

SCHEDULE OF QUANTITY

NAME OF WORK :-Providing LWSS to NC PC Habitation of Sharachali Area GP Jhagtan, Mandal, Thana, B holar & Rawin Tehsil Jubbal District Shimla (H.P) (SH:- providing laying jointing and testing of Rising Main, SUPPLY & ERRECTION OF CENTRIFUGAL PUMPING MACHINARY WITH ALLIED ACCESSORIES-Booster Stage, Ist Stage and IInd Stage). Phase IInd.

Estimated cost:- 2252589.00
 Earnest Money:- 45100.00
 Time:- 6 Months

S No.	Sub Head & Item of work.	Quantity	Unit	Rate		Unit	Amount
				in figure	in words		

<p>1 Excavation in foundation,trenches(for pipes & pits) up to all depths in all classification of earth work such as pick work,jumper work,saturated soil including bailing out water, blasting soft/hard rock or chiseling soft/hard rock where blasting is prohibited in all lifts including trimming & dressing of sides, levelling of beds to correct grade i/c shoring/strutting,planking,timbering & dewatering wherever required, stacking the excavated soil clear from the edge of excavation returning the excavated soil after laying jointing testing of pipes in trenches in 15 Cm layers including consolidating of each deposited layer by ramming & watering & then disposing of all surplus Excavated soil/unusable material as directed with in all leads & lifts including restoration of unmetalled surfaces to its original condition & including cost of diversion for traffic,night signals, fixing caution boards, crossing over trenches for access to houses, fencing etc. complete in all respects with in all leads & lifts as per the entire satisfaction & directions of engineer in charge.</p>	<p>1280.81 Cum.</p>
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2 Laying in trenches to be leveled to grades, IS marked GI flanged pipes of following diameters conforming to IS 1239-1991(Part II) (latest with up to date amendments) having minimum walls thickness as for Class of Pipe specified below jointed with flanges conforming to tables as specified below of BIS 6392-1971 (latest with up to date amendments) welded at Both ends according to relevant BIS standards & detailed specifications as appended in NIT & providing flanges, nuts & bolts of required sizes, 3mm thick compressed asbestos fibre gasket or synthetic rubber gaskets conforming to relevant BIS codes as given in technical specifications i/c all kinds of leads and lifts, flanged short pieces, bends, tees & other specials etc.made from parent tubes & welded with flanges of tables as applicable for the particular reach & of technical specifications appended in the NIT as per site conditions including flushing, cleaning & hydraulic testing complete to the best satisfaction and direction of Engineer in charge.

Phase IInd.

	Dia Of Pipe	F. Table	Length	
<u>Booster Stage</u>	80mm	5	30	30.00 Rmt.
<u>Stage--I st</u>	80mm	28	420	420.00 Rmt.

		17	270	270.00 Rmt.
	80mm	5	140	140.00 Rmt.
<u>Stage-- IInd</u>	80mm	28	390	390.00 Rmt.
		17	300	300.00 Rmt.
		5	230	230.00 Rmt.

3 Providing & laying in trenches to be leveled to grades, BIS marked MSERW flanged pipes of following diametres conforming to BIS 1978-82 (Latest with up to date amendments) having minimum walls thickness as specified below of steel grade Yst-210 jointed with flanges conforming to tables as specified below of BIS 6392-1971 (latest with up to date amendments)welded at both ends according to relevant BIS standards & detailed specifications and provided with nuts & bolts of required sizes, 3mm thick compressed asbestos fibre gasket of synthetic rubber gasket conforming to relevant BIS codes including all short pieces, bends, tees & other specials etc.made from parent tubes & welded with flanges of tables as applicable for the particular reach & of approved specifications as per site conditions including flushing, cleaning, painting & hydraulic testing complete to the best satisfaction and direction of Engineer in charge. The pipes shall be galvanised (zinc coating)in accordance with IS 4736:1986 inside and outside and shall be engraved with BIS-1978-82 and supplying firm logo at the two ends and centre of the pipe with in all leads and lifts.

	Dia Of Pipe	F. Table	Thickness	Length	
Stage--Ist	80mm	34	4.80	150	150.00 Rmt.
		34	4.40	90	90.00 Rmt.

		28	4.40	180	180.00 Rmt.
Stage--II nd	80mm	34	4.80	30	30.00 Rmt.
		34	4.40	120	120.00 Rmt.
		28	4.40	180	180.00 Rmt.

Pumping Machinery

Booster Stage

4 Supply of submersible Poldar pumping set of reputed make such as KSBI 2x5 HP Each
 CALAMA/SU/johnston conforming to latest relevent BIS code. The pump should be fitted with free flow impellers of bronze/suitable alloy as per BIS 5659-1970 latest suitable for raw water having greased packed bearings & shaft 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 latest 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 bearing & provided with stainless steel thrust bearing plate to with stand non vertical loads with minimum ear & tear. It should also be fitted with a device to take up expansion of water with the heating of motor.

include water level guard, errection clamps, cable clips & depth gauge etc. suitable for operation on data given below:-

A) SITE CONDITIONS

- i) Location of site
- ii) The altitude of place in which the motor is intended to work in ordinary service if it 1488 Mtr. exceeds 1000mt.
- iii) Humidity
- iv) Nature of atmosphere
- v) Detail of quality of water
- vi) Water free from sand or not

Weather generally remains humid during monsoon season.
 As normally encountered in Shivalik Range
 Clear cold water
 Yes

vii) Water corrosive or not	Not
viii) Turbidity (if any)	Upto 50 PPM
ix) NPSH available	
x) Any other information or requirement	
B) OPERATING CONDITIONS	
i) Type of current	AC three / single phase
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) No. of working hours per day	8 hours
vi) Speed of revolution in RPM	To be quoted by tenderer
vii) Direction of rotation	To be quoted by tenderer
viii) The max. Temp. of cooling air & water in the place in which the motor is intended to work in ordinary service.	35 Degree Centigrade
C) MOTOR	
i) Ref. to BIS code	BIS 325-1978 read with Bis 900-1992 (latest) with upto date ammendments
ii) Type of enclosure of motor	SPDP(as per BIS 4691-1985 (latest)
iii) Type of duty	Continuous
iv) Mechanical out put in KW	Suitable for driving centrifugal 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 given in B(viii) above	-
vii) Particulars of test reqd. & where they are to be conducted.	As per terms & conditions
viii) Particulars as to whether voltage limiting device will be employed	AtS/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 37.5KW, ATS between 37.5KW to 50KW & Stator rotor starter with slip ring motor beyond 50KW

