

SCHEDULE OF QUANTITY

NAME OF WORK :- Aug. of LWSS Dhaula Kuan in tehsil Paonta Sahib Distt. Sirmour (HP)
(SH: Supplying & erection and commissioning of Submersible Pumping machinery & allied accessories)

Estimated Cost:Rs. 195817/-
Earnest Money: Rs.4000/-
Time: Three Months

S.NO.	DESCRIPTION		QTY	RATE	UNIT	AMOUNT
1	Supply, erection, testing & commissioning of submersible pumping set of reputed make such as AMRUT/KSB/BS/Johnson/worthington /Sabar/Oswal conforming to latest relevent BIS code. The pump should be fitted with free flow impellers of bronze /suitable alloy as per BIS 5659 or latest with up to date ammendments suitable for raw/clear water having greased packed bearings & shell with wound stator on motor side & with shaft protection sleeve on pump side ensuring better life for shaft conforming to BIS specifications. The pump shall be directly coupled to a submersible squirrel cage electric induction motor of Kirloskar/NGEF/Jyoti / Crompton make conforming to relevent BIS code with up to date ammendments totally dust & water proof for submersible duty isolated from the pump by intermediate casing with double mechanical seal in oil chamber chamber & grease packed lubricated bearings & provided with stainless steel thrust bearing plate to withstand non vertical loads with minimum wear & tear. It should also be fitted with a device to take up expansion of water with the heating of motor. The pump set should include water level guard, erection clamps, cable clips & depth gauge etc. & suitable for operation on data given below:-	2	Set		Each.	
a)	Total Head in mtrs (i/c depth of Column Pipe in case of t/well) :	104.00				
b)	Capacity (in LPS)	2.13 LPS				
c)	Dia of R/Main (in mm)	65 mm				
d)	Dia of Column pipe (in mm)	65mm				
A)	SITE CONDITIONS:- =====		Moterable			
i)	Location of Site:-	25 Km. from Paonta.				
ii)	The altitude of place in which the motor is intended to work:-					
iii)	Humidity:-	Wheather Generally remains humid during monsoon season				
iv)	Nature of atmosphere:-	As normally encountered in Shivalik Ranges				
v)	Detail of quality of water :-	Clear water				
vi)	Water free from sand or not:-	Free from sand.				
vii)	Water corosive or not:-	---				
viii)	Turbidity :-	Clear water.				
ix)	Type of well:-	T/well				
x)	Inside Dia of Well:-	300-400mm				
xi)	Depth of water during HFL in the pond:-	NA				
xii)	Max. draw down:-	39.62				
xiii)	Depth of well:-	T/well.				

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xiv	Any other information or requirement:-	----					
B)	OPERATING CONDITIONS:-						
	=====						
i)	Type of current:-	AC three					
ii)	Operating frequency:-	50 HZ					
iii)	Rated voltage:-	400 (+/-) 10% volts					
iv)	System of earthing if any to be adopted:-	Double loop earthing as per BIS 3043-1987 latest with upto date ammendments					
v)	Speed of revolution:-	2800 RPM					
vi)	Direction of rotation:-						
vii)	No. of working hours per day:-	8 Hours.					
viii)	The max. Temp. of cooling air & water in the place in which the pumpset is intended to work in ordinary service:-	40 C					
C)	MOTOR:-						
	=====						
i)	Ref to BIS code:-	BIS 9283-1979 or latest with upto date ammendments					
ii)	Type of enclosure of motor:-	As per BIS 4691-1985 or latest with up to date ammendments					
iii)	Type of duty:-	"S1" i.e. Continuous duty type as per IS-12824-1989 or latest with up to date ammendments					
iv)	Mechanical out put in KW:-	Suitable for driving submersible pumps required for duties specified against pumps. To avoid overloading of motor a margin of about 15-20% may be kept in the rated out put of prime mover.					
v)	Class of insulation:-	Class ~B~					
vi)	Max.permissible temp. rise of motor reqd. if different from that given in B (viii) above:-	To be specified by the tenderer					
vii)	Particulars of test reqd. & where they are to be conducted:-	As per terms & conditions attached					
viii)	Particulars as to whether voltage limiting device will be employed:-	Star Delta starter, oil immersed,fully automatic to be installed between bus bar & motor. Shunt capacitor is also proposed to be installed for improving the power factor at site.					
	(NOTE:- Star delta starter upto 37.5 KW & ATS for 37.5 KW & above)						
ix)	Type of motor:-	As per BIS 9283-1979 or latest with upto date ammendments					
x)	Details of shaft extension reqd:-	To work with the pump offered					
xi)	Breakway torque in terms of rated load torque & the corresponding breakway starting current which may be taken from the supply with the starting apparatus in circuit:-	Breakway torque to be given by the tenderer but the starting current should not exceed 2.5 times of the full load current.					

