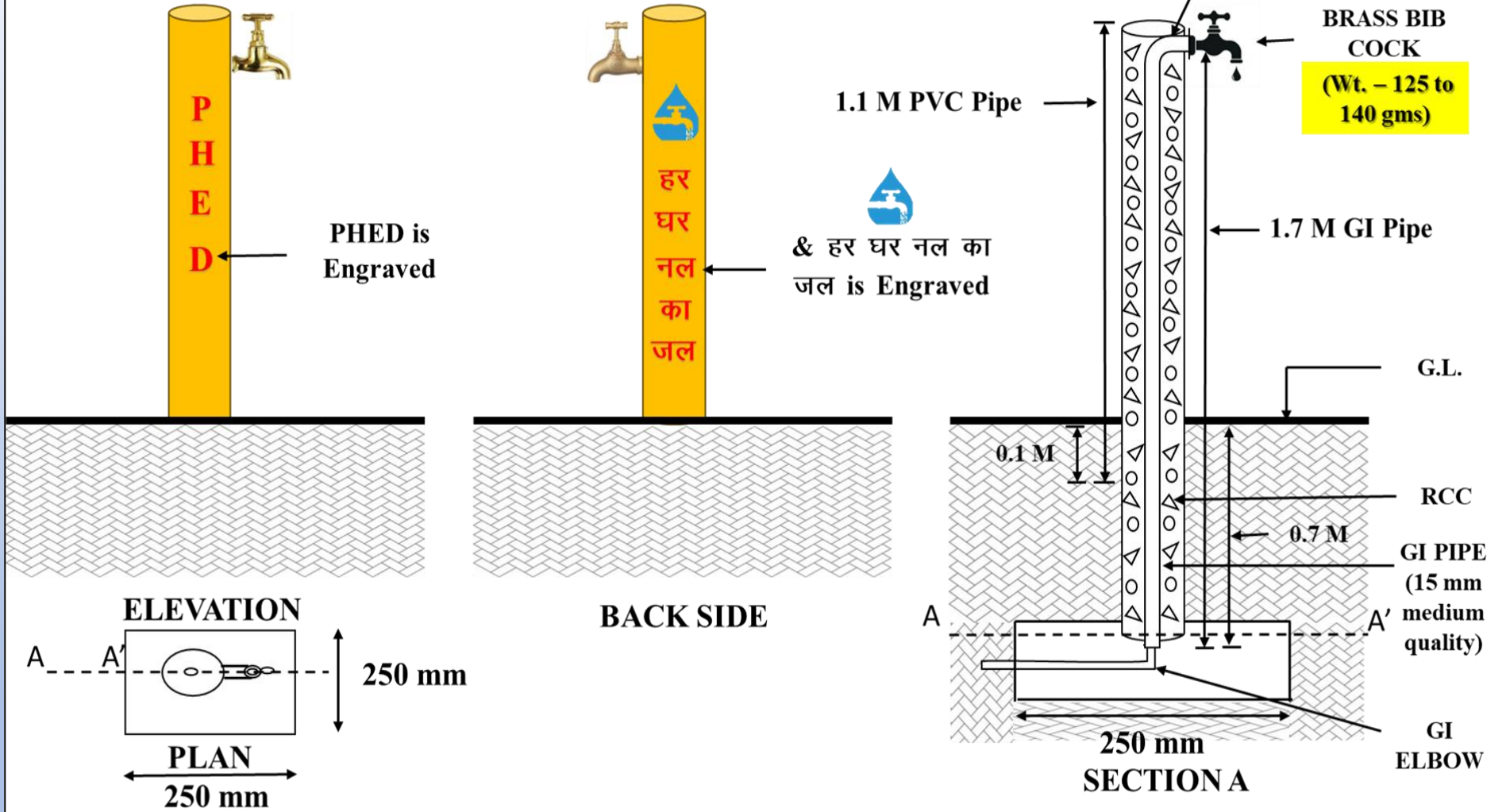
- House connection (Stand Post) is in lead role for any “Har Ghar Nal Ka Jal” Scheme because whatever we are building in this scheme has to result with “water in stand post” which finally serve the purpose of “Har Ghar Nal Ka Jal” Scheme.
- So, it is very crucial and important part of this scheme which needs proper maintenance to keep it functional and damage free.
- At the end! After finallising every step of “Har Ghar Nal Ka Jal” scheme we can analyse our workmanship and material quality used of rest component on the basis of proper discharge in every house connection of beneficiaries and “if it is well then we can say work is well”.

DESIGN, DRAWING & KEY SPECIFICATIONS

Model - A Square Stand Post



Model – B Circular Stand Post



1. MDPE Pipe (PE 80 Grade Compound) PN-12.5 as per IS: 4427.
2. Other Shapes like Hexagonal Stand Post may be used as per approved design.

ESTIMATE

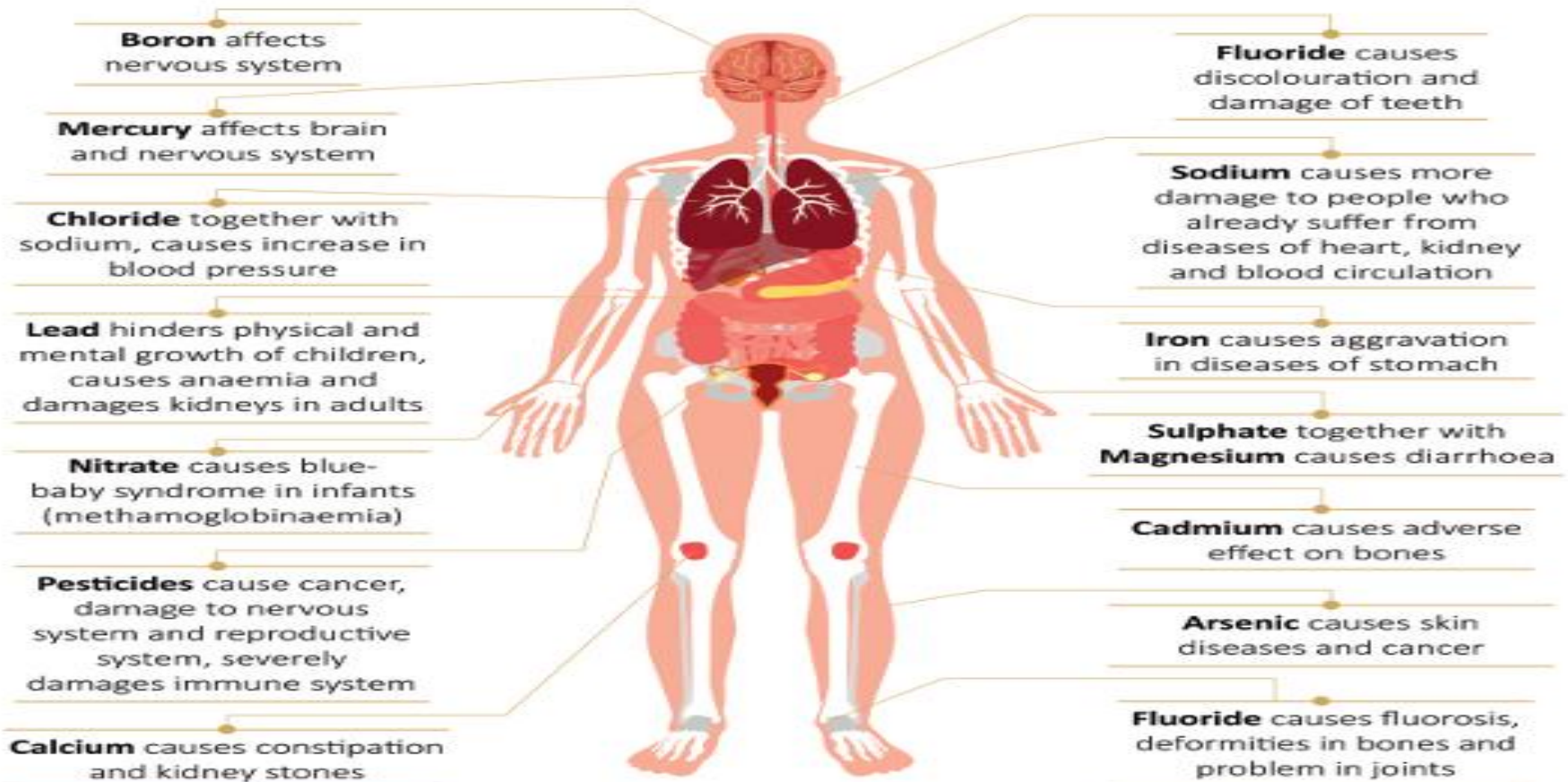
Estimate for the work - New House service connection with Retrofitting					
S.n	Description	Qty.	Unit	Rate	Amount
1	Providing and fixing MDPE (PE 80 Grade compound) pipes PN-12.5 (12.5/sqcm) as per ISO 4427 and specification for water application rates are inclusive of taxes and duties (Exise duty @ 12.5% & CST @ 2% against form "C" labour cess contractor profot and over head charges all complete as per direction of Engineer in-charge				
	MDPE pipe 20mm dia nominal bore	6.00	PM	28.31	169.86
1-B	Providing and fixing G.I. pipes complete with G.I. fittings and clamps, i/c cutting and making good the walls etc. Internal work - Exposed on wall				
18.10.1	15mm dia nominal bore	1.70	PM	227.70	387.09
1-C	Providing and faying cement concreate in kerbs, steps and the like at or near ground level excluding the cost of centring, shuttering and finishing				
4.4.1	1:2:4 (1 Cement :2 coarse sand :4 grade stone aggregate 20 mm nominal size)				
	.25x.25x.10+0.100x0.100x1.70=0.023	0.023	P/Cum	3998.10	91.9563
12.78.2	Providing and fixing of square pvc pipe with PHED engraved on wall of 100mm dia	1.10	PM	257.50	283.25

S.n	Description	Qty.	Unit	Rate	Amount
2	Earth work in excavation in foundation trenches or drains(not exceeding 1.5 m in width or 10 sqm on plan) including dressing of sides and ramming of bottoms, lift upto 1.5 m . including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.				
2.8.1	6.00X.30X.60+0.30x0.30x0.60=1.134	1.134	P/Cum	360.70	409.0338
3 2.26	Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20 cm in depth: consolidating each deposited layer by ramming and watering lead	1.06	P/Cum	123.9	131.334
4	Providing and fixing brass ferrule with C.I. mouth cover including boring and tapping the main :				
18.20. 1	15mm nominal bore	1	Each	301.60	301.60
(a)	Providing & fixing p.p clamp service saddle (Brass threaded)	1	Each	400.00	400.00
(b)	Providing & fixing female adopter for adjoining the ferrule to MDPE pipe	1	Each	75.00	75.00
(c)	Providing & fixing female elbow adopter for adjoining the ferrule to MDPE pipe to G.I pipe	1	Each	50.00	50.00
5	Providing and fixing brass bib cock of approved quality :				
18.15. 1	15 mm nominal bore	1	Each	303.80	303.80
				Total Rs.	2602.9241
				Say Rs.	2600.00

9. WATER TREATMENT PLANT

INTRODUCTION:-

Impact of prolonged consumption of contaminated drinking water on human body



Iron

- 1 Araria
- 2 Begusarai
- 3 Bhagalpur
- 4 Darbhanga
- 5 Katihar
- 6 Khagaria
- 7 Kishanganj
- 8 Madhepura
- 9 Munger
- 10 Purnea
- 11 Saharsa
- 12 Supaul

Arsenic

- 1 Bhojpur
- 2 Begusarai
- 3 Bhagalpur
- 4 Buxar
- 5 Darbhanga
- 6 Katihar
- 7 Khagaria
- 8 Lakhisarai
- 9 Munger
- 10 Patna
- 11 Samastipur
- 12 Saran
- 13 Sitamarhi
- 14 Vaishali

Fluoride

- 1 Bhagalpur
- 2 Munger
- 3 Aurangabad
- 4 Banka
- 5 Nawada
- 6 Gaya
- 7 Jamui
- 8 Kaimur
- 9 Nalanda
- 10 Rohtas
- 11 Seikhpura

- It affects the taste and colour of water.
- Excess iron causes gastrointestinal distress.
- Water containing iron slowly becomes turbid and highly unacceptable from aesthetic view point.
- The most common symptom is darkening of the skin (melanosis), often observed on the palms. Dark spots on the forehead, chest, back, limbs and gums have also been reported.
- A serious symptom is Keratosis, hardening of skin into nodules, often on palm and soles.
- Long term exposure to arsenic in drinking water > 0.01 mg/l causes increased risk of skin, lungs, bladder and kidney cancer.
- Dental fluorosis
- Skeleton fluorosis
- Prolonged and excessive fluoride concentration leads to damage of brain, liver, thyroid and kidney.