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| xi) Motor whether squirrel cage or slipring | Squirrel cage/slipring Note:- Squirrel cage upto 65HP and slipring above 65HP |
| x) Details of shaft extension reqd. | Just sufficient to provide direct drive by flexible coupling to pump. |
| xi) Type of slip ring gear whether continously rated or for starting purposes only & whether to be fitted with brush lifting or short circuiting arrangements or both if interlocks are required. | Continously rated for squirrel cage/ Slipring motor |
| xii) 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. |
| xiii) Nature of load & any information regarding the driven machine which has a bearing upon the torque reqd.during the accelearted period, the kinetic energy of the moving parts to be accelerared & No.of starts during a specified period. | To work the pump offered |
| xiv) Where possible fault capacity of the system to which the motor is connected. | The motor should be able to withstand initial currdent of 2.5 times the rated current for two minutes without suffering damages or permanent deformation. |
| D) PUMP (BIS 1520-1980)read with BIS 9137-1978 both latest with upto date ammendments | |
| a) Nos of pumps reqd. | 2 Nos. pumps one will act as stand by |
| b) Spare parts required | For Two years normal maintenance as recommended |
| c) Optional fittings reqd. | Air cock for exhausting air from each stage. |
| E) PUMP OPERATING CONDITIONS | |
| i) Capacity | 3.99 lps of each pump. |
| ii) Total head in Mtrs. If total head is not known then following details be provided:- | 19.72 Mtr. |
| i)Static head | 16 Mtr. |
| ii)Minimum depth of water | Negetive suction |
| iii)Variation in water level | ----Mtr. |
| iv)Ground level to max.level | ----Mtr. |
| v)Ground level to delivery point | ----Mtr. |
| vi)Pressure in the suction tank | ---Kg.cm/2 |
| vii)Pressure in the delivery tank | ---Kg.cm/3 |
| iii) Length of R/Main | 30 Mtr. |
| iv) Dia of R/Main | 80 mm |
| v) Drive arrangement | Direct through flexible coupling on a common base plate |
| vi) Drive type | Electric driven |
| vii) NPSH reqd. | To be quoted by the tenderer |

Viii) Limits of total head in which the pump is reqd. to operate.	(-)25%to(+)10%of total head.	
ix) Suction/delivery size of pump	To be specified by the tenderer	
x) Efficiency of pump at	To be specified by the tenderer	
a) duty head		
b) (+)10% head		
c) (-)25% head		
xi) Material of construction	To be specified by the tenderer (manufacturer-s certificafte to be appended)	
 5 Supply of suitable oil immersed star delta starter/ATS/stator rotor starter of standared make such as MEI/Kilburn/Jyoti/Siemens conforming to BIS-8544-1979 leates with up to date ammendments for squirrel cage/slopring motor(make to be specified by the tenderers) mounted on panel board with magnetic type over load release & dashpot, time lag , under voltage release wfith initial oil filling.	2 Nos	Each
 Note:- Star - delta - starter upto 37.5KW , ATS between 37.5KW to 50KW and stater rotor starter with slipring motor beyond 50KW.		
6 Providing 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 Nos	Each
a) Ammeter AC supply,100mm circular dia1Auto electric/AE/IMP/Havells make of suitable range for above motor with selector switches conforming to BIS 1248-1983 latest with up to date ammendments.	2 Nos	Each
b) Voltmeter AC supply,100mm circular dia1Auto 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 Nos	Each
c) ICTP switches with HRC fuses Kilburn/Larsen & turbo/Standard/Siemen make and having capacity 30% extra of the operational rating of motor as BIS 4064-1978 with upto date ammendments immediately after the power meter of HPSEB.	2 Nos	Each
d) Busbar chamber having 3 copper bars of suitable rating for full length equal to wirth of board of 3 live phases and one copper bar of half reating of full length for neutral conforming to BIS 8084-1976 and 11353-1985 read with 5578-1985 all latest with upto data ammendments.	1 Nos	Each

e) MCB/Oil circuit breaker of suitable capacity of Kilburn/LT/LK/MEI/Standard make on incoming feeder for motors offered by the tenderer conforming to BIS 2516-1985 latest with upto date amendments with neutral linked under voltage release.	1 Nos	Each
f) 3 phase indicating lamps complete with toggle switches for individual motors conforming to BIS 3452 part I & II latest with up to date amendments.	2 Sets	Each
g) Earth leakage circuit breaker of recommended (Kilburn/L&T/MET/GEC as per BIS-2516-1977 with upto date amendments and of suitable range with which should have control box , operating handle and trip/reset button / off indicators, re-indicating off spring condition of the circuit breaker for over current protection. The circuit should be equipped with magnet thermal release with metallic trip CTS. It should also be fitted earth fault for tripping of breaker on occurrence of earth fault on/of breaker load side.	1 Nos	Each
h) Hour run meter of reputed make of digit capacity conforming to BIS-722(latest edition)/recommendation.	2 Nos	Each
i) Suitable three phase voltage monitor relay with all protections & usual indicators with electrical sirens against single phasing, no voltage, high voltage & overloading & phase voltage difference	1 Nos	Each
j) Change over Switch of reputed make & suitable capacity.	1 Nos	Each
k) Single phase preventor of reputed make & suitable capacity.	1 Nos	Each
7 Supply of Kirloskar/Kilburn/IVC/Fouress/Gled/BHEL/Leader/of reputed make of suitable size cast iron /cast steel double flanged sluice valve having size equal to delivery of pump and capable of with standing nominal seat pressure of 10kg/cm ²	2 Nos	Each
NOTE:- The sluice valve shall conform to BIS 780-1984 latest with up to date amendments. 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 21Kg/cm ²) or class 300 ASA (seat pressure 52Kg/cm ²) as per BS 1414(API 600).		
(b) Supply of Kirloskar/ Kilburn/ IVC/Fouress /Gled/BHEL/Leader/of suitable size cast iron /cast steel double flanged swing check type reflux valve having bye pass arrangement & size equal to delivery of pump for withstanding nominal seat pressure of 10Kg/cm ²	2 Nos	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 cast steel conforming to class 150 ASA (Seat pressure 231Kg/cm²) or class 300 ASA (seat pressure 52Kg/cm²) as per BSI 1414 (API 600).