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xii)	Nature of load & any information regarding the driven machine which has a bearing upon the torque reqd. during the accelerated period, the kinetic energy of the moving parts to be accelarated & No.of starts during a specified period:-	To work the pump offered				
xiii)	Where possible fault capacity of the system to which the motor is connected:-	The motor should be able to withstand initial current of 2.5 times the rated current for two minutes without suffering damages or permanent deformations				
D)	PUMPS:-					
	=====					
i)	Nos of pumps reqd.:-	2 Nos. Pump				
ii)	Spare parts required:-	For two years normal maintenance as recommended by manufacturer.				
iii)	Type of drive:-	Electric induction motor				
iv)	Optional fittings reqd.:-	-----				
E)	PUMP OPERATING CONDITIONS:-		As per condition attached			
	=====					
i)	Capacity of each pump (in lps) :-	2.13 LPS				
ii)	Total head (in Mts.) :-	104.00				
	If total head is not known then following details be provided:-					
	i) Static head (in mtrs):-					
	ii) Minimum depth of water (in mtrs) :-					
	iii) Seasonal Variation in water level (in mtrs):-					
	iv) Ground level to max. water level (in mtrs) :-					
	v) Ground level to delivery point (in mtrs):-					
	vi) Pressure in the suction tank (in kg/cm²)-					
	vii) Pressure in the delivery tank (in kg/cm²) :-					
iii)	Length of R/Main (in mtrs):-	680 Rmt.				
iv)	Dia of R/Main (in mm):-	65 mm				
v)	Length of Column pipe (in mtrs):-					
vi)	Dia of Column pipe (in mtrs)	65mm				
vii)	Turbidity of water (in ppm):-	----ppm				
viii)	Drive type:-	Electric driven				
ix)	Limits of total head in which the pump is reqd. to operate:-	(-) 15% to (+) 10% of total head.				
x)	Suction/delivery size of pump:-	To be specified by the tenderer				
xi)	Efficiency of pump at	To be specified by the tenderer				
	a) duty head as mentioned in item 1(a)	104.00 Mtr.				
	b) (+) 10 % of head -do-	114.40 Mtr.				
	c) (-) 15 % of head -do-	88.40 Mtr.				
xii)	Material of construction:-	To be specified by the tenderer (manufacturers certificate to be appended)				

