

If either party considers that any circumstances of Force Majeure have occurred which may affect performance of his obligations, he shall promptly notify the other party.

(iv) Performance to Continue

Upon the occurrence of any situation of Force Majeure, the Contractor shall endeavor to continue to perform his obligations under the Contract so far as reasonably practicable. The Contractor shall notify the Engineer-in-Charge of the steps he proposes to take including any reasonable alternative means for performance, which is not prevented by Force Majeure. The Contractor shall not take any such steps unless directed so to do by the Engineer-in-Charge.

Clause – 35 Default

(i) Notice of Default

If the Contractor is not executing the Works in accordance with the Contract or is neglecting to perform his obligations there under so as to seriously affect the carrying out of the Works, the Engineer-in-Charge may give notice to the Contractor requiring him to make good such failure or neglect.

(ii) Contractor's Default

If the Contractor;

- a) has failed to comply, within a reasonable time, with a notice under **Sub-Clause (i)** of this **Clause**, or
- b) assigns the Contract or subcontracts the whole or part of the Works without the PHPA-II's written consent, or
- c) becomes bankrupt or insolvent, has a receiving order made against him or compounds with his creditors, or carries on business under a receiver, trustee or manager for the benefit of his creditors or goes into liquidation, the PHPA-II may, after having given **seven (7) days' notice** to the Contractor, terminate the Contract and expel the Contractor from the site. Any such expulsion and termination shall be without prejudice to any other rights or powers of the PHPA-II under the Contract.
The PHPA-II may upon such termination, complete the Works itself or by any other Contractor.

(iii) Valuation at Date of Termination

The Engineer-in-Charge shall, as soon as possible after such termination, certify the value of the Works and all sums then due to the Contractor as at the date of termination in accordance with **Clause –31 Payment Terms & Mode of Payment** hereof.

(iv) Payment after Termination



The PHPA-II shall not be liable to make any further payments to the Contractor until the Works have been completed and the Defects Liability Period is over. The PHPA-II shall be entitled to recover from the Contractor the extra costs, if any, of completing the Works after allowing for any sum due to the Contractor under **Sub-Clause (iii)** of this **Clause**. If there is no such extra cost, the PHPA-II shall pay any balance due to the Contractor.

Clause –36 Compliance with Tax laws

- iii) The Royal Government of Bhutan shall exempt taxes, levies/duties for plant, construction materials & equipment, machineries and services imported for direct use in the construction of the Project. Any procurement made under tax exemption basis shall be liable for tax payment as per the Tax Act of the Kingdom of Bhutan if disposed off in Bhutan.
- iv) Any contractor recruited in connection with the Project will be liable for tax in Bhutan as per the Income Tax Act of the Kingdom of Bhutan, 2001.

Clause – 37 Resolution of Disputes

The PHPA-II and the Supplier shall make every effort to resolve amicably by direct informal negotiation any disagreement or dispute arising between them under or in connection with the Contract. In the event the parties to the Contract are unable to resolve the dispute, the Arbitration procedure in accordance to with the Alternative Dispute Resolution Act of Bhutan 2013 shall be adopted.



SECTION IV – TECHNICAL SPECIFICATIONS



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1. Specification and Application:

Submersible Dewatering Pump Motor sets shall be used for Dewatering of seepage water from sump well of Dam of Punatsangchhu-II HEP, Bhutan. The Motors shall be of continuous duty. Water shall be lifted from the respective sump and discharged above the Maximum Tail Water Level. Pumps shall be Energy efficient with low power input.

The submersible pumps shall be designed for the following hydraulic condition:

Sl. No.	Description	Qty.	Discharge (For each pump)	Discharge Head
1	Submersible Pump for Dewatering system (2 nos. Main shall act simultaneously and 2 nos. will be stand by)	4(Four)	3000 lpm	60 m
3	Spares for Submersible Pump for Dewatering system (table no - 2)	One set	-	-

Other Technical Specifications:

Type of delivery connection	Flanged connection after every three meters with holes as per Class 150
Fluid to be pumped	The project is located along the Punatsangchhu river in Wangduephodrang Dzongkhag in Western Bhutan, where silt content would generally be high during normal flow periods and going to be very high during flood period. Water contains high content of sediment particles such as quartz, traces of mica, opaque and other rock fragments etc.
Ambient Temperature	Max: 35°C, Min: 4°C

2. Type and Construction of the Submersible Pump:

2.1 The dewatering pump sets should be of KSB/ Aqua/ Calama/ Johnston/ Crompton/ BS/ SABAR/ Oswal/ Kirloskar/ Mather & Platt make conforming to latest relevant BIS Code 8034:1975. The pump should have Bronze impeller of suitable alloys as per BIS 5659-1970 with latest amendments (if any) suitable for handling raw water, having water lubricated bearing bush and stainless steel shaft with stator on motor side and with soft protection sleeve on pump side ensuring better life for shaft coupled to a submersible squirrel cage electric induction motor (water proof type) of required HP (90 HP), RPM 2900 KSB/Aqua/SU make conforming to BIS 9283-1979 latest with up to date amendments, totally dust and water proof for submersible duly isolated from the pump by intermediate casing with double mechanical seal in oil chamber and grease packed lubricated to with stand long vertical loads with minimum wear and tear. It should also be fitted with a device to take up expansion of water with the heating of motor. The pump should include water level guards, erection clamps, cable clips and depth gauge with up to date amendments. It should include cost of bearing nuts bolts and painting etc. The pumping machinery should be installed and anchored properly. All electrical

equipment such as Starter, ICTP switches, MCB, Bush bar chamber, MCB, Panel board indicating lamps, Ammeter, Voltmeter, Hour run meter should be of electronic type, incoming and outgoing water proof cable for panel board to be installed in Pump Chamber at EL.782.50m of Dam. Double loop earthing, copper cable, pressure gauge, capacitor, common header, sluice valve, 150mm GI pipe fitted NRV connecting pump with common header including erection and testing complete involving all wear and tear at the time of erection and testing. The work should be completed to the entire satisfaction of the Engineer-In-Charge. The rates shall be for complete job to run the machinery in proper working and should meet with the requirements. Discharge to be handled by each pump = 50LPS, Gross Head =60mtrs. To number of pumps will be working at a time with two as standby.