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| (c) Supply of Kirloskar/ Kilburn/ IVC/ Fouress/ Gled.BHEL/Leader 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 i.e of R/Main i.e 1.50.mm for withstanding nominal seat pressure of 10Kg/cm ² | 1 Nos | Each |
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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 cast steel conforming to class 150 ASA (Seat pressure 231Kg/cm²) or class 300 ASA (seat pressure 52Kg/cm²) as per BSI 1414 (API 600).

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| (d) Supply of Kirloskar/Jyoti/Standard/Kilburn make cast iron flanged screwed type foot valve with strainer of dia equal to dia of suction pipe conforming to BIS 4038-1986 or latest with up to date ammendments. | 2 Nos | Each |
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OR

Supply of Kirloskar/Jyoti/Kilburn/IVC/Kartar/leader /BHEL make cast iron flanged sluice valve having equal to dia of suction pipe capable of withstanding normal seat pressure of 52 kg/ cm² conforming to BIS 780-1984 with up to date ammendments in case of positive suction.

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| 8 (a) P/L suitable size copper PVC insulated armoured power 3 1/2 core cable conforming to BIS 1554(Part I)-1988 or latest with up to date ammendments Siemen/Gloster/ICC make from meter of HPSEB to OCB & from OCB to Busbar 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 aproval 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 | L.S |
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| b) P/L suitable size copper PVC insulated armoured power three core cable conforming to BIS 1554(Part I)-1988 or latest with up to date ammendments Siemen/Gloster/ICC make from switch to starter & starter to (one cable for carring all three phases) including all other electrical equipment/ accessories such as thimbles, flexible pipes, solder,nuts & bolts, cable glands etc. laid in pipes or trenches under floor. The type ,size & make will be subject to approval of HPSEB athorities. In case of non acceptance by HPSEB authorities it shall have to be replaced by the tender free of cost . | 1 Job | L.S |
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c) P/L double loop earthing with crpper 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 ammendmentsfor above motors & other electrical equipment.	1 Job	L.S
d) Supply & errection of floor/wall mounted power factor capacitor conforming to BIS 2834-1986 latest with upto date ammendment BHEL/GEC/Machneil/Masger/Bajaj make to raise the pervailing power factor at site to 0.95 for direct connection to induction motor individually, or requird KVAR according to Himachal Pradesh of motor offered including cable siemens/ Gloster/ICC make from busbar chamber to capacitor & also including LT/LK/Kilburn make ICTP switches conforming to BIS 4064-1978 or latest with HRC fuses (Range to be specified by the tenderer.	2 Nos	Each
9 Supply of standard make 100mm dia circular dial pressure of suitable range Fiebeg/ Bourden/Precision make with all accessories such as stop cock, copper tubing etc. conforming to BIS 3624-1987 latest with up to date ammendments.	2 Nos	Each
10 P/L suction,delivery pipe considering site requirements , NPSH required & available & common header having area equal to 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 up to 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 presure indicated in item no. Ie(ii). BIS 4064-1978 or latest with HRC fuses (Range to be specified by the tenderer.	1 Job	L.S
NOTE:- Actual laying to be done as per final drawings to be approved by the Engineer in charge		
11 Supply of antivibration pads conforming to BIS 6337-1971 or latest with up to date ammendmentsof suitable size for above machinery.	2 Sets	Each
12 Errection of all equipments from S.No. 4 to 7, 9 & 11 i/c cost of tees, bends tapes & any other fittings required as per site conditions & as per directions of Engineer-in-Charge.	1 Job	L.S

Stage I st

13 Supply of horizontal spindle, horizontal split casing Single/Multistage centrifugal pumps of standard make such as KSB/ Mathar & Platt/ Jayoti/ Kirloskar confirming to BIS 1520-1980 (latest with upto date ammendments) read with BIS 9137-1978 or latest to handle raw water having turbidity 50 ppm. with impelleres, casing ring & shaft sleeves of bronze, shaft of steel with cast iron casing of suitable capacity coupled directly through a flexible coupling on a common base plate to Kirlokar/NGEF/Crompton/ Siemen/Jyoti slip ring/squirrel cage screen protected drip proof electric induction motor suitable for operation on the data given below. 2x50 =100 HP Each

A) SITE CONDITIONS

- i) Location of site
- ii) The altitude of place in which the motor is intended to work in ordinary service if it exceeds 1501 Mtr. exceeds 1000mt.
- iii) Humidity Weather generally remains humid during monsoon season.
- iv) Nature of atmosphere As normally encountred in Shivalik Range
- v) Detail of quality of water Clear cold water
- vi) Water free from sand or not Yes
- vii) Water corosive or not Not
- viii) Turbidity (if any) Upto 50 PPM
- ix) NPSH available Positive suction
- x) Any other information or requirement

B) OPERATING CONDITIONS

- i) Type of current AC three / single phase
- ii) Operating frequency 50 HZ
- iii) Rated voltage 400 (+/-)10% volts
- iv) System of earthing if any to to be adopted. Double loop earthing as per BIS 3043-1987 latest with upto date ammendments
- v) No. of working hours per day 8 hours
- vi) Speed of revolution in RPM To be quated by tender
- vii) Direction of rotation To be quated by tender
- Viii) The max. Temp. of cooling air & water in the place in which the motor is intended to work in ordinary service. 35 Degree Centigrade

C) MOTOR

i) Ref. to BIS code	BIS 325-1978 read with Bis 900-1992 (latest) with upto date ammendments
ii) Type of enclosure of motor	SPDP(as per BIS 4691-1985 (latest)
iii) Type of duty	Continuous
iv) Mechanical out put in KW	Suitable for driving centrifugal 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.permmissible temp.rise of motor reqd. if different from given in B(viii) above	-
vii) Particulars of test reqd. & where they are to be conducted.	As per terms & conditions
Viii) Particulars as to whether voltage limiting divice will be employed	AtS/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 37.5KW, ATS between 37.5KW to 50KW & Stator rotor starter with slip ring motor beyond 50KW
xi) Motor whether squirrel cage or slipring	Squirrel cage/slipring Note:- Squirrel cage upto 65HP and slipring above 65HP
x) Details of shaft extension reqd.	Just sufficient to provide direct drive by flexible coupling to pump.
xi) Type of slip ring gear whether continously rated or for starting purposes only & whether to be fitted with brush lifting or short circuiting arrangements or both if interlocks are required.	Continously rated for squirrel cage/ Slipring motor
xii) Breakway torque in terms of rated load torque & the corresponding breakway staring current which may be taken from the supply with the starting apparatus in circuit.	Breakway torque to be given by the tenderer but the staring current should not exceed 2.5 times of the full load current.
xiii) Nature of load & any information regarding the driven machine which has a bearing upon the torque reqd.during the accelearted period, the kinetic energy of the moving parts to be acceleratated & No.of starts during a specified period.	To work the pump offered
xiv) Where possible fault capacity of the system to which the motor is connected.	The motor should be able to withstand initial currdent of 2.5 times the rated current for two minutes without suffering damages or permanent deformation.