S.NO.	DESCRIPTION		QTY	RATE	UNIT	AMOUNT
2	Supply & erection of suitable direct on line/oil immersed star delta /ATS/stator rotor starter of standard make such as MEI/Kilburn/Jyoti/ Siemens/Larson & Tubro conforming to BIS-8544-1979 latest with up to date ammendments for squirrel cage/slip-ring motor (make to be specified by the tenderers) mounted on panel board with magnetic type over load release & dashpot,time lag,under voltage release with initial oil filling .	1	No.		Each.	
	Note:- Star - delta - starter upto 37.5 KW , ATS between 37.5 KW to 50 KW and stater rotor starter with slipring motor beyond 50 KW.					
3	Providing & fixing M.S. sheet 16 SWG steel fabricated floor mounted closed almirah type switch board including angle iron post of suitable height and size ISA 40x40x6mm duly painted comprising and capable of mounting the following accessories with all internal electric connections. The drawing of panel board shall be subject to approval of Engineer in charge.	1	No.		EACH	
a)	Ammeter AC supply,100 mm dia circular dial Auto electric/AE/IMP/Havells make of suitable range for above motor with selector switches conforming to BIS 1248-(P-II)1983 latest with up to date ammendments.	1	No.		EACH	
b)	Voltmeter AC supply,100 mm dia circular dial Auto electric/AE/IMP/Havells make of suitable range for above motor with selector switches conforming to BIS 4064-1978 with up to date ammendments.	1	No.		EACH	
c)	ICTP switches with HRC fuses of Kilburn/Larsen & Tubro/Standard/Siemen/Havells make and having capacity 30% extra of the operational rating of motor as per BIS 4064-1978 with upto date ammendments immediatly after the power meter of HPSEB.	1	Set		P/Set	
d)	Busbar chamber having three copper bars of suitable rating for full length equal to width of board of three live phases and one copper bar of half rating of full length for neutral conforming to BIS 8084-1976 and 11353-1985 read with 5578-1985 all latest with upto date ammendments.	1	No.			
e)	ACB/MCB/Oil circuit breaker of suitable capacity of Kilburn/L & T/MEI/GEC/Standard make on incomming feeder for motors offered by the tenderer conforming to BIS 2516-1985 latest with upto date ammendments with initial oil filling whenever required & neutral linked under voltage release.	1	No.		EACH	
f)	Three phase indicating lamps complete with toggle switches for individual motors conforming to BIS 3452 part I & II latest with up to date ammendments.	1	Set		P/Set	
g)	Earth leakage circuit breaker/relay of recommended make such as Kilburn/L&T/MET/GEC conforming to BIS-2516-1977 with upto date ammendments and of suitable range which should have control box, oprating handel and trip/reset push button, on/ off indicators, re-indicating off spring condition of the circut breaker for over current protection. The circuit should be equipped with magnet thermal release with metallic tap CTS. It should also be fitted earth fault for tripping of breaker on occurrence of earth fault on/ of breaker load side.	1	No.		EACH	
h)	Hour run meter of reputed make of four digit capacity conforming to BIS-722 (latest edition)/recommendations.	1	No.		EACH	
i)	Suitable three phase voltage monitor relay with all protections & usual indicators with electric sirens against single phasing, low voltage, high voltage & overloading & phase voltage difference as per IS-3842 with up to date ammendments.	1	No.		EACH	
j)	Change over Switch of reputed make & suitable capacity	1	No.		EACH	
k)	Single phase preventor of reputed make & suitable capacity conforming to IS:1248 (P-V)-1983 with up to date ammendments	1	No.		EACH	