DESIGN (For Illustration Only)

CALCULATION OF CAPACITY OF ARSENIC TREATMENT PLANT

As per CPHEEO manual on Water Supply and Treatment published by the Ministry of Urban Development Department, Government of India in May 1999, the design period of Water Treatment Unit is 15 years only.

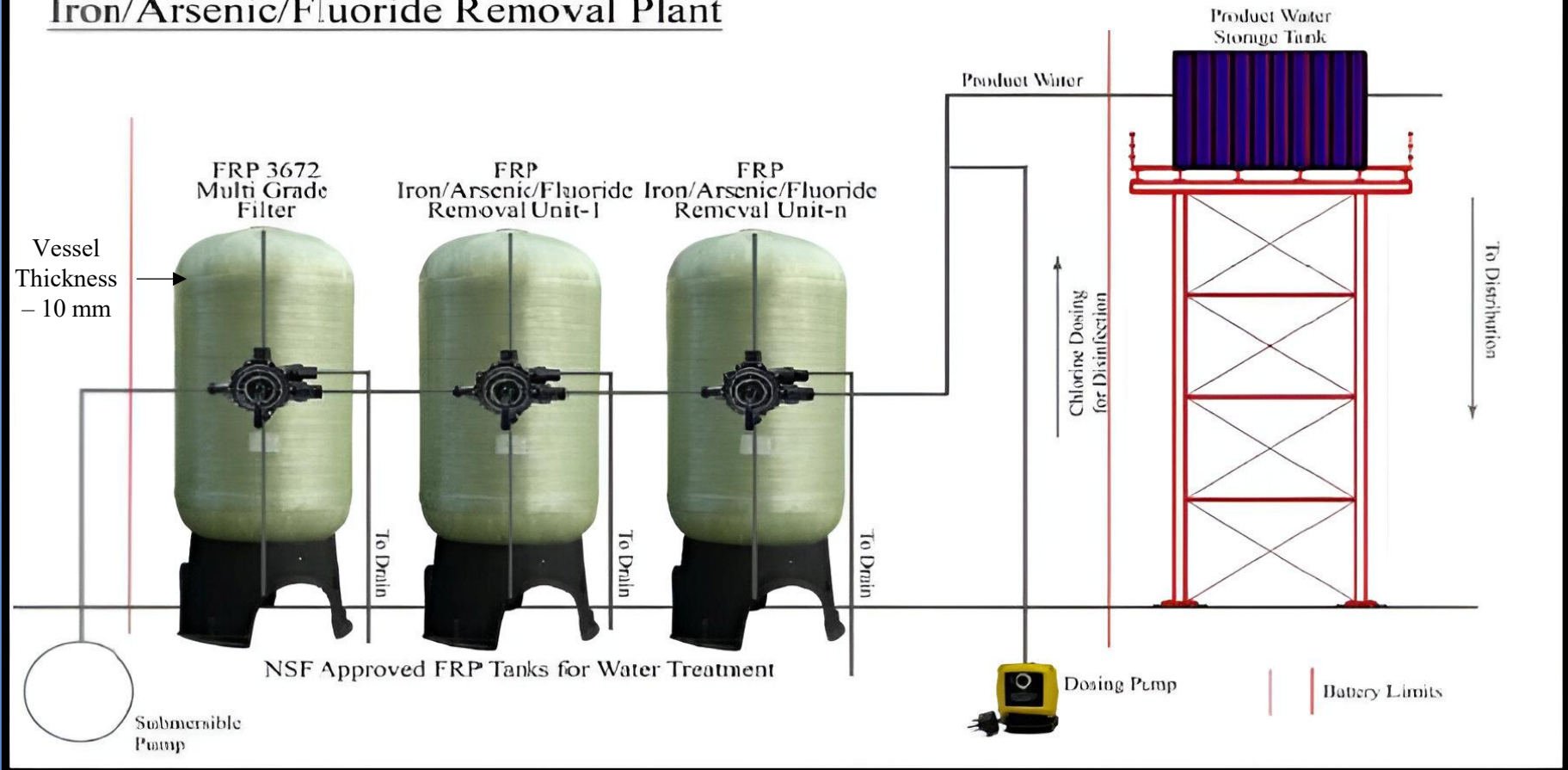
Hence, Capacity of proposed Arsenic Treatment Plant (ARP) has been calculated for Intermediate Year requirement.

Per capita water demand is = 81 LPCD

Water requirement on				Intermediate	
				2030	
Population				750	
In Intermediate year Water Demand	= 0.06075 MLD				
Pumping Hour	= 8 Hours				
	= 0.06075×10^3 KL				
	= 60.75/8				
	=7.59 KLPH				
	Say:	8 KLPH			
Hence, 8 KLPH Capacity of ARP may be provided					

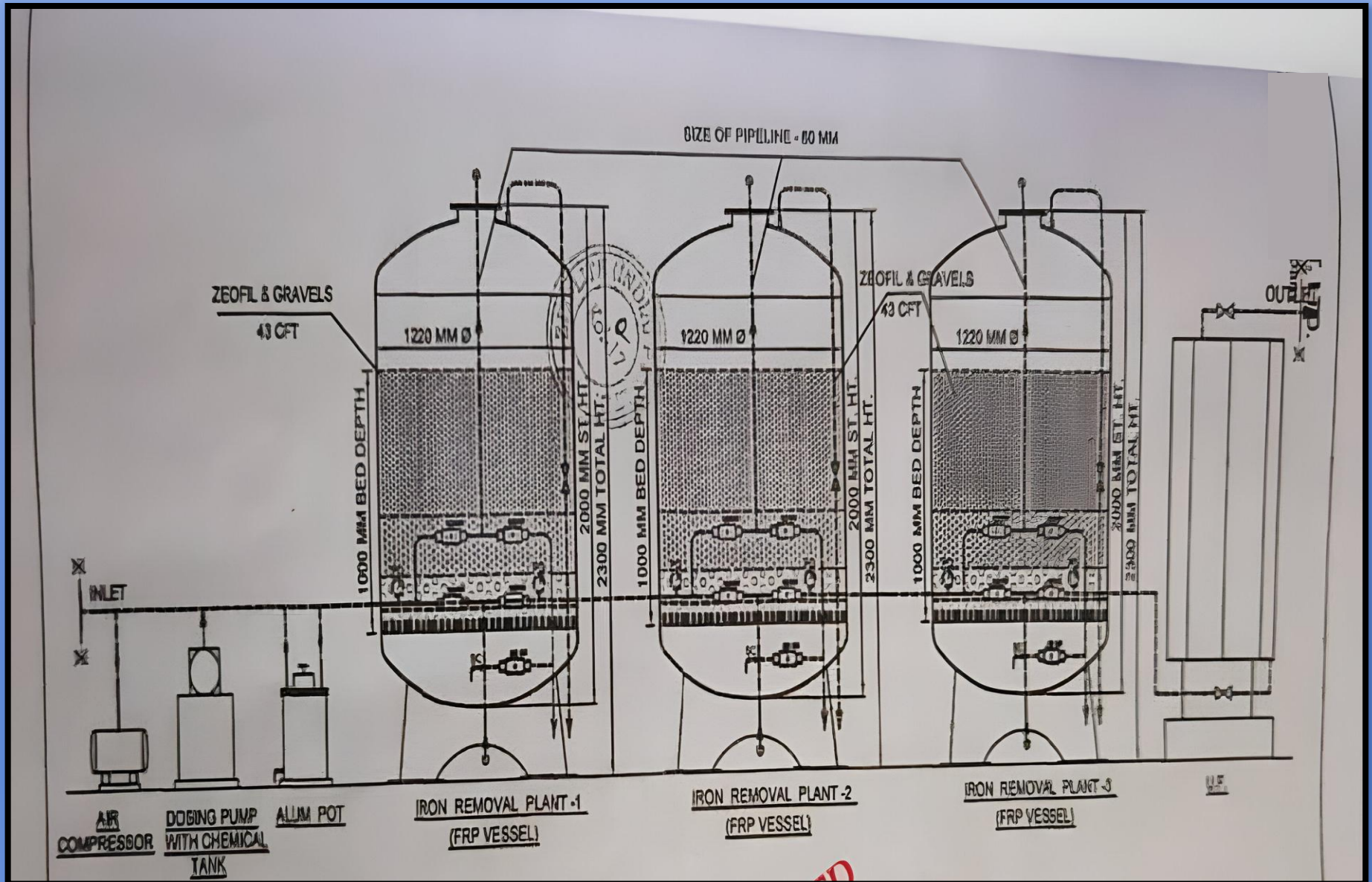
DRAWING

General Schematic Diagram for Community Based Iron/Arsenic/Fluoride Removal Plant



➤ **Backwashing should be done as per protocol of the Water Treatment plant supplying agency.**

SCHEMATIC DIAGRAM OF WATER TREATMENT PLANT (WTP)



SPECIFICATION

- Before allotment of water source for installation of contaminant specific treatment unit, the presence of the specific contaminant needs to be confirmed. During site selection, other water quality parameters *(like TDS, Nitrate, etc) should also be taken into consideration for their presence as per IS 10500.

Limit of Iron, Arsenic and Fluoride as per IS 10500: -			Technologies Used For Iron, Arsenic & Fluoride		
Parameters	Acceptable limit	Permissible limit	Iron	Arsenic	Fluoride
Iron	1.0 mg/l	No relaxation	<ul style="list-style-type: none"> Oxidation/ Filtration Ion Exchange Adsorption 	<ul style="list-style-type: none"> Oxidation /Filtration Ion Exchange Adsorption 	<ul style="list-style-type: none"> Adsorption Ion Exchange Membrane technique (Nano technology)
Arsenic	0.01mg/l	No relaxation			
Fluoride	1.0 mg/l	1.5 mg/l			

List of Empaneled Manufacturers for 8 KLPH Water Treatment Unit (WTU)

SI No.	Manufacturer	IRP having			FRP having			ARP having		
		1 Vessel	2 Vessel	3 Vessel	1 Vessel	2 Vessel	3 Vessel	1 Vessel	2 Vessel	3 Vessel
1	M/s Surya International Enterprise Pvt. Ltd.	✓				✓			✓	
2	Expert Aquatech Services	✓				✓		✓		
3	M.S. Scientifics & Aqua Systems	✓			✓			✓		
4	Bharti Waters Pvt. Ltd		✓			✓			✓	
5	Aquasolution		✓							
6	Harambh Chemicals Pvt. Ltd.		✓			✓			✓	
7	Zeolite (India) Pvt. Ltd.		✓				✓			✓
8	Capricans Aqua Pvt Ltd		✓			✓			✓	
9	Rollabss Hitech Industries		✓							
10	Aquagrants Water Purifier Pvt Ltd		✓							
11	Rite water Solutions (I) Pvt. Ltd.		✓			✓				
12	ISW Industries		✓							
13	Universal MEP Projects & Engineering Services Ltd		✓							
14	Dewpure Engineering Pvt. Ltd.		✓							
15	Macrotech		✓							
16	Hygiene Waterwave (India) Pvt. Ltd		✓							
17	Jal Instruments			✓			✓			✓
18	Hi-Tech Water Solutions Pvt. Ltd.									