D) PUMP (BIS 1520-1980)read with BIS 9137-1978 both latest with upto date ammendments

a) Nos of pumps reqd.	2 Nos. pumps one will act as stand by	
b) Spare parts required	For Two years normal maintenance as recommended	
c) Optional fittings reqd.	Air cock for exhausting air from each stage.	
E) PUMP OPERATING CONDITIONS		
i) Capacity	3.99 Lps of each pump	
ii) Total head in Mtrs.If total head is not known then following details be provided:-	491.20 Mtr.	
i)Static haad	465 Mtr.	
ii)Minimum depth of water	Positive suction	
iii)Variation in water level	---Mtrs	
iv)Ground level to max.level	---Mtrs	
v)Ground level to delivery point	---Mtrs	
vi)Pressure in the suction tank	-- Kg/ cm 3	
vii)Pressure in the delivery tank	-- Kg/ cm 2	
iii) Length of R/Main	1250 mtr.	
iv) Dia of R/Main	80 mm	
v) Drive arrangement	Direct through flexible coupling on a common base plate	
vi) Drive type	Electric driven	
vii) NPSH reqd.	To be quoted by the tenderer	
Viii) Limits of total head in which the pump is reqd. to operate.	(-) 25% to (+) 10% of total Head.	
ix) Suction/delivery size of pump	To be specified by the tenderer	
x) Efficiency of pump at	To be specified by the tenderer	
a) duty head		
b) (+)10% head		
c) (-)25% head		
xi) Material of construction	To be specified by the tenderer (manufacturer-s certificafto be appended)	
14 Supply of suitable oil immersed star delta starter/ATS/stator rotor starter of standared make such as MEI/Kilburn/Jyoti/Siemens conforming to BIS-8544-1979 leates with up to date ammendments for squirrel cage/slopring motor(make to be specified by the tenderers) mounted on panel board with magnetic type over load release & dashpot, time lag , under voltage release wfith initial oil filling.	2 Nos	Each

Note:- Star - delta - starter upto 37.5KW , ATS between 37.5KW to 50KW and stater rotor starter with slipring motor beyond 50KW.

15 Providing 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 Nos	Each
a) Ammeter AC supply,100mm circular dia1Auto electric/AE/IMP/Havells make of suitable range for above motor with selector switches conforming to BIS 1248-1983 latest with up to date ammendments.	2 Nos	Each
b) Voltmeter AC supply,100mm circular dia1Auto 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 Nos	Each
c) ICTP switches with HRC fuses Kilburn/Larsen & turbo/Standard/Siemen make and having capacity 30% extra of the operational rating of motor as BIS 4064-1978 with upto date ammendments immediately after the power meter of HPSEB.	2 Nos	Each
d) Busbar chamber having 3 copper bars of suitable rating for full length equal to wirthd of board of 3 live phases and one copper bar of half reating of full length for neutral conforming to BIS 8084-1976 and 11353-1985 read with 5578-1985 all latest with upto data ammendments.	1 Nos	Each
e) MCB/Oil circuit breaker of suitable capacity of Kilburn/LT/LK/MEI/Standard make on in coming feeder for motors offered by the tenderer conformaing to BIS 2516-1985 latest with upto date ammendments with neutral linked under voltage release.	1 Nos	Each
f) 3 phase indicating lamps complete with toggle switches for individual motors conformaing to BIS 3452 part I & II latest with up to date ammendments.	2 Sets	Each
g) Earth leakage circuit braker of reqecemended (Kilburn/L&T/MET/GEC as per BIS-2516-1977 with upto date ammendments and of suitable range with which should have control box , oprating handel and trip/rest bush button / off indicators, re-indicating off spring condition of the circuit braker for over current protection. The curcuit should be equipped with magnet thermal release with metallic tap CTS. It should also be fitted earth fault for tripping of breaker on occurance of earth fault on/of braker load side.	1 Nos	Each
h) Hour run meter of reputed make of digit capacity conforming to BIS-722(latest edition)/recommendation.	2 Nos	Each
i) Suitable three phase voltage monitor relay with all protections & usual indicators with electrical sirens against single phasing, no voltage, high voltage & overloading & phase voltage difference	1 Nos	Each

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| j) Change over Switch of reputed make & suitable capacity. | 1 Nos | Each |
| k) Single phase preventor of reputed make & suitable capacity. | 1 Nos | Each |
| 16 Supply of Kirloskar/ Kilburn/ IVC/ Fouress/Gled/BHEL/Leader/of reputed make of
(a) suitable size cast iron /cast steel double flanged sluice valve having size equal to delivery of pump and capable of with standing nominal seat pressure of 52kg/cm ² | 2 Nos | 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 21Kg/cm²) or class 300 ASA (seat pressure 52Kg/cm²) as per BS 1414(API 600).

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| (b) Supply of Kirloskar /Kilburn /IVC/ Fouress/ Gled/BHEL/Leader/of suitable size cast iron /cast steel double flanged swing check type reflux valve having bye pass arrangement & size equal to delivery of pump for withstanding nominal seat pressure of 52Kg/cm ² | 2 Nos | Each |
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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 cast steel conforming to class 150 ASA (Seat pressure 231Kg/cm²) or class 300 ASA (seat pressure 52Kg/cm²) as per BSI 1414 (API 600).

- | | | |
|--|-------|------|
| (c) Supply of Kirloskar/ Kilburn/ IVC/ Fouress/ Gled.BHEL/Leader 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 i.e of R/Main i.e 1.50.mm for withstanding nominal seat pressure of 52Kg/cm ² | 1 Nos | 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 cast steel conforming to class 150 ASA (Seat pressure 231Kg/cm²) or class 300 ASA (seat pressure 52Kg/cm²) as per BSI 1414 (API 600).