S.NO.	DESCRIPTION		QTY	RATE	UNIT	AMOUNT
4 (a)	Supply & fixing of Kirloskar /Kilburn /IVC /Fouress /Gled /BHEL/ Leader/Pelcon make of suitable size cast iron/cast steel double flanged sluice valve having size one size larger than the nominal dia of delivery of the pump or equal to dia of column pipe (in case of t/well) and capable of withstanding nominal seat pressure as mentioned in item No.1-(a) conforming to BIS/API standards with up to date ammendments for delivery line of pump of dia class PN 1.6.	1	No.		EACH	
	(NOTE:- The sluice valve shall conform to BIS 780-1984 latest with up to date ammendments However, if the seat pressure exceeds the limits prescribed in BIS 780 then the sluice valves shall be of cast steel conforming to class 150 ASA (Seat pressure 21 Kg/cm^2) or class 300 ASA (seat pressure 52 Kg/cm^2) as per BS 1414 (API 600).					
(b)	Supply & fixing of Kirloskar/Kilburn/IVC/Fouress/Gled/BHEL/Leader/Pelcon make of suitable size cast iron/ cast steel double flanged swing check type reflux valve having bye pass arrangement & size one size larger than the nominal dia of delivery of the pump or equal to dia of column pipe (in case of t/well) and capable of withstanding nominal seat pressure as mentioned in item No.1-(a) & conforming to BIS/API standards with up to date ammendments for delivery line of pump of dia class PN 1.6	1	No.		EACH	
	NOTE:- The reflux valve shall conform to BIS 5312-1984 (part I) latest with up to date ammendments. However if the seat pressure exceeds the limits prescribed in BIS 5312 then the reflux valves shall be of cast steel conforming to class 150 ASA (Seat pressure 21 Kg/cm^2) or class 300ASA (seat pressure 52 Kg/cm^2) as per BS-1414 (API600) .					
(c)	Supply & fixing of Kirloskar/Kilburn/IVC/Fouress/Gled/BHEL/Leader make of suitable size cast iron /Cast Steel double flanged swing check type reflux valve having bye pass arrangement & size equal to dia of R/main as mentioned in item No.1(c) capable of withstanding nominal seat pressure as indicated in item 1(a) for Rising main.class PN 1.6	1	No.		EACH	
	NOTE:- The reflux valve shall conform to BIS 5312-1984 (part I) latest with up to date ammendments.However if the seat pressure exceeds the limits prescribed in BIS 5312 then the reflux valves shall be of cast steel conforming to class 150 ASA (Seat pressure 21 Kg/cm^2) or class 300 ASA (seat pressure 52 Kg/cm^2) as per BS 1414 (API 600) .					
5 (a)	P/L suitable size copper PVC insulated armoured power three & half core cable conforming to BIS 1554 (Part I) 1988 or latest with up to date ammendments of Siemen/Gloster/ICC/EICO/National /IEC make from meter of HPSEB to circuite breaker & from circuite breaker to bus bar switch & starter (one cable carrying all three phases) including all other electrical equipment/accessories such as thimbles,flexible pipe,solder,nuts & bolts,cable glands etc. laid in pipes or trenches under floor The type,size & make will be subject to approval of HPSEB authorities. In case of non acceptance by HPSEB authorities it shall have to be replaced by the tenderer free of cost.	1	job.		PerJob	
5(b)	P/L PVC jointless flat water proof cable as per BIS 694-1990 (latest with up to date ammendments) suitable for the pump sets offered from circuite breaker to motor & motor to starter including all other electrical equipments such as thimbles, flexible pipes, solder,nuts & bolts,cable glands etc. laid in pipes or trenches. The type,size & make will be subject to approval of HPSEB authorities.In case of non acceptance by HPSEB authorities it shall have to be replaced by the tenderer free of cost. (50 Mtr.)	1	job.		PerJob	
5 (c)	P/L double loop earthing with copper plate 600x600x3mm thick electrode complete with material such as charcoal, common salt ,GI pipes,thimbles,nuts & bolts,digging of pits,GI wiring & 25x5mm copper strips of required capacity conforming to BIS 3043-1987 latest with up to date ammendments suitable for above motors & other electrical equipments.	1	job.		LS	