EMPANELMENT LETTER FOR WATER TREATMENT PLANT

दिनांक- 17.2.2025 को विभाग अंतर्गत **Empanelment for Manufacturers of Water Treatment unit (WTU)** के लिए मुख्यालय स्तर पर आमंत्रित **EOI** के विरुद्ध प्राप्त दस्तावेजों की समीक्षोपरांत विभिन्न फर्मों के **Empanelment** पर निर्णय हेतु "विभागीय निविदा समिति" की बैठक की कार्यवाही:-

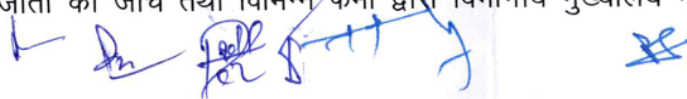
उपस्थिति-

श्री पंकज कुमार	- प्रधान सचिव
श्री नित्यानन्द प्रसाद	- मुख्य अभियंता, पटना प्रक्षेत्र, पटना
श्री दयाशंकर प्रसाद	- मुख्य अभियंता, (दक्षिण बिहार)
श्री रामचन्द्र पाण्डेय	- मुख्य अभियंता, पूर्णियाँ प्रक्षेत्र, पूर्णियाँ
श्री प्रद्युम्न शर्मा	- मुख्य अभियंता, मुजफ्फरपुर प्रक्षेत्र, मुजफ्फरपुर
श्री प्रसुन्न कुमार	- मुख्य अभियंता, भागलपुर प्रक्षेत्र, भागलपुर
श्री अभय कुमार सिंह	- मुख्य अभियंता (रूपांकण)
श्री राम प्रवेश यादव	- आंतरिक वित्तीय सलाहकार

विषय:- विभाग अंतर्गत **Empanelment for Manufacturers of Water Treatment unit (WTU)** के लिए मुख्यालय स्तर पर आमंत्रित **EOI** के विरुद्ध प्राप्त दस्तावेजों की समीक्षोपरांत विभिन्न फर्मों के **Empanelment** पर निर्णय।

राज्य के गुणवत्ता प्रभावित ग्रामीण क्षेत्रों में छुटे हुए परिवारों के घरों में पेयजलापूर्ति हेतु क्रियान्वित की जाने वाली विभिन्न पेयजलापूर्ति योजनाओं में लगाये जाने वाले **Water Treatment Unit (WTU)** से संबंधित **Manufacturers** के **Empanelment** हेतु विभागीय "तकनीकी स्क्रूटनी समिति" के मंतव्य/ अनुशंसा पर विभागीय निविदा समिति द्वारा विचार किया गया।

दिनांक-07.10.2024 तथा शुद्धि पत्र दिनांक-05.11.2024 को विभिन्न समाचार पत्रों में प्रकाशित करते हुए e-proc 2.0 के माध्यम से Online mode में **EOI** आमंत्रित की गई थी, जिसके विरुद्ध कुल 21 अदद फर्मों द्वारा भाग लेते हुए विभिन्न वांछित कागजात e-proc 2.0 portal पर upload किए गए। अपलोड किये गये कागजातों की जाँच तथा विभिन्न फर्मों द्वारा विभागीय मुख्यालय में पदाधिकारियों के समक्ष





सम्पन्न हुई प्रस्तुतीकरण के आधार पर तकनीकी स्क्रूटनी समिति द्वारा की गयी अनुशंसा के आलोक में विभागीय निविदा समिति का निर्णय निम्न है:-

तकनीकी स्क्रूटनी समिति द्वारा की गई अनुशंसा के आलोक में निम्न तालिका में अंकित क्रम संख्या-1 से 16 तक **Category - A** में अंकित फर्मों को **Empanel** करने का निर्णय लिया जाता है तथा क्रम संख्या-17 से 18 तक (**Category - B**) के दोनों फर्मों द्वारा समर्पित कागजातों के विस्तृत सत्यापन का निर्णय एवं क्रम संख्या-19 से 21 तक **Category - C** को **Empanelment** हेतु अमान्य पाया जाता है।

Summary report of document verification regarding Empanelment of manufacturers for supply of WTU												
S.N.	Name of Firm	Parameters									Remarks	
		Turnover (in any one year a Min annual financial turnover of Rs 10 Cr in the last five years)	Minimum two Number of states in which WTU is supplied	Treatment unit for which the Firm has applied	Minimum 500 units supplied in 2 states (inclusive of Iron, Arsenic & Fluoride treatment unit)			Specification as required in EOI Document				
					Iron	Arsenic (Minimum 25 units)	Fluoride (Minimum 25 units)	Iron	Arsenic	Fluoride	Technology (as per uploaded document)	Media (as per certificate/uploaded document)
1	2	3	4	5	6	7	8	9	10			
Category - A												
1	M/s Surya International Enterprise Pvt. Ltd. A/24, BDA HIG Duplex, Anant Vihar Phase 2, Pokhariput,	215.99 Cr	Bihar, Assam	Arsenic, iron and fluoride	Overall more than 500 units	Considered	Considered	Considered	Fe - Oxidation & filtration As - Ion Exchange F - Adsorption/Ion Exchange	Fe - MZ 10 Plus As - Ferrix A33E F - SSTC 60		

	Bhubaneswar, Odisha 751020									
2	Expert Aquatech Services 3D, Shalimar Bagh, Kathal More Road, Ranchi- 834004	37.04 Cr	Bihar, Assam & Madhya Pradesh	Arsenic, iron and fluoride	Overall more than 500 units	Considered	Considered	Considered	Fe - Oxidation & filtration As -Oxidation & filtration F - Adsorption/Ion Exchange	Fe - MZ 10 Plus As -MZ 10 Plus F - SSTC 60
3	M.S. Scientifics & Aqua Systems 5-2-13/2 2nd Floor, Chaitanuhya Towers, Bansilalpet, Secunderabad- 500003	54.21 Cr	Bihar, Assam, Madhya Pradesh & Karnataka	Arsenic, iron and fluoride	Overall more than 500 units	Considered	Considered	Considered	Fe - Oxidation & filtration As -Oxidation & filtration F - Ion Exchange Provision for post chlorination	Fe - MZ 10 Plus As -Katalox Light F - SAFEFDEF
4	Bharti Waters Pvt. Ltd 20 SSI, Industrial Area, 2nd Floor, GT Karnal Road, Delhi-110033	30.15 Cr	Bihar & Odisha	Arsenic, iron and fluoride	Overall more than 500 units	Considered	Considered	Considered	Fe - Nano catalytic oxidation Ar -Nano adsorption F -Bharti fluoride removal nanotechnology	Fe - Bharti senco iron removal unit Ar - Bharti senco iron cum arsenic removal unit F - Bharti nano fluoride removal technology by online dosing of SKF 282264 (A) & (B)
5	Aquasolution House No. 1,2 nd Floor, Kachari Basti Road, Ulubari, Guwahati, Assam - 781007	33.35 Cr	Bihar, Assam & Arunachal Pradesh	Arsenic, iron and fluoride	Overall more than 500 units	Considered	Considered	Considered	Fe - Oxidation & filtration Ar - Ion Exchange F - Adsorption/Ion Exchange	Fe - MZ 10 Plus Ar -Ferrix A33E F - SSTC 60

L R  J A T Y 

6	Harambh Chemicals Pvt. Ltd. B-30/2A-5 Gangabag Colony, Lanka, Varanasi (U.P.)	19.19 Cr	Bihar & West Bengal	Arsenic, iron and fluoride	Overall more than 500 units	Considered	Considered	Considered	Fe - Adsorption Ar - Adsorption F - Adsorption	Fe - FIA (Ferrite impregnated activated alumina) Ar - Mixed metal oxides impregnated activated rice husk char and alumina F - FIA (Ferrite impregnated activated alumina)
7	Zeolite (India) Pvt. Ltd. 209, A.J.C. Bose Road, 17, Karnani Estate, 1st floor, Kolkata-700017	54.69 Cr	Bihar, Assam & West Bengal	Arsenic, iron and fluoride	Overall more than 500 units	Considered	Considered	Considered	Fe - Oxidation & Adsorption Ar - Oxidation & Adsorption with ceramic membrane filtration F - Oxidation & Adsorption with ceramic membrane filtration	Fe - Zeofil Ar - Zeofil F - Zeofil
8	Capricans Aqua Pvt Ltd Laxmi Residency, 9+10, Madhusudan Das Bye Lane, Shibpur, Howrah-711103	20.86 Cr	Bihar, Tripura & West Bengal	Arsenic, iron and fluoride	Overall more than 500 units	Considered	Considered	Considered	Fe - Oxidation & filtration Ar - Oxidation & filtration F - Nano based Ion Exchange Provision for post chlorination	Fe - DMI 65/ADWT IARR 63 Ar - DMI 65/ADWT IARR 63 F - HIX- Nano 200+
9	Rollabss Hitech Industries P-48, Ramkrishna Bhaban, 48 Block, B.T.road, Sinthee More, Kolkata-700050	22.16 Cr	Bihar & Assam	Arsenic, iron and fluoride	Overall more than 500 units	Considered	Considered	Considered	Fe - Oxidation & filtration Ar - Nanoadsorption F - Nanoadsorption	Fe - Terafil Ar - Dr Water ALMIN0508 F - Dr Water ALMIN0508

10	Aquagrart Water Purifier Pvt Ltd 4th floor, Shakti Tower, Setu Nagar, New Bypass, Anisabad Patna-800001	11.03 Cr	Bihar & Uttar Pradesh	Arsenic , iron and fluoride	Overall more than 500 units	Considered	-	Considered	Fe - Oxidation & filtration F - Ion Exchange	Fe - Ionic F - Iroserve
11	Rite water Solutions (I) Pvt. Ltd. 81, Shree Vasant Enclave, Pratap Nagar, Nagpur, Maharashtra-440022	239.2 Cr	Bihar & Maharashtra	Iron and fluoride	Overall more than 500 units	Considered	-	Considered	Fe - Oxidation & filtration F - Adsorption/Ion Exchange Provision for post chlorination	Fe - MZ 10 Plus F - SSTC 60
12	ISW Industries 1/1, Taratala road, Kolkata-700088	29.37 Cr	Bihar, West Bengal	Iron	Overall more than 500 units	Considered	-	-	Fe - Oxidation & filtration	Fe - Katalox Light
13	Universal MEP Projects & Engineering Services Ltd Volta House 'A', Dr Babasaheb Ambedkar Road, Chinchpokli Mumbai-400033	2237.01 Cr	Bihar, Odisha & Uttar Pradesh	Iron	Overall more than 500 units	Considered	-	-	Fe - Oxidation & filtration Provision of IOT Device	Fe - DMI 65
14	Dewpure Engineering Pvt. Ltd. Holding No-349, 222, Garie Main road, Kolkata-700084	20.92 Cr	Bihar & Odisha	Iron	Overall more than 500 units	Considered	-	-	Fe - Oxidation & filtration Provision for post chlorination	Fe - MnO ₂

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15	Macrotech AF-217/2, Rabindrapally, Kestopur, Kolkata - 700101	13.39 Cr	Bihar & West Bengal	Iron	Overall more than 500 units	Considered	-	-	Fe - Oxidation & filtration	Fe - MnO ₂
16	Hygiene Waterwave (India) Pvt.Ltd 756, Purba Fartabad Sahapara, Garia Kolkata- 700084	10.14 Cr	Bihar, West Bengal	Iron	Overall more than 500 units	Considered	-	-	Fe - Oxidation & filtration	Fe - MnO ₂
Category -B (Subject to certificate/document verification)										
17	Jal Intruments 311/6 Tejpur Gabadi, Indore-452012	25.14 Cr	Bihar & Assam	Arsenic , iron and fluoride	Overall more than 500 units	-	-	-	Fe - Oxidation & filtration Ar -Oxidation & filtration F - Adsorption/Ion Exchange	Fe - MZ 10 Plus Ar -MZ 10 Plus F - SSTC 60
18	Hi-Tech Water Solutions Pvt. Ltd. M-11A, Someshwar Square, Vesu Char Rasta, Vesu, Surat, Gujarat - 395007	128.43 Cr	Bihar, Assam & Karnataka	Arsenic , iron and fluoride	Overall more than 500 units	-	-	-	Fe - Oxidation & filtration Ar -Oxidation & filtration F - Adsorption/Ion Exchange	Fe - MZ 10 Plus Ar -MZ 10 Plus F - SSTC 60
Presentation and many document regarding design/drawing/ media etc. submitted by both firms seems to be similar.Needs to be clarify										

Category -C (Not Considered)