- | | | |
|--|-------|------|
| (d) Supply of Kirloskar/Jyoti/Standard/Kilburn make cast iron flanged screwed type foot valve with strainer of dia equal to dia of suction pipe conforming to BIS 4038-1986 or latest with up to date ammendments. | 2 Nos | Each |
|--|-------|------|

OR

Supply of Kirloskar/Jyoti/Kilburn/IVC/Kartar/leader /BHEL make cast iron flanged sluice valve having equal to dia of suction pipe capable of withstanding normal seat pressure of 52 kg/ cm² conforming to BIS 780-1984 with up to date ammendments in case of positive suction.

<p>17 P/L suitable size copper PVC insulated armoured power 3 1/2 core cable conforming to (a) BIS 1554(Part I)-1988 or latest with up to date ammendments Siemen/Gloster/ICC make from meter of HPSEB to OCB & from OCB to Busbar 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 ..</p>	1 Job	L.S
<p>b) P/L suitable size copper PVC insulated armoured power three core cable conforming to BIS 1554(Part I)-1988 or latest with up to date ammendments Siemen/ Gloster/ ICC make from switch to starter & starter to (one cable for carrying all three phases) including all other electrical equipment/ accessories such as thimbles, flexible pipes, solder,nuts & bolts, cable glands etc. laid in pipes or trenches under floor. The type ,size & make will be subject to approval of HPSEB athorities. In case of non acceptance by HPSEB authorities it shall have to be replaced by the tender free of cost .</p>	1 Job	L.S
<p>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 ammendmentsfor above motors & other electrical equipment.</p>	1 Job	10000 L.S
<p>d) Supply & errection of floor/wall mounted power factor capacitor conforming to BIS 2834-1986 latest with upto date ammendment BHEL/ GEC/ Machneil/ Masger/ Bajaj make to raise the pervailing power factor at site to 0.95 for direct connection to induction motor individually, or requird KVAR according to Himachal Pradesh of motor offered including cable siemens/ Gloster/ICC make from busbar chamber to capacitor & also including LT/LK/Kilburn make ICTP switches conforming to BIS 4064-1978 or latest with HRC fuses (Range to be specified by the tenderer.</p>	2 Nos	Each
<p>18 Supply of standard make 100mm dia circular dial pressure of suitable range Fiebeg/ Bourden/Precision make with all accessories such as stop cock, copper tubing etc. conforming to BIS 3624-1987 latest with up to date ammendments.</p>	2 No.	Each

19 P/L suction,delivery pipe considering site requirements , NPSH required & available & common header having area equal to 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 up to 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 presure indicated in item no. Ie(ii). BIS 4064-1978 or latest with HRC fuses (Range to be specified by the tenderer.

1 Job

L.S

NOTE:- Actual laying to be done as per final drawings to be approved by the Engineer in charge

20 Supply of antivibration pads conforming to BIS 6337-1971 or latest with up to date ammendmentsof suitable size for above machinery.

2 Sets

Each

21 Errection of all equipments from S.No. 13 to 16, 18 & 20 i/c cost of tees, bends tapes &any other fittings required as per site conditions & as per directions of Engineer-in-Charge.

1 Job

L.S

Stage--- 2nd

22 Supply of horizontal spindle,horizontal split casing Single/Multistage centrifugal pumps of standard make such as KSB/Mathar & Platt/ Jayoti/ Kirloskar confirming to BIS 1520-1980 (latest with upto date ammendments) read with BIS 9137-1978 or latest to handle raw water having turbidity 50 ppm. with impelleres,casing ring & shaft sleeves of bronze, shaft of steel with cast iron casing of suitable capacity coupled directly through a flexible coupling on a common base plate to Kirlokar/NGEF/Crompton/ Siemen/ Jyoti slip ring/ squirrel cage screen protected drip proof electric induction motor suitable for operation on the data given below.

2x35 =70 HP

Per HP

A) SITE CONDITIONS

i) Location of site

ii) The altitude of place in which the motor is intended to work in ordinary service if it

1963 Mtr.

iii) Humidity

Weather generally remains humid during monsoon season.

iv) Nature of atmosphere

As normally encountred in Shivalik Range

v) Detail of quality of water

Clear cold water

vi) Water free from sand or not

Yes

vii) Water corosive or not

Not

viii) Turbidity (if any)

Upto 50 PPM

ix) NPSH available

Positive suction

x) Any other information or requirement

B) OPERATING CONDITIONS

- i) Type of current AC three / single phase
- 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) No. of working hours per day 8 hours
- vi) Speed of revolution in RPM To be quoted by tenderer
- vii) Direction of rotation To be quoted by tenderer
- Viii) The max. Temp. of cooling air & water in the place in which the motor is intended to work 35 Degree Centigrade

C) MOTOR

- i) Ref. to BIS code BIS 325-1978 read with Bis 900-1992 (latest) with upto date ammendments
- ii) Type of enclosure of motor SPDP(as per BIS 4691-1985 (latest)
- iii) Type of duty Continuous
- iv) Mechanical out put in KW Suitable for driving centrifugal 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.
Class -B-
-
As per terms & conditions
- v) Class of insulation
- vi) Max. permissible temp. rise of motor reqd. if different from given in B(viii) above
- vii) Particulars of test reqd. & where they are to be conducted. AtS/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 37.5KW, ATS between 37.5KW to 50KW & Stator rotor starter with slip ring motor beyond 50KW
- Viii) Particulars as to whether voltage limiting device will be employed Squirrel cage/slipring Note:- Squirrel cage upto 65HP and slipring above 65HP
Just sufficient to provide direct drive by flexible coupling to pump.
- xi) Motor whether squirrel cage or slipring
- x) Details of shaft extension reqd.
- xi) Type of slip ring gear whether continously rated or for starting purposes only & whether to be fitted with brush lifting or short circuiting arrangements or both if interlocks are required. Continously rated for squirrel cage/ Slipring motor

- xii) 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.
- xiii) Nature of load & any information regarding the driven machine which has a bearing upon the torque reqd.during the accelearted period, the kinetic energy of the moving parts to be accelerared & No.of starts during a specified period. To work the pump offered
- xiv) Where possible fault capacity of the system to which the motor is connected. The motor should be able to withstand initial currdent of 2.5 times the rated current for two minutes without suffering damages or permanent deformation.