- 2.2 The Pump Impeller, shaft, shaft key and fasteners shall be of Cast Stainless Steel and casing shall be of Rugged cast Iron. The pump shall properly be dynamically balanced along with all other rotating parts on proper balancing equipment to prevent vibration, before and after assembly. The pump shall be self priming type and directly coupled to the Driving Electric Motor. It shall be robust in construction and suitable for starting torque, jerks and thrust that may develop during starting and stopping operations. The pump shall also be suitable for frequent start and stop operations. Pump set components shall be cavitation free.
- 2.3 The impellers and internal water path shall be smooth and designed for high efficiency.
- 2.4 Impeller and motor shaft shall be of ample size to withstand starting / stopping jerks and axial thrust. These shall be of Stainless Steel to have corrosion resistance in addition to strength required. Seals of suitable design, preferably twin type mechanical seal shall be provided to prevent water from entering in to the bearing.
- 2.5 Impeller shaft bearing and motor bearings shall be designed to carry all the thrust and shock load that could be imposed by the pump and shall be capable to withstand unbalanced force develops during operation in addition to normal loading. The bearings shall be antifriction type without any cooling water requirement at the time of starting. The bearing shall be capable of dry start without any pre-lubrication and cooling water requirement. The supplier shall be responsible and have to undertake a guarantee for the proper function of bearing and safe operation of the pump motor sets.
- 2.6 Discharge Casing shall be of Rugged cast iron or better and to be supplied with suitable Stainless Steel bolts. Discharge casing, if required, shall be provided with an Expander Piece for connecting discharge of Pump casing to 200NB or one size higher than the delivery size of the pump whichever is greater and shall be in the scope of supplier.
- 2.7 Discharge casing of each pump shall be hydraulically pressure tested at a pressure of 1.5 times of the maximum design pressure at supplier's/manufacture workshop. The test certificates shall be furnished to PHPA-II.



- 2.8 The pump shall be provided with automatic backwash suction strainer which shall be of Stainless steel to prevent entry of foreign materials above 6mm. The flow area of mesh opening shall not be less than 2 (two) times the area of suction inlet.
- 2.9 For ease of maintenance, all pumps shall be provided separately with Auto Setter coupling, all shall be in the scope of supplier. For ease of lifting of pumps from the sumps, interchangeable shackles at 3m regular intervals to be provided in the chain.
- 2.10 All materials used for pump components shall be suitable for operation in raw river water. The material of pump parts, bearing type, arrangement and method / type of cooling / lubrication of bearing shall be suitable for raw river water.
- 2.11 General Arrangement of pumps shall be as per enclosed drawing under Section-VIII. The supplier shall also furnish the Technical particulars of all pumps as per **Data Sheet 1: For Pumps** under the same section.
- 2.12 Minimum submergence for start and stop shall not be more than 750mm. Continuous operation of pump motor set to be considered for the above minimum submergence. Requirement of cooling jet to be evaluated considering running time of pump, approximately 15 minutes.
- 2.13 Overall Pump-Motor efficiency shall be more than 70% at duty point. Maximum efficiency at other points shall not be considered.
- 2.14 **Refer Table-1 for Material Specification.**
3. Electric Motor:
- 3.1 Construction shall, generally conform to BIS 9283-1979.
- 3.2 RPM shall preferably be 2900.
- 3.3 Each pump shall be provided with an energy efficient electric motor of suitable capacity for the duty specified. Motor rating shall be at least **20% in excess** of maximum brake horsepower required in the entire range of pump operation. It should be suitable for continuous duty.
- 3.4 The motor shall be designed for $415 \pm 10\%$ volts, 3-phase, $50 \text{ Hz} \pm 5\%$, A.C. supply and working temperature up to 130°C .
- 3.5 The motor shall also be capable of operation for a period of not less than 5 minutes with a voltage of 25% below nominal voltage at nominal frequency without injurious overheating. The starting current at full voltage shall not exceed 6 (six) times the full load current.
- 3.6 The motor shall be totally enclosed damp proof squirrel cage induction type with Class 'F' insulation, but the temperature rise shall be limited to that of Class 'B' insulation at 10 % continuous overload above rated load condition.
- 3.7 Degree of protection shall be **IP68** as per relevant Indian / International Standards.
- 3.8 The motor shall be suitable for **STAR-DELTA** starting.
- 3.9 The starting torque of the motor shall be suitable for the pump application. The motor shall be suitable for frequent start and stop duty.



- 3.10 The pump-motor service factor shall be 1.15.
- 3.11 Supplier shall have to supply minimum 50 m long copper flexible cable along with the motor. Cable size should be 1.5 times of calculated size after considering all de-rating factor in sizing calculation.
- 3.12 Due to constraints in transportation, handling, installation and de-installation during repair & maintenance, Detachable type and joint free cable is preferred.
- 3.13 However, in case of difficulty in providing detachable type & joint free cable, a water proof junction box or water proof sealing of cables may also be considered as secondary option with sufficient length (appx. 30 m) of cable fixed to the pump. In such case, remaining length of cable of all pumps may be clubbed and supplied in straight length.
- 3.14 Irrespective of type of cable arrangement i.e. either joint free type or with water proof junction box type or with water proof sealing type with IP68 class protection, supervision & installation of joining, fixing, sealing of cables with pumps and from pumps to respective control panels at **PHPA-II site** shall be in the **scope of supplier**.
- 3.15 The size/selection of the cable should be such that, in normal condition, the voltage drop is not be more than 5%, & in starting condition, it should not be more than 10%.
- 3.16 The motor shall have built-in moisture detector along with discrete signal convertor to give 4 no. potential free contacts for alarm SCADA control in starter panel.
- 3.17 The motor shall have built-in thermistor along with discrete signal to give 4 no. potential free contacts for alarm SCADA control in starter panel.
- 3.18 The contacts from thermistor & moisture detector shall be used in starter panel for switching of pumps.
- 3.19 Each pump / motor shall be provided with lifting lugs for handling purpose.
- 3.20 The motor terminal box shall have water tight cable entry arrangement and firmly fixed to the motor frame. The terminal studs shall be so sized as to be adequate for current duty required and shall be identifiable. Supplier shall give details of terminal arrangement and terminal size in the technical offer.
- 3.21 Each motor shall be provided with suitable space heaters with necessary protection to facilitate the heating of the motor when it is not running or to restart after a prolonged shutdown. The details of heaters, the voltage, current rating and connection details shall be furnished in the technical offer.
- 3.22 Each motor shall be tested at manufacturer's workshop to confirm compliance with the requirements. Each motor shall be tested for IR & HV, no load running, locked rotor and reduced voltage running etc. The supplier shall have to furnish Test Certificates for routine tests (for each motor) and type test (for the batch). The supplier shall also have to furnish the Technical particulars of the motor as per Data Sheet 2: Electric Motors under this section.