19	Hydromaterial Pvt Ltd. (AMRIT) No-34, Block II, III Floor, SIDCO Electronic Complex, Guindy, Chennai - 600032	26.34 Cr	Bihar & Punjab	Arsenic, iron and fluoride	Less than 500 units	-	-	-	Most of the units supplied are household filters which cannot be taken into account for the minimum criteria of 500 WTU.
20	Eesavyasa Technologies Pvt. Ltd. Plot 79, Dr. Feroz Lane, SVCIE Society, Phase 3, Balanagar, Hyderabad, Telangana-500037	62.02 Cr	Bihar, West Bengal & Andhra Pradesh	Iron	Less than 500 units	-	-	-	Bank Guarantee not provided. Only 1 undertaking provided, affidavit for blacklist or debar, dispute/ litigation, legal conviction and upper limit not provided.
21	Parth Multi Aqua Pvt. Ltd. Flat no - 405, Lalti Apartment, Hanuman Nagar, Kankarbagh, Patna - 800020	10.06 Cr	Bihar, Madhya Pradesh, Jharkhand & Assam	Iron and Arsenic	Less than 500 units	-	-	-	uploaded Supporting document is not clear

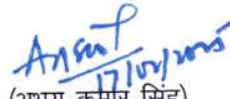
इसके साथ ही सभी Empanelled फर्मों तथा विभागीय पदाधिकारियों हेतु निम्न बिन्दुओं में अंकित शर्तों का अनुपालन आवश्यक होगा।

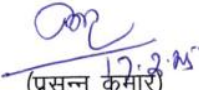
1. WTU में Post chlorination यूनिट का उपयोग करने वाले तथा vessels में स्वचालित मल्टी पोर्ट वाल्व (MPV) लगाने वाले फर्मों को प्राथमिकता दी जायेगी। संबंधित पेयजलापूर्ति योजनाओं में क्लोरिनेटर का भुगतान संवेदकों को अलग से नहीं किया जायेगा।


(Handwritten signatures and initials)


2. Empanelment के पूर्व यह सुनिश्चित कर लेना आवश्यक होगा कि WTU से संबंधित License/certification हेतु विभागीय EOI Document में अंकित प्रावधान के अनुसार निर्धारित संस्थानों में से किसी के द्वारा निर्गत WTU संबंधित प्रमाण पत्र Empanelment के पूर्व अद्यतन हो।
3. Empanelled फर्मों द्वारा WTU के आपूर्ति/अधिष्ठापन से पूर्व EOI Document में निहित प्रावधानों के अनुरूप WTU के अवयवों, तथा विभिन्न फर्मों द्वारा उपलब्ध कराये गये License/certification/Design/Document आदि के अनुरूप तकनीक/मीडिया आदि की जाँच क्षेत्रीय पदाधिकारियों द्वारा सुनिश्चित कर लेना अनिवार्य होगा।

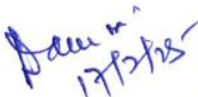

(राम प्रवेश यादव)
आंतरिक वित्तीय सलाहकार



(अभय कुमार सिंह)
मुख्य अभियंता (रूपांकण)

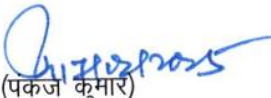

(प्रसुन्न कुमार)
मुख्य अभियंता, भागलपुर प्रक्षेत्र, भागलपुर


(प्रद्युम्न शर्मा)
मुख्य अभियंता, मुजफ्फरपुर प्रक्षेत्र, मुजफ्फरपुर


(रामचन्द्र पाण्डेय)
मुख्य अभियंता, पूर्णियाँ प्रक्षेत्र, पूर्णियाँ


(दया शंकर प्रसाद)
मुख्य अभियंता (दक्षिणी बिहार)


(नित्यानन्द प्रसाद)
मुख्य अभियंता, पटना प्रक्षेत्र, पटना


(पंकज कुमार)
प्रधान सचिव

नांक- 14/04/25 को विभाग अंतर्गत Empanelment for Manufacturers of Water Treatment unit (WTU) के लिए
ब्यालय स्तर पर आमंत्रित EOI के विरुद्ध प्राप्त दस्तावेजों की समीक्षोपरांत विभिन्न फर्मों के Empanelment पर निर्णय हेतु
"विभागीय निविदा समिति" की बैठक की कार्यवाही:-

स्थिति-

श्री पंकज कुमार	- प्रधान सचिव
श्री नित्यानन्द प्रसाद	- अभियंता प्रमुख-सह-विशेष सचिव (मुख्यालय)
श्री अभय कुमार सिंह	- मुख्य अभियंता (रूपांकण) सह अभियंता प्रमुख-सह-विशेष सचिव (कार्य प्रबंधन)
श्री दयाशंकर प्रसाद	- मुख्य अभियंता, (दक्षिण बिहार)
श्री प्रद्युम्न शर्मा	- मुख्य अभियंता, मुजफ्फरपुर प्रक्षेत्र, मुजफ्फरपुर
श्री प्रसुन्न कुमार	- मुख्य अभियंता, भागलपुर प्रक्षेत्र, भागलपुर
श्री विजय कुमार	- मुख्य अभियंता, पूर्णियाँ प्रक्षेत्र, पूर्णियाँ
श्री राम प्रवेश यादव	- आंतरिक वित्तीय सलाहकार

विषय:- विभाग अंतर्गत Empanelment for Manufacturers of Water Treatment unit (WTU) के लिए मुख्यालय स्तर पर आमंत्रित EOI
के विरुद्ध प्राप्त दस्तावेजों की समीक्षोपरांत विभिन्न फर्मों के Empanelment पर निर्णय।

राज्य के गुणवत्ता प्रभावित ग्रामीण क्षेत्रों में छोटे हुए परिवारों के घरों में पेयजलापूर्ति हेतु क्रियान्वित की जाने वाली विभिन्न पेयजलापूर्ति
योजनाओं में लगाये जाने वाले Water Treatment Unit (WTU) से संबंधित Manufacturers के Empanelment हेतु विभागीय
"तकनीकी स्क्रूटनी समिति" के मंतव्य/ अनुशंसा के आलोक में दिनांक-17.02.2025 को सम्पन्न विभागीय निविदा समिति के बैठक की
कार्यवाही में 16 अदद फर्मों को Category 'A' में शामिल करते हुए Empanel करने का तथा 2 अदद फर्मों Jal Instruments, Indore एवं
Hi-Tech Water Solutions Pvt. Ltd. Surat को Category 'B' में शामिल करते हुए उनके द्वारा समर्पित कागजातों के सत्यापन/विस्तृत
जाँच हेतु निर्णय लिया गया था।


पुनः दिनांक-11.04.2025 को तकनीकी स्क्रूटनी समिति के बैठक की कार्यवाही में की गई अनुशंसा के आलोक में Jal Instruments,
311/6 Tejpur Gabadi, Indore, Pincode - 452012 तथा Hi-Tech Water Solutions Pvt. Ltd. M-11A, Someshwar Square, Vesu

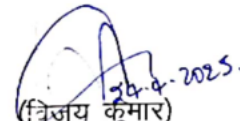
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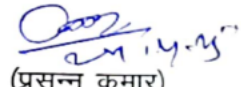
Char Rasta, Vesu, Surat, Gujarat - 395007 को आर्सेनिक, फ्लोराईड एवं आयरन हेतु Category - 'A' में Empanel करने का निर्णय लिया जाता है।

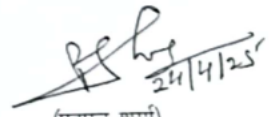
इसके साथ ही Empanelled फर्म तथा विभागीय पदाधिकारियों हेतु निम्न बिन्दुओं में अंकित शर्तों का अनुपालन आवश्यक होगा।

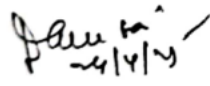
1. WTU में Post chlorination यूनिट का उपयोग करने वाले तथा vessels में स्वचालित मल्टी पोर्ट वाल्व (MPV) लगाने वाले फर्मों को प्राथमिकता दी जायेगी। संबंधित पेयजलापूर्ति योजनाओं में क्लोरिनेटर का भुगतान संवेदकों को अलग से नहीं किया जायेगा।
2. Empanelment के पूर्व यह सुनिश्चित कर लेना आवश्यक होगा कि WTU से संबंधित License/certification हेतु विभागीय EOI Document में अंकित प्रावधान के अनुसार निर्धारित संस्थानों में से किसी के द्वारा निर्गत WTU संबंधित प्रमाण पत्र Empanelment के पूर्व अद्यतन हो।
3. Empanelled फर्मों द्वारा WTU के आपूर्ति/अधिष्ठापन से पूर्व EOI Document में निहित प्रावधानों के अनुरूप WTU के अवयवों, तथा विभिन्न फर्मों द्वारा उपलब्ध कराये गये License/certification/Design/Document आदि के अनुरूप तकनीक/मीडिया आदि की जाँच क्षेत्रीय पदाधिकारियों द्वारा सुनिश्चित कर लेना अनिवार्य होगा।

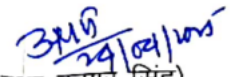

(राम प्रवेश यादव)
आंतरिक वित्तीय सलाहकार

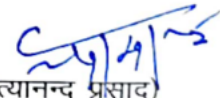

(विजय कुमार)
मुख्य अभियंता, पूर्णियाँ प्रक्षेत्र,
पूर्णियाँ

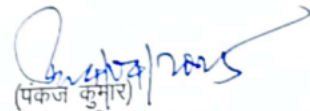

(प्रसुन्न कुमार)
मुख्य अभियंता, भागलपुर प्रक्षेत्र, भागलपुर


(प्रद्युम्न शर्मा)
मुख्य अभियंता, मुजफ्फरपुर प्रक्षेत्र, मुजफ्फरपुर


(दया शंकर प्रसाद)
मुख्य अभियंता (दक्षिणी विहार)


(अभय कुमार सिंह)
मुख्य 3 अभियंता (रूपांकण)
सह
अभियंता प्रमुख-सह-विशेष
सचिव (कार्य प्रबंधन)


(नित्यानन्द प्रसाद)
अभियंता प्रमुख-सह-विशेष सचिव
(मुख्यालय)


(पंकज कुमार)
प्रधान सचिव

ESTIMATE FOR ARP

Estimate for Arsenic Treatment Plant

S.N.	Particulars	Quantity	Unit	Rate (In Rs.)	Amount (In Rs.)
1	Supplying all designs drawing construction and commissioning of fully tested and successfully well operated Standard type Arsenic Treatment Unit (activated allumina based/Nano technology based/any approved technology (CSIR) for removal of excessive Arsenic) suitable for designed flow of capacity given below pipeline, valve and specials all complete job as per requirement and demand of the E/I. The Mild steel pressure tank and other articles should have not less than as per the specification so as to sustain the design pressure with due factor of safety. It should be duly painted with two coats of anticorrosive paints over a coat of red oxide primer. The materials article should be as per respective Indian standard and should be manufactured from ISO : 9001 company including delivery charges and all taxes & duties complete including all civil works all complete as per standard specification and direction of E/I. 8 KLPH Capacity				
	8 KLPH Capacity	1 No.	Each	Rs. 5,78,625.00	Rs. 5,78,625.00
TOTAL :-					Rs.5,78,625.00

ESTIMATE FOR DISPOSAL UNIT OF ARP

Detailed Estimate for construction of chamber for waste water disposal from ARP 1.00Mx 2.00M x 1.50M deep (with fly proof galvanized M.S. wire covering)

1		Earth work in excavation					
	2.8	1.50m x 2.50m x 1.00M =	3.750M3	P/M3	Rs.230.50	Rs.864.38	
2	2.28	Supplying & filling in plinth with local sand under floors including watering, ramming consolidating and dressing complete.					
		1.50m x 2.50m x 0.10M =	0.375M3	P/M3	Rs.204.40	Rs.76.65	
3	11.72	Providing designation 100 A one brick flat soling joints filled with local sand including cost of watering, taxes, royalty all complete as per building specification and direction of E/l.					
		1.50m x 2.50m =	3.750M2	P/M2	Rs.253.80	Rs.951.75	
4	(SOR 4.1.4)	Providing & laying in position cement concrete of specified grade excluding the cost of centring & shuttering etc. all work up to plinth level.					
		1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size)					
		1.50m x 2.50m x 0.08M =	0.300M3	P/M3	Rs.3,740.20	Rs.1,122.06	