D) PUMP (BIS 1520-1980)read with BIS 9137-1978 both latest with upto date ammendments

- a) Nos of pumps reqd. 2 Nos. pumps one will act as stand by
- b) Spare parts required For Two years normal maintenance as recommended
- c) Optional fittings reqd. Air cock for exhausting air from each stage.

E) PUMP OPERATING CONDITIONS

- i) Capacity 2.85 lps for each pump.
- ii) Total head in Mtrs. If total head is not known then following details be provided:- 450.44 Mtr.
- i)Static head 435 Mtr.
- ii)Minimum depth of water Positive suction
- iii)Variation in water level ----Mtr.
- iv)Ground level to max.level ----Mtr.
- v)Ground level to delivery point ----Mtr.
- vi)Pressure in the suction tank ---Kg.cm/2
- vii)Pressure in the delivery tank .
- iii) Length of R/Main 1250 Mtr.
- iv) Dia of R/Main 80 mm
- v) Drive arrangement Direct through flexible coupling on a common base plate
- vi) Drive type Electric driven
- vii) NPSH reqd. To be quoted by the tenderer
- Viii) Limits of total head in which the pump is reqd. to operate. (-)25%to(+)10%of total head.
- ix) Suction/delivery size of pump To be specified by the tenderer
- x) Efficiency of pump at To be specified by the tenderer
- a) duty head
- b) (+)10% head
- c) (-)25% head
- xi) Material of construction To be specified by the tenderer (manufacturer-s certificafto be appended)

<p>23 Supply of suitable oil immersed star delta starter/ATS/stator rotor starter of standard make such as MEI/Kilburn/Jyoti/Siemens conforming to BIS-8544-1979 latest with up to date amendments for squirrel cage/slipring 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.</p>	2 Nos	Each
<p>Note:- Star - delta - starter upto 37.5KW, ATS between 37.5KW to 50KW and stator rotor starter with slipring motor beyond 50KW.</p>		
<p>24 Providing 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.</p>	1 Nos	Each
<p>a) Ammeter AC supply, 100mm circular dial Auto electric/AE/IMP/Havells make of suitable range for above motor with selector switches conforming to BIS 1248-1983 latest with up to date amendments.</p>	2 Nos	Each
<p>b) Voltmeter AC supply, 100mm 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 amendments.</p>	1 Nos	Each
<p>c) ICTP switches with HRC fuses Kilburn/Larsen & turbo/Standard/Siemens make and having capacity 30% extra of the operational rating of motor as BIS 4064-1978 with up to date amendments immediately after the power meter of HPSEB.</p>	2 Nos	Each
<p>d) Busbar chamber having 3 copper bars of suitable rating for full length equal to width of board of 3 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 up to date amendments.</p>	1 Nos	Each
<p>e) MCB/Oil circuit breaker of suitable capacity of Kilburn/LT/LK/MEI/Standard make on incoming feeder for motors offered by the tenderer conforming to BIS 2516-1985 latest with up to date amendments with neutral linked under voltage release.</p>	1 Nos	Each
<p>f) 3 phase indicating lamps complete with toggle switches for individual motors conforming to BIS 3452 part I & II latest with up to date amendments.</p>	2 Sets	Each

g) Earth leakage circuit breaker of recommended (Kilburn/L&T/MET/GEC as per BIS-2516-1977 with upto date amendments and of suitable range with which should have control box , operating handle and trip/reset button / off indicators, re-indicating off spring condition of the circuit breaker for over current protection. The circuit should be equipped with magnet thermal release with metallic trip CTS. It should also be fitted earth fault for tripping of breaker on occurrence of earth fault on/of breaker load side.	1 Nos	Each
h) Hour run meter of reputed make of digit capacity conforming to BIS-722(latest edition)/recommendation.	2 Nos	Each
i) Suitable three phase voltage monitor relay with all protections & usual indicators with electrical sirens against single phasing, no voltage, high voltage & overloading & phase voltage difference	1 Nos	Each
j) Change over Switch of reputed make & suitable capacity.	1 Nos	Each
k) Single phase preventer of reputed make & suitable capacity.	1 Nos	Each
25(a) Supply of Kirloskar/ Kilburn/ IVC/Fouress/ Gled/ BHEL/Leader/of reputed make of suitable size cast iron /cast steel double flanged sluice valve having size equal to delivery of pump and capable of with standing nominal seat pressure of 52kg/cm ²	2 Nos	Each
NOTE:- The sluice valve shall conform to BIS 780-1984 latest with up to date amendments. 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 21Kg/cm ²) or class 300 ASA (seat pressure 52Kg/cm ²) as per BS 1414(API 600).		
(b) Supply of Kirloskar/ Kilburn/ IVC/ Fouress/ Gled/BHEL/Leader/of suitable size cast iron /cast steel double flanged swing check type reflux valve having bye pass arrangement & size equal to delivery of pump for withstanding nominal seat pressure of 52Kg/cm ²	2 Nos	Each
NOTE:- The reflux valve shall conform to BIS 5312-1984 (part I) latest with up to date amendments. However if the seat pressure exceeds the limits prescribed in BIS 5312 then the reflux valves shall be cast steel conforming to class 150 ASA (Seat pressure 231Kg/cm ²) or class 300 ASA (seat pressure 52Kg/cm ²) as per BSI 1414 (API 600).		
(c) Supply of Kirloskar/ Kilburn/ IVC/Fouress/ Gled.BHEL/Leader 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 i.e of R/Main i.e 1.50mm for withstanding nominal seat pressure of 52Kg/cm ²	1 Nos	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 cast steel conforming to class 150 ASA (Seat pressure 231Kg/cm²) or class 300 ASA (seat pressure 52Kg/cm²) as per BSI 1414 (API 600).

- (d) Supply of Kirloskar/Jyoti/Standard/Kilburn make cast iron flanged screwed type foot valve with strainer of dia equal to dia of suction pipe conforming to BIS 4038-1986 or latest with up to date ammendments. 2 Nos Each

OR

Supply of Kirloskar/Jyoti/Kilburn/IVC/Kartar/leader /BHEL make cast iron flanged sluice valve having equal to dia of suction pipe capable of withstanding normal seat pressure of 52 kg/ cm² conforming to BIS 780-1984 with up to date ammendments in case of positive suction.