4. Control Panel System:

Control Panel system should have a complete Automation System at Dam Control Building for all the submersible pumps with the following features:

- i) Control System.



- ii) Manual/Automation/on-off switch for manual/automatic operation of pumps.
- iii) Remote/Local selector switch.
- iv) Drainage pump selector switch.
- v) Start/stop push button.
- vi) Emergency stop push button.
- vii) Lamp Test push button.
- viii) Drainage pump running.
- ix) Drainage water no flow.
- x) Drainage water level Max/Min.
- xi) Pumps inlet choked.
- xii) Other required indication and control and current/voltage measurement.

4.1 Detail scope of the Control Panel System

- a) Providing suitable digital pressure gauge ISI marked = 2.00 Nos.
- b) Supply of digital soft starter of Allen Bradely/ MEI/ Kilburn/ Joyoti/ Siemens/ S&S of heavy-duty application of suitable rating constant current torque control starting from comprehensive motor protection with large LCD key pad mounted on panel board & built in rear time clock complete suitable for above motor starter. The starter shall be of suitable rating and compatible to automation = 4.00 Nos.
- c) Providing M.S sheet 16 SWG steel fabricated floor mounted closed almirah type switch board powdered coated rust proof including angle iron post of suitable height and size ISA 65x65x6mm duly painted comprising and capable of mounting the following accessories with all internal electric connections. Note:- The drawing of panel board shall be subject to approval of Engineer-In-Charge = 2.00 No.
- d) Ammeter of required capacity AC supply, 100 mm square dial Auto electric/IMP/Havells make of suitable range for above motor with selector switches conforming to BIS: 1248-1983 latest with up to date amendments = 4.00 Nos.
- e) Voltmeter of required capacity AC supply, 100 mm Auto electric/IMP/Havells make of suitable range for above Pumping Set with selector switches conforming to BIS: 8044-1978 with up to date amendments = 2 Nos.
- f) ICTP switches (complete set) of required capacity with HRC fuses L&T/Havell's make and having capacity 30% extra of the operational rating of motor as per BIS: 4064-1978 with up to date amendments immediately after the power meter of PHPA-II = 1.00Nos.
- g) Bus bar chamber having 3 copper bars of suitable rating for full length of 3 lives phases and one copper bar of half rating of full length for neutral conforming to BIS: 8084-1976 and BIS:11353-1985 read with BIS:5578-1985 all latest with up to date amendments = 2.00 Nos.

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- h) MCB of required capacity of Kilburn/L&T/MEI/ standard/GEC/Havells make on in coming feeder for motors offered by the tenderer conforming to BIS:2516-1985 latest with up to date amendments with neutral linked under voltage release=4.00 Nos.
- i) Hour run meter of reputed make of four-digit capacity conforming to BIS-722 (latest edition) = 4.00 Nos.
- j) Three phase indicating lamps (complete set) with toggle switches for individual phase conforming to BIS: 3452 (part I & II) latest with up to date amendments = 2.00 Nos.
- k) Earth leakage circuit breaker (ELCB) of required capacity with 20x3 Copper strip of Indtech/Batar/Havell's make as per BIS: 2516-1977 with up to date amendments and of suitable range 20x3mm coper strips, with which should have control box, operating handle and trip/reset bush button, on/off indicators, re-indicating off spring condition of the circuit breaker for over current protection. The circuit should be equipped with magnetic thermal release with metallic tape CTs. it should also be fitted with earth fault for tripping of breaker on occurrence of earth fault on/off breaker load side = 2 Nos.
- l) Supply of Kirloskar/Kilburn/IVC/Fouress/Gled/BHEL/Leader/ Kartar make C.I. double flanged sluice valve Class PN-1.60 (to be provided on delivery side) of size one step higher than the delivery size of pump and capable of withstanding normal seat test pressure of 16 kg/cm². conforming to relevant BIS-14846-2000. = 4 Nos
- m) Supply of Kirloskar/Kilburn/IVC/Fouress/Gled/BHEL/Leader/Kartar make C.I. double flanged swing check type reflux valve Class PN-1.60 having bye pass arrangement (to be provided on delivery side) of size one step higher than the delivery size of pump and shall be suitable for withstanding normal seat pressure of 16 kg/cm². conforming to relevant BIS-5312-1984=4 Nos.
- n) Supply of Kirloskar/Kilburn/IVC/Fouress/Gled/BhEL/Leader/ Kartar make C.I. double flanged swing check type reflux valve Class PN-1.60 having bye pass arrangement (to be provided on common delivery side) of size 300mm and shall be suitable for withstanding normal seat pressure of 16 kg/cm². Conforming to relevant BIS-5312-1984=2 Nos.
- o) Providing PVC insulated joint less, flat water proof copper cable of Finolex/Havells/siemens/Gloster/ICC make conforming to BIS:1554 (Part1)-1988 or latest with up to date amendments of suitable size for the pump sets offered (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.
- i. On supply side of 3½ core. (Size to be specified by the tenderer) (From PHPA-II Meter to Panel board in the Pump chamber at EL.782.50m) = 120.00 Rmt.



