बैंक नोट पेपर मिल् इण्डिया प्रा. लिमिटेड
BANK NOTE PAPER MILL INDIA PVT LIMITED
JV of SPMCIL - A Govt. of India Enterprises & BRBNMPL - A Subsidiary of RBI

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LIMITED TENDER ENQUIRY No. BNPM/LTE/HVLS/0809/2020-21

Issue Date: 17.11.2020
Extension-6: 11.01.2021
Closing Date: 15.01.2021

A. Scope of Supply / work:

Detailed Survey for shifting existing 220KV line outside BNPM Premises as per the details mentioned below

Sl.no.	Description	Qty
1	Detailed Survey for shifting existing 220KV line outside BNPM Premises Work schedule as provided in page no. 16-19 (Point: 16. Price Bid Format) Technical Specifications for 220KV Transmission lines survey as provided in page no. 11-29	1 No.

(i) Introduction:

BNPM intends to carry out the detailed survey related to feasibility of shifting of 22KV line passing through our factory premises using the Modern Survey Techniques as approved by KPTCL.

(ii) Details of the Existing 220KV Line:

220 KV Hootagalli – Vajamangala line - single circuit is passing through RBI compound with the tower bearing numbers 512(B), 513(A), 514(A).
KPTCL is planning to replace the existing towers so as to upgrade the 220kV line with dual circuit between Hootagalli – Vajamangala.

(iii) Scope:

The scope of work involves Preliminary Survey, Detailed Survey, Stone Marking, Soil Resistivity Testing, Digitized map, Geo reference etc. and submission of detailed report as per KPTCL requirement **related to Shifting of 220KV Line passing through Bank Note Paper Mill India (P.) Ltd. for 2 alternative routes within 1.5Km distance.**

The Surveying work should follow all the standard guidelines as mentioned in "**Technical Specifications for Detailed Surveying by Modern Survey Techniques for 220 KV Transmission Lines**" issued by KPTCL provide for reference at page no.

(iv) General Instructions to the Bidders:

(a) Bidder shall take full responsibility for supervision and proper execution of works covered under the scope. The work should be executed in thorough professional way & in true workmanship.

(b) Bidder shall be held responsible for any violation of statutory regulations local, state or central and BNPM instructions, that may endanger safety of men, equipment, material and environment in his scope of work or another bidder's or agencies. Cost of damages if any, to life and property arising out of such violation of statutory regulations and BNPM instructions, shall be borne by the bidder.

(c) Bidder should ensure the safety of his work personnel while carrying out the job. Supply of all necessary safety gadgets are in the scope of bidder.

(d) Bidder personnel engaged shall have to obtain entry pass from BNPM Security department / Individual Section Heads authority for entering in BNPM's secured areas / installations, if required.

(e) Bidder may visit / inspect the BNPM installations at their own cost with prior permission of BNPM, if required, before submitting the offer.

(f) Any expenses towards transportation of man & materials, data collection, accommodation (food & lodging) of personnel, local transport & travel, expenses towards report preparation, delivery etc. will be in the scope of bidder.

(g) Successful bidder shall mobilize all their resources including manpower and start the work at location mentioned in the tender after getting confirmation from the Engineer-in-charge.

(h) Bidder to mobilize sufficient surveying man power, testing kits and Surveying tools and tackles so as to carry out the work.

(i) The said work should be completed and reported has to be submitted to BNPM within 60 Days from the date of issue of Work Order. Hence the bidder to plan the work execution accordingly on short notice from BNPM.

(j) The bidder shall familiarize themselves with and be governed by all laws and rules of India and Local statutes and orders and regulations applicable to his/her their work.

(v) Documents to be submitted along with the offer:

(i) Bidder should be eligible to participate in Surveying and Geo-technical investigation works for transmission lines of all voltage class.
(ii) Bidder should be empanelled surveyor for KPTCL. Copy of valid empanelment letter issued by the Corporate Office, KPTCL to be submitted.
(iii) Bidder should have executed minimum one similar survey work on 220 KV Line in past 10 years as on 31.10.2020. Relevant certificates and supporting documents to be submitted.