S.NO.	DESCRIPTION		QTY	RATE	UNIT	AMOUNT
5 (d)	Supply & erection of floor/wall mounted power factor shunt capacitor conforming to BIS 2834-1986 or latest with upto date ammendments of BHEL/GEC/Machneil/ Mager/Bajaj/L&T make to raise the prevailing power factor at site to 0.95 for direct connection to induction motor individually,of required KVAR according to HP of motor offered including cable Siemens/Gloster/ICC make from busbar chamber to capacitor & also including L&T/Kilburn/Standard/Siemen/Havells make ICTP switches conforming to BIS 4064-1978 or latest with HRC fuses (Range to be specified by the tenderer).	1	No.		EACH	
6	Supply & erection of 100mm dia circular dial pressure gauge of suitable range & standard make such as Fiebeg/Bourden/ Precision/PREGA with all accessories such as stop cock,copper tubing etc.conforming to BIS 3624-1987 or latest with up to date ammendments.	1	No.		EACH	
7	Providing and fixing double flanged suction delivery pipe & common header considering site requirements,NPSH required & available & common header having area equal to two times the area of delivery branch of pump including tapers flanges rubber gaskets 3mm thick as per BIS 2712-1978 nuts & bolts as per 1364-1983 & special upto 5 mtrs. away from the outer wall of pump house as per layout drawings approved by Engineer-in-charge .The pipes shall be capable of withstanding 1.5 times the total pressure indicated in item No. i.e.(ii) .The size of suction pipe shall be one or two size larger than nominal suction size of pump such that velocity of flow in suction pipe is not more than 3.00 mtr. / sec. & size of delivery pipe shall be one size larger than nominal size of pump .	1	job.		Per job.	
	NOTE: Actual laying to be done as per final drawings to be approved by the Engineer-in-charge.					
	<i>(in case of source is sumpwell /percolation well)</i>					
	OR					
7	Providing and lowering of GMS/MSERW column pipe assembly of size as indicated in item 1(d) including MS flanges of appropriate table capable to withstand nominal pressure as mentioned in item No 1(a) & confirming to IS :6392 -1971 with up to date amendments including the cost of rubber/asbestos gasket of maximum 3 mm thickness as per IS: 2712 - 1979 and required numbers of nuts and bolts as per IS 1364 -1983. The column pipe should be provided & lowered as per the direction of engineer incharge. The same shall be of suitable thickness & grade specification capable of withstanding 1.5 times the total pressure as indicated in item no. 1(a) unless otherwise specified and properly jointed at every three mtr.including all necessary accessories like increaser/ reducer , flanges ,tees, bends etc.including supporting clamps (2Nos) at the top of assembly and as per the direction of engineer-in charge.G.I.(H) with FT-17.	1	job.		L.S.	
	<i>(in case of source is sumpwell /percolation well)</i>					
9	Excavation in drains and channels etc. in earth work in all kinds of soil such as Kankar Moorom, shingles, Colglomerate saturated soil decomposed or soft rock and hard rock by blasting by chiselling (where blasting prohibited) including dressing of sides and beds disposing of excavated earth with all leads lifts disposed earth to be levelled and neatly dressed and then returning the stacked soil into foundation and trenches etc. including ramming and consolidating the same wherever required with all leads lifts and including jungle clearance and as per direction of Engineer-in-charge.	351.90	Cum.		P/Cum	

S.NO.	DESCRIPTION			QTY	RATE	UNIT	AMOUNT
10	Laying , jointing & commissioning at site in trenches following plain ended GMS pipes of 65mm dia of medium grade as under confirming to BIS 1239 (Part-1)- 1990 or latest with upto date ammendments, capable of withstanding required test pressure as prescribed in BIS code in randum lengths of 5.5 to 6.5 mtr. . The pipe's ends shall bevelled suitable for butt weld, including cost of jointing with butt welding confirming to IS 816-1969 or latest as applicable (leak proof) in three layers at site of work with welding rods of standard make & all allied accessories whatever required for welding at site, tail pieces ,tees, bends manufactured from parent pipes etc. and cutting of pipes wherever required as per site requirement including carriage in all leads lifts and as directed by Engineer-in-charge (Earth work shall be measured & paid seperately)						
	RD's	Nominal dia	Length in mtr.				
	0 to 680	65mm dia (HG)	680 mtr.	(L/Rate)	680	Rmt.	P/Rmt.
11	Providing , welding and fixing M.S. Plate Flanges of various dia (nominal bore) of following Flange Table confirming to IS 6392-1971 or latest with upto date ammendments to MSERW/G.I. Pipes after every 90 metres or as per site requirement including cutting of pipes wherever required , welding in three layers (Leak proof) confirming to specifications as prescribed in relevent IS code i.e. IS 816-1969 or latest as applicable with upto date ammendments with nuts, bolts & washers & specials etc. confirming to IS-1963 of latest with upto date ammendments including packing sheet i.e. asbestos fibre sheet minimum 3mm thick and painting with anticorrosive paints complete in all respect in all leads lifts and carriage of material at site and as directed by Engineer-in-charge.						
	RD's	Nominal dia	Length (in mtr)	F.T			
	0 to 680	65 mm dia	680	5	8	Pair	P/pair

Total: _____

**Executive Engineer,
IPH Division, Paonta Sahib**