- ii. On motor side 3 core. (Size to be specified by the tenderer) (From Starter to Motor) =160.00 Rmt.
- p) Supply of floor/wall mounted power factor shunt capacitor conforming to BIS 2834-1986 latest with up to date amendments of GEC/Havells/L&T make to raise the prevailing power factor at site to 0.95 for direct connection to induction motor individually, of required KVA according to HP of motor offered including cable of siemens/ Gloster/ ICC make from bus bar chamber to capacitor & also including ICTP switches kilburn/ L&T/ Standard/ Siemen's/ Havell's of conforming to 4064-1978 or latest with HRC fuses with two years warrantee. Supply of Panels in the Pump Chamber in the Dam Body at EL.782.50m: KVAR (To be specified by the tenderer) = 2 Nos.
5. Monorail:
- 5.1 Monorail should be of electric rope hoist with 3-ton capacity having complete system fitted with all accessories required for installation of pumps at EL 753m and lowering of pumps from Pump Chamber at EL782.5m to bottom of sump well at EL753m.
- 5.2 ISMB 300x140 for monorail to be installed as shown in the drawings/instruction of EIC with Hilti bolts confirming to the relevant IS codes.
- 5.3 **Refer Table-3 for Material Specifications.**
6. Foundation arrangements:
- The supplier shall have to furnish the size and details of foundation. The foundation details including loads etc should suit the arrangement given in the enclosed sketch. Material shall be Stainless Steel.
- Base plate, Foundation bolts, hardware required for mounting pump and motor i.e., guide rail / support shall be supplied along with the pump-motor set. For maintenance, pumps shall be supplied with auto setter coupling, lifting lug, guide support, guide rail and chain and the material shall be stainless steel.
7. Special Tools:
- All fixtures and arrangements required for transportation, installation, testing, erection and commissioning of all pumps including those required during operation & maintenance shall be under the scope of Supplier's supply. A set of special tools, required for Erection, Operation and Maintenance of the Pump-Motor sets shall also be supplied.
8. Set of Spares:
- The supplier shall have to quote for a set of spares as per Table-2.
9. Painting and Protection:
- 9.1 Painting:**
- All surfaces in contact with water shall be painted with 1 (one) coat of zinc epoxy primer, thickness 40 µm and 2 to 3 coats of epoxy coal pitch finishing, (thickness 2 times of 225 µm each or 3 times of 150 µm each, total minimum thickness shall be 450 µm)



The complete protection shall be applied in the shop, except when expressly waived by the Customer, and on site intervention shall be limited to touch-ups.

9.2 Packing / Protection:

Before dispatch all items, pumps and motors shall be packed in wooden cases suitable for long storage and to prevent any kind of minor or major damage or pilferage during transportation or storage.

Instruments, if any to be packed separately in thermocol covered by polyethylene sheet with silica gel and placed in a carton or case with adequate cushioning material to avoid damage or pilferage during transportation or storage.

10. Inspection and Testing:

- 10.1 Inspection and testing shall be carried out as per QA plan approved by PHPA-II and / or Customer or Customer's Representative at supplier/manufacturer workshop before dispatch.
- 10.2 Combined performance tests on these pump-motor sets shall be carried out as per relevant IS or International standards at supplier's workshop in the presence of Customer's representative. Supplier has to furnish his QA plan indicating the details and method of inspection / testing and performance testing along with the offer for PHPA-II / Customer's approval. A notice period of 30 days shall be given for inspection and witnessing the performance test.
- 10.3 Supplier shall furnish the result of Inspection and performance for PHPA-II 's approval for dispatch.
- 10.4 Final inspection and testing shall be not be limited to the following:
 - i. Certificates for calibration of testing instruments.
 - ii. Material test certificates, hydraulic test and Static / dynamic balancing reports and NDT, dimensional and Inspection records of equipment.
 - iii. Each pump motor set shall be tested for performance tests as per relevant standards to ensure reliability of workmanship. The performance test shall include proving of duty points, measurement of discharge, dynamic head, efficiency of pump etc. It shall also include measurement of temperature of motor, pump and motor bearings.
 - iv. After performance test, the pump assembly will be dismantled for inspection of water passage and Impeller.
 - v. Routine tests of all pump motor sets.

Note: Pump and motor unit shall be tested as a whole, individual testing of pump and motor is not acceptable. Testing of pumps with testing motor is not acceptable.

11. Warranty Clause:

All equipment shall be warranted for a period of 18 months after dispatch or 12 months after commissioning, which ever later.

12. Details to be furnished along with the Offer:

The supplier shall have to furnish two sets of certified copies of the following documents along with the offer.

- i) Head v/s discharge curve.
- ii) Efficiency curve.



- iii) Drawing and catalogues showing overall dimensions of Pump, Motor including their weights.
- iv) Sectional assembly drawing giving materials of major components.
- v) Loads on foundation and mounting details of pump and motor.
- vi) Suction and delivery connection details.
- vii) Technical particulars and dimensions of the motor and pump as per enclosed Annexure-2 & 3 and Sketch-1.
- viii) Quality Assurance (QA) Plan

If above documents / any information as sought are not furnished along with the offer, the offer shall be rejected.

13. Details to be furnished after Placement of Order (for PHPA-II 's approval):
The supplier shall have to furnish following documents to PHPA-II, immediately after placement of order:
- i) 3 (three) copies of QA Plan
 - ii) 3 (three) prints of Pump-Motor set drawings indicating overall dimensions and details of pump and motors and their arrangement.
 - iii) 3 (three) copies of foundation details of pump-motor set, mounting arrangement of columns and support guide etc.
 - iv) Catalogue / drawing of pump-motor sets showing complete inner details along with complete Bill of Material.
 - v) 3 (three) copies each for Arrangement drawing, detailed drawing of terminal box, details of bearings and sealing, details of discharge case coupling (quick type) and support guide for pump motor etc.

Note: Manufacturing shall have to be commenced only after the approval of drawings.