5	(SOR 6.1.14A)	Brick work with bricks of class designation 100A in foundation and plinth in					
		Cement mortar 1:4 (1 cement : 4 coarse sand)					
		L. W. = 2 x 2.50 x 0.25 x 1.5 =	1.875				
		S. W. = 2 x 1.00 x 0.25 x 1.5 =	0.375				
			2.250M3	P/M3	Rs.4,490.60	Rs.10,103.85	
6	(SOR 13.17.1)	12 mm cement plaster 1:3 (1 cement: 3 coarse sand) finished with a floating coat of neat cement					
		In side					
		L. W. = 2 x 2.00 x 1.5 =	6.000				
		S. W. = 2 x 1.00 x 1.5 =	3.000				
		Bottom = 2.0 x 1.0 =	2.00				
			11.000M2	P/M2	Rs.159.00	Rs.1,749.00	
7	(SOR 13.11.2 & 13.26)	Providing 12mm cement plaster (1:4)					
		out side with neat cement punning					
		L. W. = 2 x 2.5 x 0.75 =	3.75		Rs.114.70		
		S. W. = 2 x 1.50 x 0.75 =	2.250		Rs.32.30		
			6.00M2	P/M2	Rs.147.00	Rs.882.00	

8	(SOR 9.51.2)	Providing and fixing fly proof galvanized M.S. wire gauze to windows and clerestory window using galvanized M.S. wire gage with average width of aperture 1.4 mm in both directions with wire of dia.0.63 mm.						
		with mild steel U beading						
		2.5m x 1.5m =	3.750	M2	P/M2	Rs.525.10	Rs.1,969.13	
9		Carriage of materials.						
		Bricks (7 Km. Pucca & 1 Km. Kachha lead)	1037	No.	P/%0	Rs.590.35	Rs.612.19	
		Coarse Sand (100 Km. lead)	1.09	M3	P/M3	Rs.931.66	Rs.1,015.51	
		Stone chips (150Km. Pucca lead)	0.27	M3	P/M3	Rs.1,469.05	Rs.396.64	
		Local Sand (2 Km. Pucca + 1 Km. Kachha lead)	0.43	M3	P/M3	Rs.139.02	Rs.59.78	
						Total	Rs.23,868.00	
		Grand Total for with 18% GST Difference (Multiplying Factor - 1.0633)						Rs.25,378.84
						Say	Rs.25,379.00	

ESTIMATE FOR DISPOSAL UNIT

Material Consumption Statement			
S.N.	Items	Quantity	
1	Clean Coarse Sand filling	0.375	M3
2	Brick Flat Soling	3.75	M2
3	P.C.C. (1:2:4)	0.30	M3
4	B Work in 1:4 C.M.	2.250	M3
5	Cement Plaster 12mm/6mm (1:3)	11.000	M2
6	Cement Plaster 12mm/6mm (1:4)	6.00	M2

ESTIMATE FOR IRP

Estimate for Iron Treatment Plant (Included GST @ 18%)

S. N.	Particulars	Quantity	Unit	Rate (In Rs.)	Amount (In Rs.)
1	Design, supply, erection, installation, testing and commissioning of Iron removal plant based on aeration/ filtration/ activated carbon treatment units or any other suitable treatment process of ISO 9001 certified reputed make housed in MS/FRP vessel suitable for required flow rate with iron concentration upto 10 ppm in raw water to deliver treated water quality confirming to IS 10500(latest revision) including all necessary civil works, accessories,taxes and duties etc. all complete as per directions of Engineer-in-Charge.				
	12 KLPH Capacity	1No.	Each	Rs. 5,45,245.00	Rs. 5,45,245.00
TOTAL :-					Rs.5,45,245.00

ESTIMATE FOR FRP

S.N.	Description	Qty.		Unit	Rate	Amount
1	<p>Supplying all designs drawing construction and commissioning of fully tested and successfully well operated Standard type Fluoride Treatment Unit (activated alumina based/Nano technology based/any approved technology (CSIR) for removal of excessive Arsenic) suitable for designed flow of capacity given below pipeline, valve and specials all complete job as per requirement and demand of the E/I. The Mild steel pressure tank and other articles should have not less than as per the specification so as to sustain the design pressure with due factor of safety. It should be duly painted with two coats of anticorrosive paints over a coat of red oxide primer. The materials article should be as per respective Indian standard and should be manufactured from ISO : 9001 company including delivery charges and all taxes & duties complete including all civil works all complete as per standard specification and direction of E/I including provision of safe waste water disposal etc. all complete work. 8 KLPH.</p>	1	8 klph	No.	5,78,625	Rs.5,78,625.00
					Total=	Rs.5,78,625.00

ESTIMATE FOR DISPOSAL UNIT OF FRP

Detailed Estimate for construction of chamber for waste water disposal from treatment plant 1.00Mx 2.00M x 1.50M deep (with fly proof galvanized M.S. wire covering)

1		Earth work in excavation						
	2.8		1.50m x 2.50m x 1.00M =	3.750	M ³	P/M ³	Rs.360.70	Rs.1,352.63
2	2.28	Supplying & filling in plinth with local sand under floors including watering, ramming consolidating and dressing complete.						
			1.50m x 2.50m x 0.10M =	0.375	M ³	P/M ³	Rs.287.30	Rs.107.74
3	11.72	Providing designation 100 A one brick flat soling joints filled with local sand including cost of watering, taxes, royalty all complete as per building specification and direction of E/l.						
			1.50m x 2.50m =	3.750	M ²	P/M ²	Rs.283.30	Rs.1,062.38
4	(SOR 4.1.4)	Providing & laying in position cement concrete of specified grade excluding the cost of centring & shuttering etc. all work up to plinth level.						
		1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size)						
			1.50m x 2.50m x 0.08M =	0.300	M ³	P/M ³	Rs.3,879.40	Rs.1,163.82
5	(SOR 6.1.14A)	Brick work with bricks of class designation 100A in foundation and plinth in						
		Cement mortar 1:4 (1 cement : 4 coarse sand)						
			L. W. = 2 x 2.50 x 0.25 x 1.5 =	1.875				
			S. W. = 2 x 1.00 x 0.25 x 1.5 =	0.375				
				2.250	M ³	P/M ³	Rs.4,819.90	Rs.10,844.78

6	(SOR 13.17.1)	12 mm cement plaster 1:3 (1 cement: 3 coarse sand) finished with a floating coat of neat cement					
		In side					
		L. W. = 2 x 2.00 x 1.5 =	6.000				
		S. W. = 2 x 1.00 x 1.5 =	3.000				
		Bottom = 2.0 x 1.0 =	2.00				
			11.000	M ²	P/M ²	Rs.203.60	Rs.2,239.60
7	(SOR 13.11.2 & 13.26)	Providing 12mm cement plaster (1:4) out side with neat cement punning					
		L. W. = 2 x 2.5 x 0.75 =	3.75			Rs.152.90	
		S. W. = 2 x 1.50 x 0.75 =	2.250			Rs.40.50	
			6.00	M ²	P/M ²	Rs.193.40	Rs.1,160.40
8	(SOR 9.51.2)	Providing and fixing fly proof galvanized M.S. wire gauze to windows and clerestory window using galvanized M.S. wire gage with average width of aperture 1.4 mm in both directions with wire of dia.0.63 mm.					
		with mild steel U beading					
		2.5m x 1.5m =	3.750	M ²	P/M ²	Rs.639.90	Rs.2,399.63
10		Carriage of materials.					
		(a) Bricks (7 Km. Pucca & 1 Km. Kachha lead)	1037	No.	P/%0	Rs.1,429.60	Rs.1,482.50
		(b) Coarse Sand (100 Km. lead)	1.09	M ³	P/M ³	Rs.1,015.10	Rs.1,106.46
		(c) Stone Chips (150 Km. lead)	0.27	M ³	P/M ³	Rs.1,690.70	Rs.456.49
		(d) Local Sand (2 Km. Pucca & 1 Km. Kachha lead)	0.43	M ³	P/M ³	Rs.407.10	Rs.175.05
							Rs.23,551.45
		Say					Rs.23,551.00

VARIOUS COMPONENTS OF WATER TREATMENT UNIT

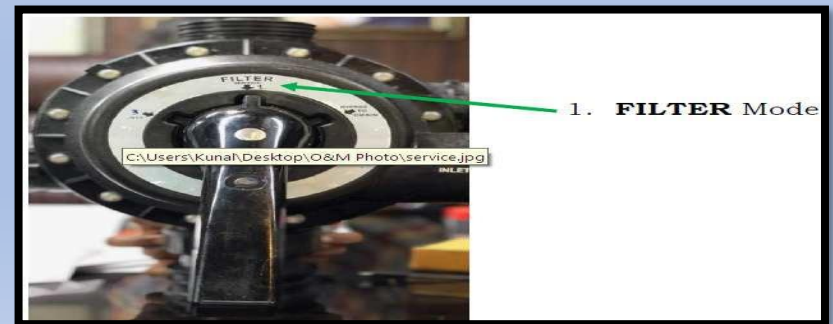
- 1) **FRP vessels:** Vessel used should be NSF/ANSI - 61 certified and should not hamper the quality of water.
- 2) **Multiport valve:** Filter Multiport valve is used for backwash of removal unit. The valve can be set in 1 of the 3 positions given & each position has its own purpose.
- 3) **Service Position:** - In this position the water will come from the mainline and flow from top to bottom of the vessel while passing through the media present in the vessel and thus getting cleaned in the process. The outlet water is then moved into the mainline to either another vessel or to storage tank.
- 4) **Backwash Position:** - In this position water will flow in the opposite direction from the service flow direction, therefore it will flow from bottom to top. In this process the pressure of water is kept as such that the media can be lifted up and all the contaminations that were trapped by the media will flow out of the vessel with the flow of water. This waste water is then thrown away through the drain line & the waste water will go through further treatment.
- 5) **Rinse:** - After backwash the contaminations that are left in the vessels or the pipeline are removed by again flowing of water from top to bottom but this time the outlet water will go to drain so that the contamination does not get mixed with the clean water.
- 6) **Pipes:** The pipes utilised for various connections should be of UPVC confirming to IS code.

OPERATION AND MAINTENANCE OF TREATMENT UNIT

- In an engineering sense, operation refers to hourly and daily operations of the components of a system such as plant, machinery, equipment, control valves etc. which is done by an operator or his assistant.
- This is a routine work. The term maintenance is defined as the act of keeping the plant, equipment, structures and other related facilities in optimum working order.
- Maintenance includes preventive maintenance or corrective maintenance of the system, mechanical adjustment, pipe line leakage repair, cleaning of storage tank, maintenance of the media (backwashing & regeneration/replacement) and reject- sludge management.
- Different manufacturers of treatment units adopt different technologies for removal of arsenic, fluoride and iron from ground water. Therefore, operation and maintenance of treatment units based on different technologies requires different methods.
- The life and contaminant removal efficiency of different media for different technologies are different.

Generic operating protocol for filter and backwash of treatment units is as follows:

1. Make sure that the multiport valve of the Treatment unit is in “FILTER” mode and air release valve is open in case of manual air valve.