- 26 P/L suitable size copper PVC insulated armoured power 3 1/2 core cable conforming to (a) BIS 1554(Part I)-1988 or latest with up to date ammendments Siemen/Gloster/ICC make from meter of HPSEB to OCB & from OCB to Busbar 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 L.S
- b) P/L suitable size copper PVC insulated armoured power three core cable conforming to BIS 1554(Part I)-1988 or latest with up to date ammendments Siemen/Gloster/ICC make from switch to starter & starter to (one cable for carring all three phases) including all other electrical equipment/ accessories such as thimbles, flexible pipes, solder,nuts & bolts, cable glands etc. laid in pipes or trenches under floor. The type ,size & make will be subject to approval of HPSEB athorities. In case of non acceptance by HPSEB authorities it shall have to be replaced by the tender free of cost . 1 Job L.S
- c) P/L double loop earthing with crpper 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 ammendmentsfor above motors & other electrical equipment. 1 Job L.S

d) Supply & erection of floor/wall mounted power factor capacitor conforming to BIS 2834-1986 latest with upto date ammendment BHEL/GEC/Machneil/Masger/Bajaj make to raise the pervailing power factor at site to 0.95 for direct connection to induction motor individually, or requird KVAR according to Himachal Pradesh of motor offered including cable siemens/ Gloster/ICC make from busbar chamber to capacitor & also including LT/LK/Kilburn make ICTP switches conforming to BIS 4064-1978 or latest with HRC fuses (Range to be specified by the tenderer.	2 Nos		Each
27 Supply of standard make 100mm dia circular dial pressure of suitable range Fiebeg/Bourden/Precision make with all accessories such as stop cock, copper tubing etc. conforming to BIS 3624-1987 latest with up to date ammendments.	2 No.		Each
28 P/L suction,delivery pipe considering site requirements , NPSH required & available & common header having area equal to 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 up to 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 presure indicated in item no. Ie(ii). BIS 4064-1978 or latest with HRC fuses (Range to be specified by the tenderer.	1 Job		L.S

NOTE:- Actual laying to be done as per final drawings to be approved by the Engineer in charge

29 Supply of antivibration pads conforming to BIS 6337-1971 or latest with up to date ammendmentsof suitable size for above machinery.	2 Sets	NR	Each
30 Errection of all equipments from S.No. 22 to25 ,27 & 29 i/c cost of tees, bends tapes & any other fittings required as per site conditions & as per directions of Engineer-in-Charge.	1 Job		L.S

**Terms and conditions
R/Main**

Total :-

- i) Laying of pipes shall be strictly as per specification & depth of trenches will be measured after laying of pipes from bottom of pipes.
- ii) Abrupt changes in gradient and alignment to suit the convenience to contractor shall not be entertained
- iii) Before filling the trenches entire pipe line shall be tested for any leakage of joints by plugging it at end and filling water and in case of leakage it shall be set right by the contractor with out any damage to the pipes.
- iv) The re-filling of trenches shall be restored to only after obtaining written order from the concerned Assistant Engineer and it shall be done carefully without any harm to the pipe lines
- v) Inspection of MSREW pipes shall be got carried out before dispatch from manufacture store/Ex-factory as under :

- (i) Inspection will be carried out from the third party nominated by department through ADG(GA)DGS&D New Delhi or inspection agencies born on DGS & D authorized list for inspection like.
- (a) RITES (b) SGS (c) LLOYDS (d) BUREAW VARITS
- (e) DETNORSAKE VARITAS etc. any cost involve in this connection and as per directions of the Engineer in Charge.
- vi) The work will be executed as per HP IPH specification and as per directions of the Engineer in Charge.
- vii) Nothing shall be paid to the contractor for rejected work/material
- viii) Any dispute item arising at site of work will be settled by the contractor himself at his own cost. No compensation shall be paid to the contractor/firm for delay due to dispute at the site of work.
- ix) GI pipe and HDPE pipes will be issued to contractor by the department free of cost from divisional store at "Pucca-pathar". Other fittings such as Union / Elbow / Tees/ joints bends etc. for HDPE pipes will be procured by the contractor .and nothing extra shall be paid to him on this account.In case pipes becomes surplus and do not handed over to the department recovery will be mark at double of issue rates as under.
- x) Final payment shall be made only after testing of pipe line/joint.
- xi) Contractor will be responsible for watch and ward of his material during execution.
- xii) The contractor shall arrange all the MSERW pipe at site of work before start of work.
- xiii) Any road crossing/street crossing will be executed by the contractor at his own cost and nothing shall be paid extra by the department for cutting of hard road source.
- xiv) Pipe shall be ISI marked and name of manufacture shall be engraved on the pipe.
- xvi) In case pipes to be laid along road, reflective diversion and caution sign boards shall be provided by the contractor at his own cost along the excavated trenches in the stretches where such work is to be taken up.
- xvii) Welding :-
- (a) The electrode to be used for welding shall confirm to BIS:814 and shall be of standard make like "Advani" etc. as approved by Engineer in Charge.
- (b) Flanges shall be welded on to the pipes with fillet weld having sufficient width as per directions of Engineer in Charge.
- (c) Seal welding shall be provided to all flanges with at least two passes using 3mm electrode.
- xviii) Gaskets :-
- Compressed asbestos fiber (CAF) gasket 3mm thick confirming to relevant BIS specifications with upto date amendments, suitable for working pressure of 25Kg/ cm² shall be only be used.
- xix) Bolts :-
- (a) Bolts shall be of high carbon steel confirming to BIS 1364 (latest with upto date ammendments)
- (b) In case the pipe with design thickness as provided in the schedule of quantity is not readily availlable/ manufactured, the next higher thickness of pipe available shall be provided without extra cost.
- xx) Bends :-
- (a) Bends for pipes shall be fabricated from the parental tubes to be used in respective RD's Bends should be smooth having sufficient radius of curvature, keeping frictional losses of minimum as per directions of Engineer in Charge, preferably these bends should be factory make from pipes having required grade as per NIT.nothing extra is payable.
- (b) All cut ends of the pipes shall be bevelled properly prior to welding operation.
- (c) The circumferential butt welding wherever required for the fabrication of bends and others special shall be acomplished with three weld layer using 3 mm & 4 mm dia elctrode after beveling the pipes ends.
- (d) The firm shall make all the arrangements for working night hours(required) & nothing extra shall be paid for this