14. Details to be furnished prior to dispatch of the material / equipment:
The supplier shall have to furnish the following documents to PHPA-II prior to dispatch of the equipment:
- i) 5 (Five) sets of Operation and Maintenance manuals along with catalogues and drawings and packing list of spare parts.
 - ii) 5 (Five) copies of test certificates / test reports / balancing reports / inspection records and performance test certificate / Guarantee Certificate of Pumps and Motors.
 - iii) 5 (Five) copies of sectional arrangement drawings of pump motor set with part number and description with major dimensions, clearances and bill of material.
 - iv) In addition to above, all drawings. Operation and Maintenance manuals and all other documents shall also be supplied on CD in an Electronic media. All the drawings shall be prepared in AutoCAD latest version.
15. Details to be furnished at the time of dispatch of the material / equipment:
The supplier shall have to furnish the following documents to PHPA-II at the time of dispatch of the equipment.
- i) To purchaser (PHPA-II) – 5 copies
 - ii) Inside each case / package – 1 copy of list of items contained in that case.



Note: Shipping list should also contain the following information for each case / package:

- i) List of items contained in the case, giving drawing / catalogue number, item number in BOM, description of items and quantity.
- ii) Case number, dimensions and gross weight of the case and net weight of the items.
- iii) All items shall have to be dispatched in suitable wooden cases (crate packing is not allowed) to prevent damage / pilferage during transportation or long storage.

Table-1: Material Specification for Submersible Dewatering Pump

Sl. No.	Item Description	Grade of Material Required
1	Discharge Casing	Rugged cast iron
2	Guide Rail	Stainless Steel
3	Shaft	SS to ASTM A276 Type 410
4	Impeller	Cast Stainless Steel (Gr CF8M)
5	Bearings	Anti-friction
6	Discharge Elbow	CI – IS 210 Gr. FG 260
7	Suction Bell	CI – IS 210 Gr. FG 260
8	Shaft Coupling / fasteners	Corrosion resistant Stainless Steel
9	Impeller Wear Rings	Wear resistant Stainless Steel / any other equivalent material
10	Suction strainer	Stainless Steel
11	Base Plate	MS, IS-2062
12	Foundation Bolt	Stainless Steel

Table-2: Spares for Submersible Dewatering Pumps:

Sl. No.	Description	Qty
1	Pump & Motor assembly	1 No.
2	Pump bearings.	1 No.
3	Pump suction sealing rings	1 No.
4	Pump motor bearing	1 No.
5	Complete set of rings and gaskets of each type	1 No.
6	Stuffing box/cable Glands	1 No.
7	Strainer	1 No.
8	Cable	1 length of each type



Table-3: Technical Specifications of Electric Wire Rope Hoist

Capacity	3 Ton
Standard	Conform to IS:807 & IS:3177 & IS:3938
Height of Lift	35 Meters
Traverse	3 Meters
Drive	Individual
Class	II, Medium Duty
Operations	Floor operated through Pendent Push Buttons
Hoisting Motors	Crane Duty 5 HP 960RPM
Make	CROMPTON/BBL
Cross Travel Motor	0.5 HP 960RPM SIEMENS make geared motor
Wire Rope	14mm, 6X36 construction FMC x 4 nos. of USHA MARTIN make

Note: Quote item wise price for spares separately.

DATA SHEET 1: FOR PUMP

- 1) Make of Pump _____
- 2) Number of Pump _____
- 3) Type of Pump _____
- 4) Rated capacity of Pump _____
- 5) Size and type of Pump _____
- 6) Number of Stages _____
- 7) Head / Stage _____
- 8) Best efficiency of Pump _____
- 9) Delivery end connection with drilling details _____
- 10) Weight of _____
 - (i) Pump (kg) _____
 - (ii) Motor (kg) _____
 - (iii) Columns (kg) _____
 - (iv) Total Weight (kg) _____
- 11) Max. Hydraulic Thrust (Ton) _____
- 12) Speed of Pump Motor set _____
- 13) Head _____
 - (i) Max. Shut off Pressure _____
 - (ii) Dynamic Rated Head _____
 - (iii) Range of Head _____
- 14) (i) Type of Impeller _____
- (ii) Diameter of Impeller _____
- 15) Column Pipe _____
 - (i) Length _____
 - (ii) Diameter _____
- 16) Material and construction of following parts, conforming standard and major dimensions:
 - (i) Discharge Casing _____
 - (ii) Column Pipe _____
 - (iii) Shaft _____
 - (iv) Impeller _____
 - (v) Bearings _____
 - (vi) Discharge Elbow _____
 - (vii) Suction Bell _____
 - (viii) Shaft Coupling / fasteners _____
 - (ix) Impeller Wear Rings _____
 - (x) Suction strainer _____
 - (xi) Base Plate _____
 - (xii) Foundation Bolt _____
- 17) Max. BHP required by the pump _____
- 18) Motor details _____
 - (i) Make & Type of Motor _____
 - (ii) HP of Motor _____
 - (iii) Rotor construction _____
 - (iv) Max. starting current _____



19)	Type of cable connection for motor	
20)	Temp. rise of motor above ambient	
21)	Whether non-reversing ratchet provided	
22)	Type of thrust bearing	
23)	Whether automatic oil lubrication is provided for line shaft	
24)	The dimension details of pumps	

DATA SHEET 2: FOR ELECTRIC MOTOR

- 1) Make _____
- 2) Frame size and Design code number _____
- 3) Application (Driven equipment) _____
- 4) kW rating _____
- 5) Rated Voltage _____
- 6) Rated frequency _____
- 7) Permissible voltage variation (under normal running conditions) _____
- 8) Permissible frequency variation (under normal running conditions) _____
- 9) Minimum voltage required under starting conditions, to bring driven equipment upto rated speed _____
- 10) No. of Phases _____
- 11) Stator winding _____
 - (i) Connection (Star or Delta) _____
 - (ii) Resistance per Phase _____
- 12) At rated voltage and frequency _____
 - (i) Full load Speed (RPM) _____
 - (ii) Full load Current (amp) _____
 - (iii) No load current (amp) in free condition _____
 - (iv) Starting current (% of full load Current) _____
 - (v) Starting Torque (% of full load Torque) _____
 - (vi) Max. Torque (% of full load Torque) _____
 - (vii) Full load efficiency (%) _____
 - (viii) Full load Power Factor _____
- 13) Class of Insulation _____
- 14) Direction of rotation and corresponding terminal designation _____
- 15) Enclosure and ventilation _____
- 16) Degree of Protection _____
- 17) Type and catalogue number of bearing _____
- 18) Terminal connection: Type and Number _____
 - (i) For Stator loads _____
 - (ii) For purchaser's incoming cable _____
- 19) Net weight of complete motor (kg) _____
- 20) Test certificate and Inspection Reports _____



SECTION V – FORMS



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FORM NO. 1

PROFORMA FOR
TENDER

To

Subject: Bid for Supply, erection, testing & commissioning of Submersible Dewatering Pumps in Sump Well of Dam, PHPA-II.