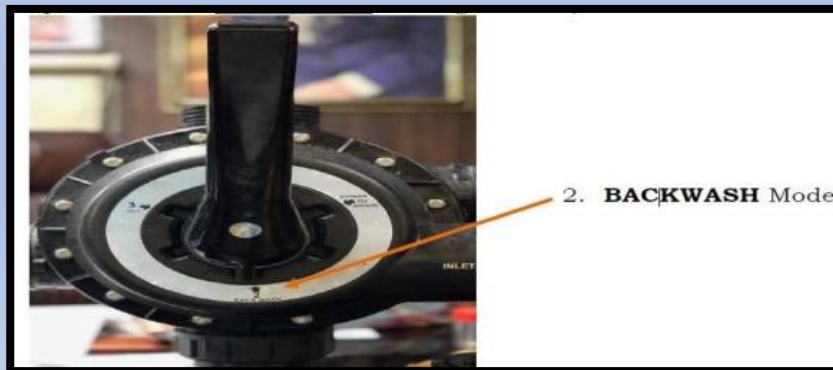
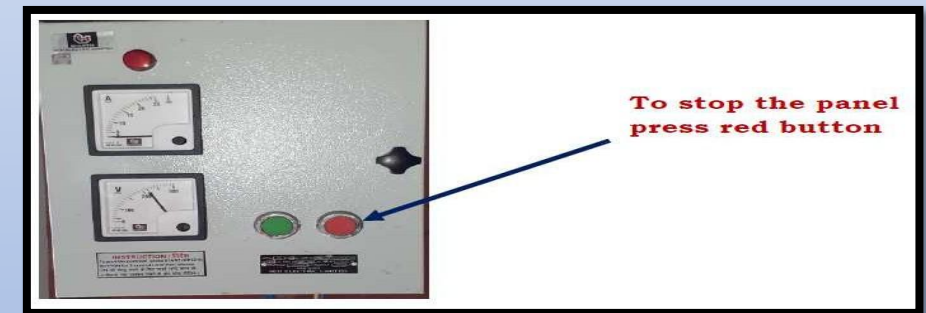
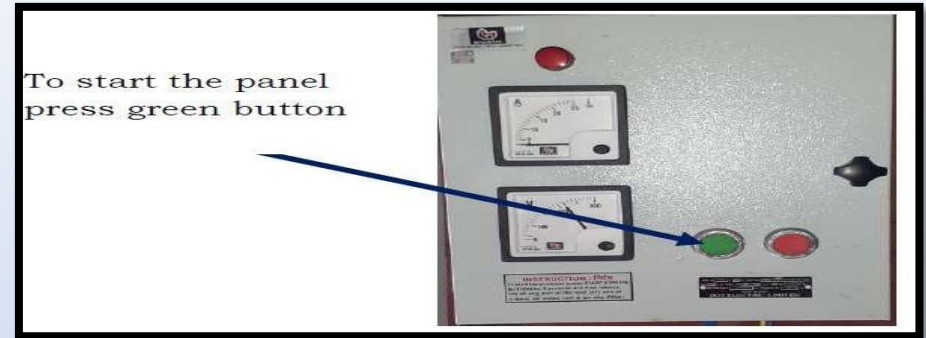


2. Start the unit by pressing the Green/power on button of the panel.
3. Treated water is discharged from the unit.

BACKWASH:

In case of iron treatment plant backwash should be preferably be done using treated water to avoid buildup of iron in backwash water. The treatment unit must be backwashed as per backwash interval with the following procedure

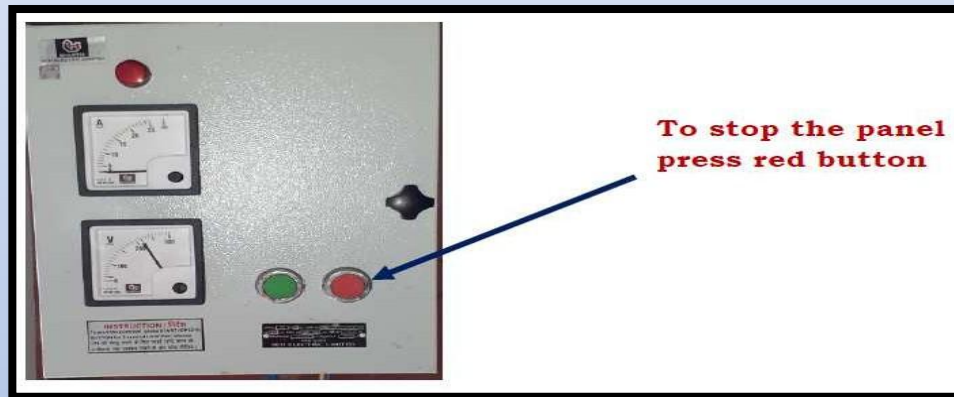
1. Switch off the starter panel of the unit by pressing red/power off button.



2. Turn the multiport valve in “BACKWASH” configuration/mode.

3. Start the starter panel of the unit by pressing green/ power on button. The backwash will start and backwash water will go to the backwash pit/sedimentation tank.

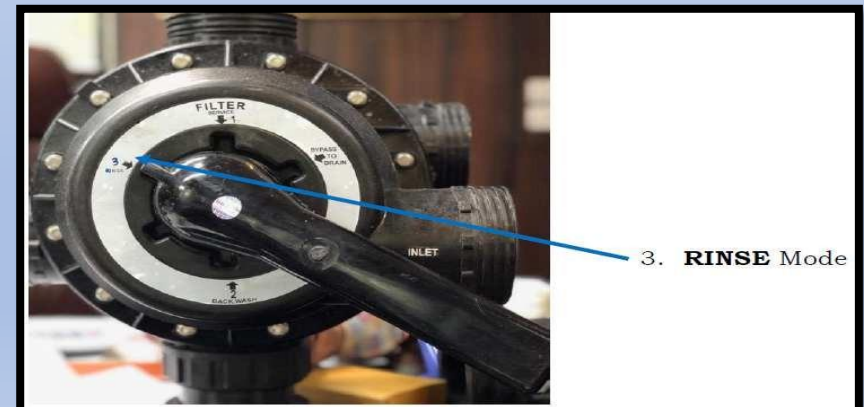
Do backwash for required time as per protocol.



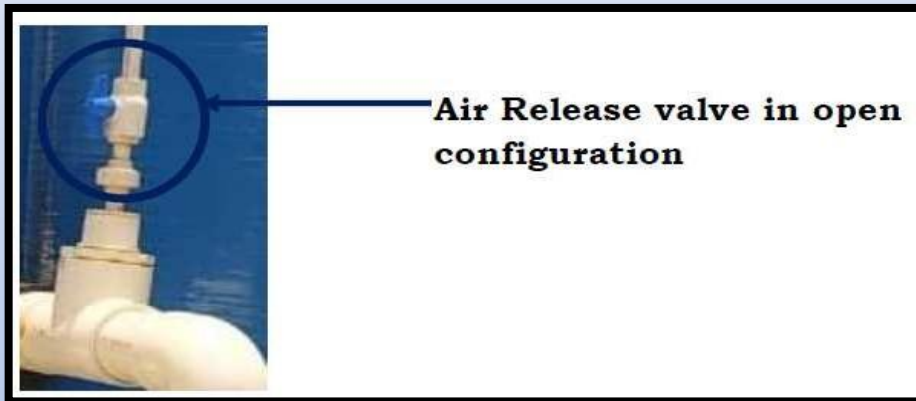
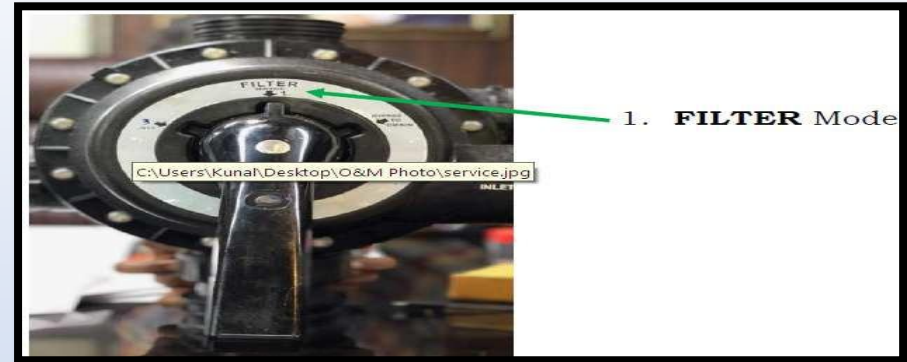
4. Switch off the starter panel of the unit by pressing red/ power off button.

5. Turn the multiport valve in “RINSE” configuration/mode.

Leave it for at least 2 minutes in “RINSE” configuration/mode.



6. Turn the multiport valve in “FILTER” Configuration/mode.



Note: 1. Never close the air release valve in case of manual air valve

Note2. Above pictures are indicative may vary based on different technologies.

OTHER KEY POINTS:

- Contractor has to arrange skilled operator and other manpower to efficiently operate treatment plant in accordance with O&M protocol provided by respective manufacturer.
- The contractor shall ensure submission of O&M and Reject Management (Backwash water, supernatant water, sludge and exhausted media) protocol at the time of approval of design and drawing of treatment unit.

- Details of vessel-wise contents and its function should also be submitted by the contractor at the time of submission of Design & Drawing of treatment unit for approval in the format given below.
- Along with approval of Design & Drawing of treatment unit, approval of O&M and Reject Management (Backwash water, supernatant water, sludge and exhausted media) protocol and vessel-wise contents should also be approved by competent authority.

		Details of Material/Media in different vessels													
		Vessel 1					Vessel 2					Vessel 3			
Name of manufacturer	Treatment Technology	Media / Material	Life	Interval of backwash	Interval of media regeneration if required	Interval of media replacement	Media/ Material	Life	Interval of backwash	Interval of media regeneration if required	Interval of media replacement	Media/ Material	Life	Interval of backwash	Interval of media regeneration if required

REJECT MANAGEMENT OF TREATMENT UNITS

Waste streams in arsenic fluoride and iron, removal plants can be categorized as follows:

- Backwash wastewater stream
 - Sludge from treatment reactors
 - Spent adsorbents/Nano-materials and replaceable catalysts
-
- Out of all the treatment plants mentioned above, arsenic/fluoride poses maximum possibility of groundwater and soil contamination if not handled properly while iron removal plants generate more quantity of waste.
 - Quality of sludge is not as hazardous as that of arsenic/fluoride removal plant and handling of waste from iron removal plants is easier; quantity of sludge/waste particularly in arsenic/fluoride removal plant is low as compared to arsenic and iron removal techniques.
 - Common options for waste generated are disposal in either municipal or hazardous waste landfills. Although landfills are supposed to properly provide engineered containment to keep leachate and wastes from re-entry into the environment, concerns remain about this practice of waste disposal in India.
 - This has resulted in recommendations for waste disposal options such as mixing wastes with cow dung, stabilization in concrete, storage in dug or concrete lined pits, or storage in an aerated coarse sand filter.

PROTOCOL FOR REJECT MANAGEMENT, SPENT MEDIA DISPOSAL AND HANDLING, BACKWASH WATER

Considering numerous water treatment plants likely to be installed in Bihar, it is proposed to develop scientifically designed disposal sites in each district for disposal of solid waste. Generic protocol for waste management is provided below:

- Backwash water generated from Arsenic, Fluoride and Iron, removal plant shall be analysed, on weekly basis.
- Sedimentation tank shall be provided for the backwash water generated for the treatment unit.
- Dewatering of sludge shall be carried out by sand drying bed, freeze assisted sand beds, vacuum assisted bed, solar drying bed etc.
- Engineered landfills, if necessary, shall be designed for sludge generated for arsenic, fluoride or iron removal for working period of 15 years or for the period decided as per availability of land.
- Exhausted media of arsenic, fluoride removal shall be tested for the toxicity characteristics leaching prior to transport to the designated disposal facility.
- Supernatant after sedimentation and dewatering shall be tested before discharging into environment.
- Sedimentation tank and sludge storage facility shall be included as mandatory part of water treatment plant

10. CHLORINATOR

INTRODUCTION:-

- Chlorination is the process of adding chlorine or chlorine compounds such as sodium hypochlorite to water. This method is used to kill bacteria, viruses and other microbes in water. In particular, chlorination is used to prevent the spread of waterborne diseases such as cholera, dysentery, and typhoid.

DESIGN:-

- For 2 ppm and 30% chlorine solution Amount of NaOCl required per litre
$$(A) = (\text{Total population served} \times 81 \times 2 / 1000000) \times (100/30) \times 365$$
- Generally, 25-litre chlorinator is used in the ward level scheme.

DRAWING:-

Dosing System



SPECIFICATION:-

In Water supply schemes under “Har Ghar Nal Ka Jal” Yojna, the department uses Electronically Regulated doser-type chlorinator using Sodium Hypo Chlorite.

- Residual chlorine of 0.2 ppm should be maintained at the tail end of supply.