- (e) The firm has to give its working schedule for various components before start of work and get same approved from Engineer in Charge
 - (f) The rate of the all items be inclusive of carriage of all the material with in all leads and lifts upto the site of work.
 - xxi) The contractor should have experience for execution of similar work
 - xxii) The contractor shall be responsible for any loss/damage/theft of material while in his custody.
 - xxiii) The energy charges for running the scheme after commissioning shall be paid by the department.
- 3 Pumping Machinery
- i) The firm shall forward a copy of supply order/indent placed by it for the supply of pumps and motors on the manufactures/authorized dealers of the pumps and motors to the consignee with in 30 day after issue of the letter of indent/award by the Engineer-in-Charge. The copy or supply order/Indent to the consignee should also accompany the dealership certificate. Of the dealer for the pumping machinery in case the pumps and motors are arranged from the authorized dealer
 - ii) The firm shall arrange dispatch of offered pumps and motors to the consignee direct from the manufactures/their authorized dealer of the pumping machinery for which the supply order/Indent has been placed by the firm. The packing slip should indicate the details of materials in the package and material of construction of pumps and motors.
 - iii) The Shop Test for the pumps and motors shall be carried out at manufacture's works in the presence of representative of the department as per IS: 325-1978. The test performance certificate of the pumping machinery shall be arranged by the firm from the manufactures and get it approved from the Engineer-in-Charge before actual dispatch of the pumping machinery.
 - iv) The firm shall supply the recommended list of spares and quantities required for normal working of pumping machinery (2 years) from the manufactures of the aforesaid equipment at the time of quoting rates and shall quote item rates for the same also.
 - v) The firm shall supply the manufacture's manuals for the operation and maintenance of the pumping equipments
 - vi) The characteristic curves of the pumping equipment shall be supplied with the offer, otherwise the tender shall be rejected.
 - vii) The firm shall supply layout drawing in respect of various components such as suction pipes, valves, cable trenches, control panel etc. from the foot valve location of the common header which shall extend up to 5 meter from the outer wall of the pump house towards rising main. The details of foundations required for various components shall also be supplied by the firm within 30 days of the letter of indent/award.
 - viii) The installation of pumping machinery above 100HP shall be inspected by the technical representative of the manufactures of rank not less than that of a service engineer, at the work site and inspection certificate shall be supplied to the Engineer-in-Charge. This inspection shall be in addition to the test report and nothing extra shall be paid on this account
 - ix) The firm/contractor shall also construct/lay the foundation of pumping machinery as per approved design of Manufactures/Deptt. and also make good the civil works damaged during installation of pumping machinery.
 - x) The wiring and installation of electric equipment shall be as per HPSEB rules and regulations & subjected to the approval of the Chief Electrical Inspector and or his authorized officer. Any defect pointed out shall be rectified by the firm without extra cost. The wiring and installation of all electric equipment shall be done by a licensed contractor of approved class of HPSEB authorized on their approved format (form D) for release of power connection by the firm without extra cost.
 - xi) The temporary electrical connection, if required during installation shall be arranged by the firm at its own cost and energy charges shall also be paid directly by the firm to the HPSEB
 - xii) Prices of all the items shall be for site of work inclusive of all leads, lifts and all charges of transportation, insurance, packing, taxes and duties such as sale tax, excise duty and local taxes extra.
 - xiii) The rates shall be quoted only on the format of schedule of quantities which is attached with the tender document giving all specified data so desired there in.
 - xiv) The rates offered for the specified make in the schedule of quantities only shall be considered rates quoted for part and or non specified makes shall lead to rejection of the tender.

- xv) The site of work is located at 50 Km by mechanical transports and 0.5 Km by head load from head quarter. The rates quoted by the firm shall be inclusive of all mechanical and manual transport with in all leads and lifts.
- xvi) All the equipment/material shall conform to the relevant BIS specifications wherever applicable and in its absences to any accepted National/International standards.
- xvii) The general specifications of work shall conform to PWD HPPWD specifications as per direction of the Engineer-in-Charge.
- xviii) The validity of the tender shall be as mentioned in the DNIT
- xix) All the equipment shall be guaranteed, against any manufacturing defect including metallurgy and its performance for a period of 60 (sixty) months from the date of commissioning. Any defect if noticed within the stipulated period shall be rectified by the firm at its own cost within 15 days of bringing the same to its notice. The guarantee clause shall be substantiated by the guarantee bond of a Nationalized Bank for an amount equal to the cost of pumping and electric equipment (accessories included) pledged in the name of the Executive Engineer, in charge at the time of supplying for refund of security deposits. The guarantee bound shall be released after the expiry of guarantee period.
- xx) The installed pumping machinery and other allied accessories shall be tested daily for stipulated pumping hours in the NIT for a period of seven day without extra cost. However the cost of electricity and water shall be borne by the department. During the guarantee period efficiency of the pumping and the electric equipment should not vary beyond the range of (+/-) 2.5%, if during guarantee period, the efficiency falls beyond 2.5% to a maximum of 5% 1% cost of the pump set for 1% fall of the efficiency shall be deducted. In case of fall of efficiency beyond 5% the pump set shall be rejected and cost of the effected pump set recovered from the pledged Bank guarantee & or from the security deposit as the case may be.
- xxi) 80% (Eighty percent) payment of the cost of pumping machinery and equipment less 10% security and other statutory recovery shall be made after receipt of complete pumping machinery i.e. pump and motor received together at site of work in good condition. The balance 20% cost after deduction of the security and other recoveries shall be release after successful and satisfactory installation and testing of the entire equipment. The percent security deposit shall be release as stipulated in the agreement.
- xxii) 90% (ninety percent) installation charges shall be released after satisfactory installation of all the pumping and electrical equipment remaining 10% of installation charges shall be release after testing of the entire equipments.
- xxiii) The class of pipes for common header/suction shall be of same specification as the class of pipe provided by department immediately after pump house or as approved by the Engineer-in-Charge.
- xxiv) Departmental reserves the right to award part of the work to any contractor.
- xxv) The enegy charges for running the scheme after commissiong shall be paid by the department.
- xxvi) 1% labour cess shall be deducted from bill.
- xxvii) Income tax and sale tax shall be deducted as per prevailing market rates.

Executive Engineer,
I&PH Division,Jubbal.