Sir,

1. With reference to the Bidding Documents forwarded to us under your letter No. _____ dated _____, we the undersigned, having examined the Drawings, Conditions of Contract, Specifications and Bill of Quantities for the execution of the above named Works offer to execute and complete the whole of the said works in conformity with the approved Drawings, Conditions of Contract, Specifications and Price Schedules given in the Bidding Documents **at the rates mentioned in the Price Schedule with a total cost of Nu. / Rs..... (Nu. / INR.....)only (Total Bid Price both in figures and words)as ascertained in accordance with the said Price Schedule.**
2. The Bid Security for the amount of Nu./Rs. _____ in the form of _____ is enclosed.
3. We undertake, if our Bid is accepted, to commence the Works within thirty days of receipt of the orders of the Engineer-in-Charge to commence and to complete and deliver the whole of the Works comprised in the Contract within _____ months (Time should conform to the timing specified by the Punatsangchhu-II Hydroelectric Project Authority (PHPA-II) in the Bidding Documents) calculated from the last day of the aforesaid period in which the Works are to be commenced.
4. If our Bid is accepted, we will furnish a performance security in the form of a bank guarantee to be jointly and severally bound with us in an amount of 10 (ten) percent of the above named sum in accordance with the Conditions of Contract.



-
5. We agree to abide by this Bid for the period of 120 days from the date of Bid opening and it shall remain binding upon us and may be accepted at any time before the expiration of that period.
 6. Unless and until an agreement is prepared and executed, this Bid, together with your written acceptance thereof, shall constitute a binding Contract between us.
 7. We understand that you are not bound to accept the lowest or any Bid you may receive.

Date _____

Signature _____

In the capacity of _____

Witness:

1. _____
Address and Occupation

2. _____
Address and Occupation



FORM NO .2

PROFORMA FOR
AGREEMENT

[Note; This Proforma is included in the Bidding Documents only for the information of Bidder. Only the successful Bidder shall, in due course, be required to fill this Proforma.]

THIS AGREEMENT MADE the _____ day of _____ BETWEEN Punatsangchhu-II Hydroelectric Project Authority (PHPA-II) _____ of (Mailing address of PHPA-II) _____ (hereinafter called "the PHPA-II") of the one part and (Name of Contractor) _____ of (Mailing address of Contractor) _____ (hereinafter called "the Contractor") of the other part.

WHEREAS the PHPA-II is desirous that **"Supply, erection, testing and commissioning of Submersible Dewatering Pumps in Sump Well of Dam, PHPA-II"** (herein after referred to as "the Work") should be executed by the Contractor AND WHEREAS by a Letter of Award No. _____ dated _____ the PHPA-II has accepted a Bid by the Contractor for the execution and completion of such Works AND WHEREAS the Contractor has agreed to undertake such work and furnish a performance security/bond pursuant to the Clause 35 of the section 'Instructions to Bidders.'

NOW THIS AGREEMENT WITNESSETH as follows;

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the conditions of Contract hereinafter referred to.
2. The following documents shall be deemed to form and be read and construed as part of this Agreement, viz;
 - a) The Agreement
 - b) The Letter of Award (LOA)
 - c) General Conditions of the Contract
 - d) Technical Specifications
 - e) Drawings
 - f) Price Schedule
 - g) Corrigendum/Amendments if any
 - h) Instructions to Bidders
 - i) Documents furnished by bidder
 - j) Notice Inviting Tender (NIT)
 - k) Forms
 - l) Any other documents as forming part of the contract



3. The aforesaid documents shall be taken as complementary and mutually explanatory of one another but in case of ambiguities or discrepancies, shall take precedence in the order set out under Para 2 above.
4. In consideration of the payment to be made by the PHPA-II to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the PHPA-II to execute and complete the Works in conformity, in all respects, with the provisions of the Contract.
5. The PHPA-II hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying of defects therein the Contract Price or such other sum as may become payable under the provisions of the contract at the time and in the manner prescribed by the Contract.

IN WITNESS whereof the parties hereto have caused their respective common Seals to be hereunto affixed (or have hereunto set their respective hands and Seals) the day and year first above written.

SIGNED, SEALED AND DELIVERED

By the said

NAME _____

on behalf of the Contractor in the presence of:

NAME _____

Address _____

By the said

NAME _____

on behalf of the PHPA-II in the presence of; _____

NAME _____

Address _____



FORM NO. 3

PROFORMA FOR

BANK GUARANTEE FOR PERFORMANCE SECURITY

(ON A NON-JUDICIAL STAMP PAPER OF THE REQUISITE VALUE)

To

The Punatsangchhu-II Hydroelectric Project Authority,

(Address of PHPA-II)

WHEREAS (Name and Address of Contractor) _____ (hereinafter called
“the Contractor”) has undertaken, in pursuance of Contract No. _____ dated
_____ to execute (Name of Contract and Brief Description of Works) _____
(hereinafter called “the Contract”).

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with his obligations in accordance with the Contract;

AND WHEREAS we have agreed to give the Contractor such a Bank Guarantee;

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Contractor, upto a total of Rs./Nu. _____ (Amount of Guarantee) (in words to be inserted by the Guarantor), representing the percentage of the Contract Price, specified in the Contract, and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of Rs./Nu. _____ (Amount of Guarantee) as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the Contractor before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the Contract or of the Works to be performed there under or of any of the Contract documents which may be made between you and the Contractor shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modification.