ESTIMATE

Electronically Regulated Doser Type Chlorinator (Included GST @ 18%)

Sl. No.	Particulars	Quantity	Unit	Rate (In Rs.)	Amount (In Rs.)
1	Providing cost of electronically regulated Doser type chlorinator using sodium Hypo Chlorite (NaOCl) and installation including all cost and necessary fittings and connections as required and carriage cost etc. all complete as per direction of E/I.				
		1No.	Each	Rs.25,000.00	Rs.25,000.00
TOTAL : -					Rs.25,000.00

11. Item-wise Description for Repairing/New installation For PRD Transferred “Har Ghar Nal Ka Jal” Scheme

S.N.	Description	Quantity	Unit	Rate
1	Construction of 150mm X100mmx 125m deep T/W etc. all complete and as per direction of E/I.(As per sub Estimate no.- 1)	1	Nos.	Rs.2,70,643.00
2	Constructing masonry Chamber 100x100x75 cm inside, in brick work in cement mortar 1:4 (1 cement : 4 coarse sand) for Tube Well, and RCC top slab 1:1.5:3 mix (1 cement : 1.5 coarse sand : 3 graded stone aggregate 20mm nominal size) , necessary excavation, foundation concrete 1:2:4(1 cement : 2 fine sand : 4 graded stone aggregate 20 mm nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3coarse sand) 12 mm thick with 5% cico finished with a floating coat of neat cement, out side plastering with cement mortar 1:4 (1 cement : 4coarse sand) 12 mm thick complete as per standard specifications & direction of E/I. (As per sub Estimate no.- 2)	1	Nos.	Rs.15,314.08
3A	Supply Installation, commissioning and testing of single phase 3 H.P submersible pump set having discharging capacity 3.35 lps at a total head of 35 meter(approx) of different capacity of KSB/ Kirloskar or equivalent make with all accessories & fittings such as 7.5KVA Stabalizer, cable, panel board etc including loading unloading and transportation of the pump set to the work site with all required labour, materials, tools and tackles installation, testing & commissioning as per standards specifications and direction of E/I. (As per sub Estimate no.- 3a)	1	Nos.	Rs.1,10,628.00

3AA	Supply Installation, commissioning and testing of single phase 3 H.P submersible pump set only having discharging capacity 3.35 lps at a total head of 35 meter(approx) of different capacity of KSB/ Kirloskar or equivalent make with all accessories & fittings etc including loading unloading and transportation of the pump set to the work site with all required labour, materials, tools and tackles installation, testing & commissioning excluding the cost of GI pipes for lowering and cables etc. as per standards specifications and direction of E/I. (As per sub Estimate no.- 3a items)	1	Nos.	Rs.26,340.00
3B	Supply Installation, commissioning and testing of single phase 2 H.P submersible pump set having discharging capacity 2.25 lps at a total head of 35 meter(approx) of different capacity of KSB/ Kirloskar or equivalent make with all accessories & fittings such as 7.5KVA Stabalizer, cable, panel board etc including loading unloading and transportation of the pump set to the work site with all required labour, materials, tools and tackles installation, testing & commissioning as per standards specifications and direction of E/I. (As per sub Estimate no.- 3b)	1	Nos.	Rs.68,220.60
3BB	Supply Installation, commissioning and testing of single phase 2 H.P submersible pump set having discharging capacity 2.25 lps at a total head of 35 meter(approx) of different capacity of KSB/ Kirloskar or equivalent make with all accessories & fittings etc including loading unloading and transportation of the pump set to the work site with all required labour, materials, tools and tackles installation, testing & commissioning excluding the cost of GI pipes for lowering and cables etc. as per standards specifications and direction of E/I.(As per sub Estimate no.- 3B items)	1	Nos.	Rs.21,072.00
4a	Providing & Fixing BIS approved 3 HP submersible motar starter all complete as per direction of engineer in charge. (As per sub Estimate no.- 4a)	1	Nos.	Rs.5,478.72
4b	Providing & Fixing BIS approved 2 HP submersible motar starter all complete as per direction of engineer in charge. (As per sub Estimate no.- 4b)	1	Nos.	Rs.4,741.20
5a	Supply & Installation of 90-220 V range single phase 7.5 KVA automatic voltage stabilizer make- Sen & Pandit/ Vertex/ISI marked Stabilizer of reputed make. (As per sub Estimate no.- 05)	1	Nos.	Rs.26,340.00

5b	Supply & Installation of 90-220 V range single phase 5.0 KVA automatic voltage stabilizer make- Sen & Pandit/ Vertex/ISI marked Stabilizer of reputed make. (As per sub Estimate no.- 05)	1	Nos.	Rs.21,072.00
6A	Providing and Laying Distrbution network of 90 MM High Density Polyethylene pipe (HDPE pipe) all complete as per direction of E/I. (As per sub Estimate no.- 6A) *	1	per m	794.94
6B	Providing and Laying Distrbution network of 75 MM High Density Polyethylene pipe (HDPE pipe) all complete as per direction of E/I. (As per sub Estimate no.- 6B) *	1	per m	649.30
6C	Providing and Laying Distrbution network of 63 MM High Density Polyethylene pipe (HDPE pipe) all complete as per direction of E/I. (As per sub Estimate no.- 6C) *	1	per m	552.30
6D	Providing and Laying Distrbution network of 50 MM High Density Polyethylene pipe (HDPE pipe) all complete as per direction of E/I. (As per sub Estimate no.- 6D) *	1	per m	439.05
6E	Providing and Laying Distrbution network of 40 MM High Density Polyethylene pipe (HDPE pipe) all complete as per direction of E/I. (As per sub Estimate no.- 6E) *	1	per m	395.10
7a	Cost of replacement of riser / delivery pipe by 50 mm dia G.I.Pipe from T/well to PVC Tank	1	per m	Rs.603.29
7b	Cost of replacement of riser / delivery pipe by 65 mm dia G.I.Pipe from PVC Tank to Distribution main	1	per m	Rs.703.49
7c	Cost of replacement of riser / delivery pipe by 80 mm dia G.I.Pipe for wash out	1	per m	Rs.862.06
7d	Providing and fixing brass gate valve with C.I. wheel of approved quality (screwed end). 80mm dia Pipe	1	Job	Rs.2,347.00
7e	Providing and fixing brass gate valve with C.I. wheel of approved quality (screwed end). 50mm dia Pipe	1	Job	Rs.925.27
7f	Supplying all materials labours & fixing 50mm dia. G.I pipe for using as filling station etc. All as per direction of E/I.	1	Job	Rs.3,756.61

8	Estimate for supply & installation of water storage tank (5000 Ltr. =5000 X 1) as per direction of engineer in charge. (As per sub Estimate no.- 08)	1	Job	Rs.55,840.80
9	Installation of Electronically Regulated Doser type chlorinator using Sodium Hypo Chlorite (Hypo NaOCl) (As per sub Estimate no.-09)	1	Nos.	Rs.24,775.40
10	Providing and erecting 8M high staging with ladder of ISA65x65x6 and 16mm dia MS bar as trade @ 400mm c/c and GI enclosure to house electric switch panel & treatment unit (where required) of suitably designed MS section of angle, channel, etc. as per drawing attached. (As per sub Estimate no.-10) *	1	Job	Rs.7,34,220.00
11	Estimate for Painting of 8M Steel Staging all complete as per direction of engineer in charge. (As per sub Estimate no.- 11)	1	Job	Rs.21,246.00
12a	Estimate for Providing GI enclosure to house electric switch panel for steel structure staging all complete. (As per sub Estimate no.- 12) *	1	per m2	Rs.1,581.77
12 b	Repair/ Replacement of M.S angle / channel / Roof Sheet including riveted/ welded/bolted in built up sections, trusses and framed work, including cutting,hoisting,fixing in position and applying a priming coat of approved primer all complete	1	per Kg	Rs.109.57
13a	Estimate for Construction of floor of staging etc. all complete as per direction of engineer in charge. (As per sub Estimate no.- 13) *	1	per m2	Rs.1,606.74
14	Providing ladder in staging including all accessories etc. all complete. (As per sub Estimate no.- 14)	1	Job	Rs.31,776.58
15	Providing New house connection for each house hold including supplying all materials, labours, tools and making ferrule connection with 20 mm dia MDPE and 15mm G.I Pipes with all fittings etc all complete. (As per sub Estimate no.- 15)	1	Each	Rs.2,623.46
15a	Providing New house connection <u>without retrofitting</u> for each house hold including supplying all materials, labours, tools and making ferrule connection with 20 mm dia MDPE and 15mm G.I Pipes with all fittings etc all complete. (As per sub Estimate no.- 15a)	1	Each	Rs.2,197.00

16	Repairing of House Connection (As per sub Estimate no.- 16)	1	Nos.	Rs.801.79	
16A	Repairing of House Connection with leakage at ferrule (As per sub Estimate no.- 16A)	1	Nos.	Rs.1,668.00	
16B	Minor repairs to House Connection (As per sub Estimate no.- 16B)	1	Nos.	Rs.191.76	
17	Replacing of damage Bib cock with New Bib cock (As per sub Estimate no.- 17)	1	Nos.	Rs.115.90	
18	Repairing of 3 HP/2 HP Pump Motor (As per sub Estimate no.- 18)	1	Nos.	Rs.9,355.97	
19	Repairing of Starter (As per sub Estimate no.- 19)	1	Nos.	Rs.1,580.40	
20	Repairing of Stabilizer (As per sub Estimate no.- 20)	1	Nos.	Rs.3,160.80	
21	Supplying & fitting 2.5 mm ² copper service cable from power point from nearest source up-to pumping station. (As per sub Estimate no.- 21)	1	per m	Rs.136.97	
22	Cleaning of one 5000 Ltr capacity overhead pvc tank and getting water quality tested from departmental lab. (As per sub Estimate no.- 22)	1	Nos.	Rs.526.80	
23A	Repairing of Leakages in HDPE Pipe line with PCC cutting & Restoration. (For HDPE Laid at depth 0.5 to 1.0 m)(As per sub Estimate no.- 23)				
		90 mm Dia	1	Nos.	Rs.1,671.01
		75 mm Dia	1	Nos.	Rs.1,652.04
		63 mm Dia	1	Nos.	Rs.1,596.20
		50 mm Dia	1	Nos.	Rs.1,563.54
		40 mm Dia	1	Nos.	Rs.1,536.15
23B	Repairing of Leakages in HDPE Pipe line without PCC cutting & Restoration.(For HDPE Laid at depth 0.5 to 1.0 m)(As per sub Estimate no.- 23)				
		90 mm Dia	1	Nos.	Rs.1,262.21
		75 mm Dia	1	Nos.	Rs.1,243.25
		63 mm Dia	1	Nos.	Rs.1,187.41
		50 mm Dia	1	Nos.	Rs.1,154.75
		40 mm Dia	1	Nos.	Rs.1,127.35