This guarantee is valid until the date of 30 days after issuing of the Completion Certificate.

SIGNATURE AND SEAL OF THE GUARANTOR

Name of Bank

Address

Date

Note: The Bidders are not required to fill this Proforma.



FORM NO. 4

PROFORMA FOR BANK GUARANTEE FOR BID SECURITY

To
The Punatsangchhu-II Hydroelectric Project Authority

(Address of PHPA-II)

WHEREAS, (Name of Bidder) _____ (hereinafter called "the BIDDER") has submitted his bid dated (_____) for the work of (Name of Contract) _____ (hereinafter called "the Bid").

KNOW ALL MEN by these presents that we (Name of Bank) _____ of (Name of Country) _____ having our registered office at _____ (hereinafter called "the Bank") are bound Unto the Punatsangchhu-II Hydroelectric Project Authority (PHPA-II) in the sum of _____ for which payment well and truly to be made to the PHPA-II the Bank binds himself, his successors and assigns by these presents. SEALED with the Common Seal of the said Bank this _____ day of _____.

THE CONDITIONS of this obligation are;

- i) If the Bidder withdraws his Bid during the period or bid validity specified in the Proforma of Bid; or
- ii) If the Bidder having been notified of the acceptance of his Bid by the PHPA-II during the period of bid validity;
 - a) fails or refuses to execute the Proforma of Agreement in accordance with the Instructions to Bidders, if required; or
 - b) fails or refuses to furnish the Performance Security, in accordance with the Instructions to Bidders,
 - c) does not accept the correction of its Bid Price pursuant to ITB Sub-Clause-29.

We undertake to pay to the PHPA-II upto the above amount upon receipt of its first written demand, provided that in its demand the PHPA-II will note that amount claimed by it is due to it owing to the occurrence of one or both of the two conditions, specifying the occurred condition or conditions.

This Guarantee will remain in force upto and including the date **150 days** after the closing date for submission of bids as stated in the Invitation to Bid or as extended by you at any time prior to this date, notice of which extension to the Bank being hereby waived, and any demand in respect thereof should reach the Bank not later than the above date.

DATE

WITNESS

(Signature, Name and Address)

SIGNATURE OF THE BANK

SEAL



FORM NO. 5

PROFORMA FOR
BANK GUARANTEE FOR MOBILISATION ADVANCE
(ON A NON-JUDICIAL STAMP PAPER OF THE REQUISITE VALUE).

In consideration of the Punatsangchhu-II Hydroelectric Project Authority (PHPA-II) (which expression shall unless repugnant to the subject or context include its administrators, successors and assigns), (hereinafter called the "Principal") having agreed to make advance payment to (Name and full address of the Contractor) _____ (hereinafter called "the Contractor(s)", (which expression shall unless repugnant to the subject or context or meaning thereof include its successors, administrator, executors and permitted assigns), whose bid for (Name of the Contract) _____ has been accepted and to whom the acceptance of the bid has been communicated by a Letter of Award and who is required to execute a formal agreement on conditions of production of a Bank Guarantee for Rs.....

(Both in figures and words) _____ we, the _____ Bank Limited (Bank of Bhutan or any scheduled Bank of Bhutan) hereinafter referred to as "the Bank") do hereby undertake promise and guarantee payment to the Principal on demand all the amounts advanced by the Principal to the said Contractor.

2. The Bank further agrees that;

- a) The Principal shall have the fullest liberty without affecting in any way the liability of the Bank under the Guarantee or Indemnity, from time to time, to vary any of the terms and conditions of the said Contract or to extend time for performance by the said Contractor or to postpone for any time and from time to time any of the powers exercisable by it against the said Contractor and either to enforce or forbear from enforcing any of the terms and conditions governing the said Contract or the securities available to the Principal and the Bank shall not be released from its liability under these presents by any exercise by the Principal of the Liberty with reference to the matters aforesaid or by reason of time being given to the said Contractor or any other forbearance, act or omission on the part of the Principal or any indulgence by the Principal to the said Contractor or of any other matter or thing whatsoever which under the law relating to sureties would but for this provision have the effect of a releasing the Bank from its such liability.

These presents shall be governed by and constructed in accordance with Bhutanese laws.



- c) the Bank hereby declares that it has the power to issue this Guarantee and the undersigned has full power to do so.
- d) It shall not be necessary for the Principal to proceed against the Contractor before proceeding against the Bank and the Guarantee herein contained shall be enforceable against the Bank, notwithstanding any other security which the Principal may have obtained or obtain from the Contractor, shall at the time when proceedings are taken against the Bank hereunder, be outstanding or unrealized.
- e) The Guarantee herein contained shall remain in full force and effect, during the period that would be taken for the performance of the terms and conditions of the said Contract, Letter of Award and the Agreement which is to be executed as aforesaid and that it shall continue to be enforceable until all the dues of the Principal have been duly paid and its claims satisfied and discharged and till the Principal discharges the Guarantee in writing or until _____ whichever is earlier.
- 3 The Bank lastly undertakes not to revoke this Guarantee until all the dues of the Principal have been duly paid except with the previous consent of the Principal in writing.

Dated the _____ Day of _____ 20__

Here affix the Common Seal of the
_____ Bank Ltd.

Note: The Bidders are not required to fill this Proforma.



FORM NO. 6

PRE-CONTRACT INTEGRITY PACT

Note: This Proforma is included in the Bidding Documents for information of Bidders and shall be signed by successful Bidder when the work(s) is awarded. Signing authorities will be the head of the client (agency) or the authorized representative of the bidder.

1 General:

Whereas(Name of head of the procuring agency or his/her authorized representative, with power of attorney) representing the Punatsangchhu-II Hydroelectric Project Authority (PHPA-II), hereinafter referred to as the “**Employer**” on one part, and(Name of bidder or his/her authorized representative, with power of attorney) representing M/s.....(Name of firm), hereinafter referred to as the “**Bidder**” on the other part hereby execute this agreement as follows:

2 Objectives:

Whereas, the Employer and the Bidder agree to enter into this agreement, hereinafter referred to as IP, to avoid all forms of corruption or deceptive practice by following a system that is fair, transparent and free from any influence/unprejudiced dealings in the **bidding process**¹ and **contract administration**², with a view to:

- 2.1 Enabling the Employer to obtain the desired contract at a reasonable and competitive price in conformity to the defined specifications of the works or goods or services; and
- 2.2 Enabling bidders to abstain from bribing or any corrupt practice in order to secure the contract by providing assurance to them that their competitors will also refrain from bribing and other corrupt practices.

3. Scope:

The validity of this IP shall cover the bidding process and contract administration period.

4. Commitments of the Employer:

The Employer Commits itself to the following:-

¹ Bidding process, for the purpose of this IP, shall mean the procedures covering tendering process starting from bid preparation, bid submission, bid processing, and bid evaluation.

² Contract administration, for the purpose of this IP, shall mean contract award, contract implementation, unauthorized sub-contracting and contract handing/taking over.



- 4.1 The Employer hereby undertakes that no officials of the Employer, connected directly or indirectly with the contract, will demand, take a promise for or accept, directly or through intermediaries, any bribe, consideration, gift, reward, favor or any material or immaterial benefit or any other advantage from the Bidder, either for themselves or for any person, organization or third party related to the contract in exchange for an advantage in the bidding process and contract administration.
- 4.2 The Employer further confirms that its officials shall not favor any prospective bidder in any form that could afford an undue advantage to that particular bidder in the bidding process and contract administration and will treat all Bidders alike.
- 4.3 Officials of the Employer, who may have observed or noticed or have reasonable suspicion shall report to the head of the employing agency or an appropriate government office any violation or attempted violation of clauses 4.1 and 4.2.
- 4.4 Following report on violation of clauses 4.1 and 4.2 by official (s), through any source, necessary disciplinary proceedings, or any other action as deemed fit, including criminal proceedings shall be initiated by the Employer and such a person shall be debarred from further dealings related to the bidding process and contract administration.

5. Commitments of Bidders

The Bidder commits himself/herself to take all measures necessary to prevent corrupt practices, unfair means and illegal activities during any stage of the bidding process and contract administration in order to secure the contract or in furtherance to secure it and in particular commits himself/herself to the following :-

- 5.1 The Bidder shall not offer, directly or through intermediaries, any bribe, gift, consideration, reward, favor, any material or immaterial benefit or other advantage, commission, fees, brokerage or inducement to any official of the Employer, connected directly or indirectly with the bidding process and contract administration, or to any person, organization or third party related to the contract in exchange for any advantage in the bidding process and contract administration.
- 5.2 The Bidder shall not collude with other parties interested in the contract to manipulate in whatsoever form or manner, the bidding process and contract administration.
- 5.3 If the bidder(s) have observed or noticed or have reasonable suspicion that the provisions of the IP have been violated by the procuring agency or other bidders, the bidder shall report such violations to the head of the procuring agency.

6. Sanctions for Violation:

The breach of any of the aforesaid provisions shall result in administrative charges or penal actions as per the relevant rules and laws.



6.1 The breach of the IP or commission of any offence (forgery, providing false information, mis-representation, providing false/fake documents, bid rigging, bid steering or coercion) by the Bidder, or any one employed by him, or acting on his/her behalf (whether with or without the knowledge of the Bidder), shall be dealt with as per the terms and conditions of the contract and other provisions of the relevant laws, including Debarment Rules.

6.2 The breach of the IP or commission of any offence by the officials of the procuring agency shall be dealt with as per the rules and laws of the land in vogue.

7. Monitoring and Administration:

7.1 The respective procuring agency shall be responsible for administration and monitoring of the IP as per the relevant laws.

7.2 The bidder shall have the right to appeal as per the arbitration mechanism contained in the relevant rules.

We, hereby declare that we have read and understood the clauses of this agreement and shall abide by it.

The parties hereby sign this Integrity Pact at (place) _____ on (date) _____

Affix
Legal
Stamp

Affix
Legal
Stamp

EMPLOYER

BIDDER/REPRESENTATIVE

CID :

CID :

Witness: _____

Witness: _____

Name:

Name:

CID :

CID :



SECTION VI – PRICE SCHEDULE



Sl. No.	Item Description	Units	Quantity	Rate (Nu./ INR.)		Total Amount
				Figure	Word	
	complete system & as per directions of Engineer-in-Charge (Note:- Before supply & erection, it must be ensured that the Pumping set & its allied accessories/appliances are compatible with the Automation system of the scheme)					
6	Supply of mandatory spares (as per Table-2 of Section IV, Technical Specification)	Lot	1			
Total Amount (Nu./ Rs.)						

Total quoted amount (in words)

Signature of Bidder

(SEAL)



Bill of Quantities (BoQ) for Submersible Dewatering Pumps in Sump Well of Dam, PHPA-II

Sl. No.	Item Description	Units	Quantity	Rate (Nu./ INR.)		Total Amount
				Figure	Word	
1	Supply of Submersible dewatering pump sets of KSB/ Aqua/ Calama/ Johnston/ Crompton/ BS/ SABAR/ Oswal/ Kirloskar/ Mather & Platt make conforming to latest relevant BIS Code 8034:2002 or as specified in technical specifications. Discharge to be handled by each pump = 50LPS, Gross Head =60mtrs	Per Set	4			
2	Supply of control panel having complete Automation System for all the submersible pumps consisting of all the features specified in the technical specification	Per Set	2			
3	Supply of monorail complete as specified in the technical specification, Section IV, Cause 5	LS	2			
4	Supply of GI Delivery Pipe of 300mm dia.	Rmtr.	70			
5	Erection, Testing and Commissioning of all equipment at Sl.No. 1 to 4 including fixing GI Delivery Pipe of 300mm dia. with flange joint @ 3000mm C/C with double welding at joints with MS strips as specified in the drawings or as per instructions of the Engineer-In-Charge along with cost of tees, bends, tapers & any other fittings required as per site conditions with	LS	1			



SECTION VII –DRAWING