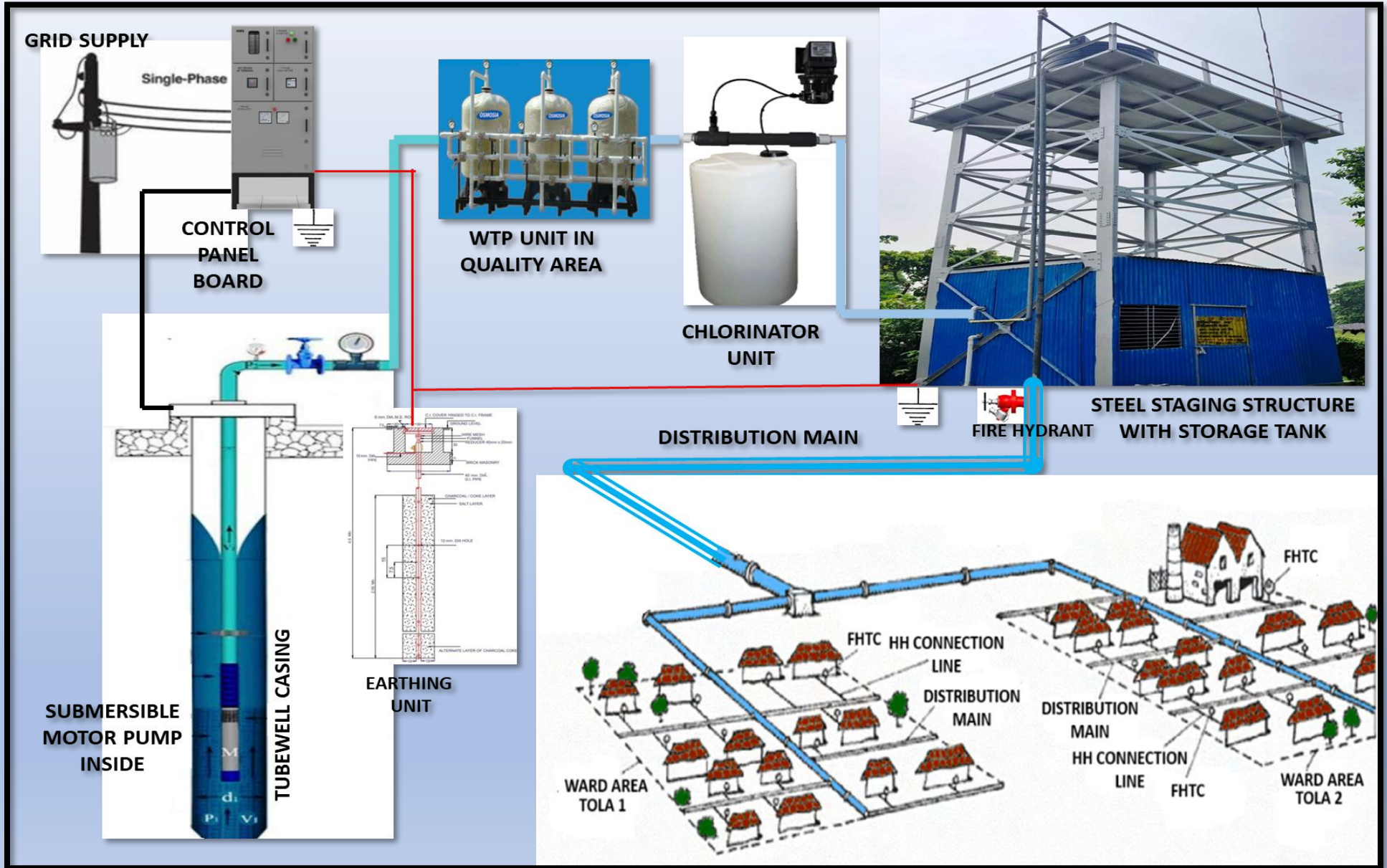
24A	Repairing of Leakages in HDPE Pipe line with PCC cutting & Restoration. (For HDPE Laid at depth 0.0 to 0.5 m)(As per sub Estimate no.- 24)			
	90 mm Dia	1	Nos.	Rs.1,590.94
	75 mm Dia	1	Nos.	Rs.1,571.97
	63 mm Dia	1	Nos.	Rs.1,516.13
	50 mm Dia	1	Nos.	Rs.1,483.47
	40 mm Dia	1	Nos.	Rs.1,456.08
24B	Repairing of Leakages in HDPE Pipe line without PCC cutting & Restoration.(For HDPE Laid at depth 0.0 to 0.5 m)(As per sub Estimate no.- 24)			
	90 mm Dia	1	Nos.	Rs.1,182.14
	75 mm Dia	1	Nos.	Rs.1,163.17
	63 mm Dia	1	Nos.	Rs.1,107.33
	50 mm Dia	1	Nos.	Rs.1,074.67
	40 mm Dia	1	Nos.	Rs.1,047.28
25	Supplying and laying of submersible flat cable ISI marked 3 core copper wire of suitable size with proper clamping of approved make. (Rate Chattisgarh SOR 34.20.107)	1	m	Rs.127.49
26	Replacing damaged portion of riser and delivery pipe 8 meter staging with CPVC / UPVC pipe and providing gun metal Gate valve. (Sub Estimate No.26)			
	Replacing damaged portion 50 mm dia. CPVC / UPVC Riser pipe	1	m	Rs.833.40
	Replacing damaged portion 80 mm dia. CPVC / UPVC Riser pipe	1	m	Rs.1,990.78
	Replacing CPVC / UPVC Gate Valve 50 mm dia.	1	Nos.	Rs.915.00
	Replacing CPVC / UPVC Gate Valve 80 mm dia.	1	Nos.	Rs.2,240.00

27	Development of Twell. (Sub Estimate No.27)	1	Job	Rs.16,973.50
28	Repairing and painting of RCC staging (Sub Estimate No.28)	1	Job	Rs.75,413.00
29	Restoration of road for pipeline work having trench size 300 mm.	1	per meter	Rs.362.26
30	Providing and fixing 19mm PVC/Block board with KitKat to affix/hang starter, fuses, IoT devices etc all complete as per the directions of the E/I.	1	Job	Rs.3,000.00
31	Providing 50 mm GI pipe for lowering the riser pipe of submersible pump all complete as per the directions of the E/I. (Sub Estimate No.30)	1	Job	Rs.1,512.51
32	Providing and fixing MS clamp consisting of 32mm x 5mm thick two no. rings spaced suitably distance apart around the tank and six nos. L type flats suitably connected with the rings and the other leg suitably connected with the top of the steel structure as per direction of E/I.	1	Job	Rs.3,000.00
33	Providing and fixing of New PVC 5000 L Tank Cover with all accessories.	1	Job	Rs.300.00
34	Providing and fixing M.S Stabiliser Stand near panel Board to keep stabiliser safe.	1	Job	Rs.2,500.00
35	Renovation (Repairing and painting) of Attendent Cum Pump room & toilet. (As per sub Estimate no.- 31)	1	Job	Rs.33,308.10
36	Renovation (Repairing and painting) of Existing Boundry wall of Length 29Mtr and height 1.5Mtr. all complete as per direction of E/I. (As per sub Estimate no.- 32)	1	per meter	Rs.1,826.76
37	Campus development by land filling and brick soaling. (As per sub Est.no.-33)	1	Job	Rs.28,766.23
38	Replacement of Existing Solar driven Pump with Electric driven single phase 2 H.P. submersible pump set having discharging capacity 3 lps at a total head of 45meter (approx) of KSB/ Kirloskar or equivalent make with all accessories & fittings etc including loading unloading and transportation of the pump set to the work site with all required labour, materials, tools and tackles installation, testing & commissioning as per standards specifications and direction of E/I. (As per sub Est. no.- 34)	1	Job	Rs.93,243.60
39	Supplying, installation Testing & commissioning of Solar Pannel plate etc all complete as per direction of E/I. (As per sub Est. no.- 35)	1	Job	Rs.16,594.20

40	Supplying, installation Testing & commissioning of Variable Frequency Drive (VFD), Change over Switch and Net Energy Metering (NEM) system (As per sub Est. no.- 36)	1	Job	Rs.63,690.12
41	Providing and Fixing 12 VOLT Solar Battery as per direction of E/I. (As per sub Est. no.- 37)	1	Job	Rs.36,876.00
42	Providing all labours, tools and materials to repair the leakage of different sizes of pipe at different places including earthwork in excavation, opening of joint, dewatering of the trenches, making lead caulked joint & back filling the trenches etc. all complete work (As per sub Est. no.- 38)			
	40mm dia			
	(i) without road cutting	1	Nos.	Rs.864.00
	(ii) with Pucca road cutting	1	Nos.	Rs.2,114.29
	50mm dia			
	(i) without road cutting	1	Nos.	Rs.937.70
	(ii) with Pucca road cutting	1	Nos.	Rs.2,188.00
	65mm dia			
	(i) without road cutting	1	Nos.	Rs.1,243.25
	(ii) with Pucca road cutting	1	Nos.	Rs.2,493.59
	80mm dia			
	(i) without road cutting	1	Nos.	Rs.1,317.00
	(ii) with Pucca road cutting	1	Nos.	Rs.2,567.34
43	Repairing of 63/25 kva transformer including LT pannel rapair in pump house Including Conductor,fuse relay,Timer as required,ST- CTBT pannel repair,Transformer Oil (630Ltr) Make-Servo etc all complete as per direction of engineer in charge.	1	Nos.	Rs.12,643.20
44	Providing all labours, materials and cleaning of RCC water VAT from inside and doing chlorination etc. all complete work as per specification & direction of E/I. (As per sub Est. no.- 39)	1	Nos.	Rs.1,053.60

***The rates are inclusive of GST @ 18%**

12. "HAR GHAR NAL KA JAL SCHEME" AT A GLANCE





'हर घर नल का जल' योजना की सतत् क्रियाशीलता पर्यवेक्षण प्रणाली

समाधान की पुष्टि

केन्द्रीकृत शिकायत निवारण प्रकोष्ठ

उपभोक्ता/शिकायकर्ता एवं पम्प चालक/अनुरक्षक

(समस्या)

समाधान की पुष्टि

सामाजिक प्रमाणीकरण/
जियोटिंग फीडब्याक

समाधान की पुष्टि

उपभोक्ता/शिकायकर्ता एवं
पम्प चालक/अनुरक्षक

(समस्या)



पम्प चालक/अनुरक्षक

उपभोक्ता

समाधान की पुष्टि

उपभोक्ता/शिकायकर्ता एवं पम्प चालक/अनुरक्षक

(समस्या)

(समाधान)

(समस्या)

मुख्यमंत्री ग्रामीण पेयजल निश्चय योजना एवं पंचायती राज विभाग द्वारा हस्तांतरित पेयजलापूर्ति योजनाओं से संबंधित शिकायत दर्ज करना हुआ अब और आसान

पेयजलापूर्ति के अनुभवण, मरम्मत एवं संशोधन संबंधित अपनी शिकायत एवं सुझाव दर्ज करा सकते हैं

टोल-फ्री नंबर 1800-123-1121 / 1800-345-1121 / 155367

अब "नल जल शिकायत एप" के माध्यम से शिकायत करना होगा और भी आसान अपने एंड्रॉयड फोन में Play Store से डाउनलोड करें

SMS/व्हाट्सएप नंबर: 8544429024/8544429082 पर सई संख्या, गांव, पंचायत, प्रकंड, जिला के साथ शिकायतकर्ता का नाम एवं मोबाइल नंबर तथा शिकायत का प्रकार लिखकर Whatsapp करें

QR कोड स्कैन कर जल जल शिकायत एप डाउनलोड करें

ईमेल: phedcgrc2024@gmail.com
वेबसाइट: www.phedcgrc.in

QR Code

फ - BiharPHED | टि - biharphed | ट्वि - BiharPHED | यूट्यू - PHED Media

जलापूर्ति संबंधित के शिकायत हेतु अपने जिला नियंत्रण कक्ष के निम्न नंबरों पर संपर्क करें

नियंत्रण कक्ष (मुख्यालय, पटना) : 0612 2215152 | 0612 2215271 | 0612 2215739

जिला का नाम	पियंत्रण कक्ष दूरभाष	कार्यपालक अभियंता का मोबाइल नंबर	जिला का नाम	पियंत्रण कक्ष दूरभाष	कार्यपालक अभियंता का मोबाइल नंबर	जिला का नाम	पियंत्रण कक्ष दूरभाष	कार्यपालक अभियंता का मोबाइल नंबर
पटना	0612-225796	8544429562	शिवपुर	06341-223262	8544429569	रोहतास	8544429896	8544429572
नालंदा	0612-2280879	8544429563	लखीसराय	06346-296112	8544429590	सुपौल	06473-223669	8544429593
		8544429565	जमुई	8544429897	8544429591	मुंगेर	06276-296190	8544429902
	0611-391801	8544429566	मुजफ्फरपुर	0621-224245	8544429638		06273-222280	8544429601
मध्या	0631-2220611	8544429566		0622-3291256	8544429612	सदरसा	06476-225501	8544429592
	8544429805	8544429649	सैशाली	06224-260320	8544429672	सौरासगढ़ी	06226-251018	8544429575
जहानाबाद	8430999051	8544429568	सोनभद्र	06182-241761	8544429578	सिपहर	06222-299928	8544429576
नवादा	06324-210038	8544429567	सोनभद्र	06154-242075	8544429579	खगड़िया	06244-222915	8544429594
औरंगाबाद	8544429882	0939386605	सोपलमण्ड	06156-224700	8544429580	मधेपुरा	06476-223382	8544429595
बेगूसर	06169-223445	8544429574	सुरसंगा	06272-202256	8544429581		06454-242531	8544429596
मोतिपुर	05182-350034	8544429571	समस्तीपुर	06274-295464	8544429602	सुपौल	9904043182	8544429605
बक्सर	06183-290053	8544429573	पुर्वी चम्पारण	06252-233374	8544429885	किशनगंज	06456-295069	8544429597
बागलपुर	0641-240058	8544429584		06250-206049	8544429582	अररिया	06453-350024	8544429598
	06424-237051	8092646745	शुभ चम्पारण	9471807001	8544429583		7903996518	7905050802
बौंगा	9472667624	8544429587	अरवल	06337-229306	8544429560	कटिहार	06452-242580	8544429599
मौना	0632-458609	8544429608	बनारस	062-338834	8544429603			
मनेर	06344-226211	8544429588		0627-9358847	8544429549			

दीर्घकालीन अनुरक्षण एवं रख-रखाव संवेदक/ एजेंसी नियंत्रण कक्ष

समाधान

ओ0 एंड एम0/ मरम्मत दल

लोक स्वास्थ्य अभियंत्रण विभाग, बिहार द्वारा जनहित में जारी

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PREPARED BY DESIGN WING &
SUPPORTED BY MECHANICAL WING
PHED, BIHAR