B. Terms & Conditions:

1. **Documents to be submitted**:
   a) Signed copy of this document (All the pages).
   b) Filled price details as per the format provided below at point 17.

c) Technical details /datasheet for the enquired product (if applicable).

d) Micro / Small Enterprise (Certificate issued by MSME)/UAM/NSIC certificate (If applicable).

2. **Price:** Price shall be all inclusive of Boarding, Lodging, Conveyance Charges and GST. Price shall remain fixed & no price variation shall be accepted till pendency of the contract.

3. **Terms of Payment:** 100% after successful completion of work & submission of Report to BNPMIPL, Mysuru and based upon certification of user dept. NEFT/RTGS details shall be furnished along with the Original Invoice.

4. **Service Terms & Service Address:** Work shall be carried out at Bank Note Paper Mill India (P.) Ltd., Mysuru.
   Service Address: Bank Note Paper Mill India (P.) Ltd., Note Mudran Nagar, Mysore - 570003. Contact details: 0821-2401 354.

5. **Taxes:** All Taxes shall be as applicable in GST regime.
   Payment of CGST, SGST, IGST & UTGST: The suppliers are required to adhere the following procedure in order to honour the payment against CGST, SGST, IGST & UTGST in the invoice.

   i) An invoice issued by the vendor for goods or services or both as applicable should be in accordance with the provisions of Sec 31 of the CGST Act & should contain all the prescribed information's in accordance with Chapter VI of CGST rules 2017.

   ii) A debit note issued if any, by the vendor should be in accordance with the provisions of Sec 34 of the CGST Act.

   iii) The vendor should mandatorily upload the aforementioned documents in respective GSTR, details of outward supplies of goods or services as applicable within the prescribed time under GST Act.

   iv) The vendor should provide the relevant documents to confirm the tax charged on the invoice has been paid to the credit of government after adjusting the ITC if any.

   Notwithstanding the above, the supplier should provide indemnification as follows:

   In the event of non-compliances with respect to GST Act & Rules by the successful bidder, the purchaser is allowed to adjust the GST amount from retention amount (either in BG or in cash) held by the company. If no amount is available for recovery, the successful bidder will refund the GST liability within 10 days from the date of GST reversal in GSTRN.

   The above requirements are mandatory to claim any GST liability, falling which, the GST liability will not be paid /reimbursed/accepted.

6. **Warranty:** The product/service provided shall be under warranty for 12 months from the date of receipt of material/completion of work at BNPM Plant, Mysore. Warranty certificate to be enclosed wherever applicable. If the applicable warranty period is less than 12 months then the same has to be mentioned at the appropriate place provided at page no. of this enquiry document.

7. **Liquidated Damages (LD):** Liquidated damages shall be applicable at the rate of 0.5% per week or part thereof until actual delivery or performance, subject to a maximum deduction of 10% of the delayed good's /service's contract price.

8. **Delay in supplier's performance:** Time for and the date specified in the contract or as extended for the delivery of the stores shall be deemed to be the essence of the contract and the supplier shall deliver the goods and perform the services under the contract within the time schedule specified by BNPM in the contract.

   Any delay attributable to the supplier in maintaining its contractual obligations towards delivery of goods and performance of services shall render the supplier liable to any or all the following sanctions besides any administrative action such as (a) Imposition of liquidity damages (as mentioned in point 7 of this enquiry document); (b) Termination of contract for default (as mentioned in point 10 of this enquiry document).

9. **Extension of Time:** If the contract is delayed in the progress of work by changes ordered in the work, or any clause which BNPM shall decide to justify the delay, then the time of completion shall be extended by a reasonable time.

   If at any time during the currency of contract, the supplier encounters conditions hindering timely delivery of the goods and performance of services, the supplier shall promptly inform BNPM in writing about the same and its likely duration and make a request to BNPM for extension of the delivery schedule accordingly. On receiving the supplier's communication, BNPM shall examine the situation as soon as possible and, at its discretion, may agree to extend the delivery schedule, with or without liquidated damages for completion of supplier's contractual obligations by issuing an amendment to the contract.

10. **Risk Purchase Clause:** If the supplier fails to abide by the terms and conditions of the contract/agreement, or fails to supply the material as per the delivery schedule or any time repudiates the contract,

    Procure the tendered item / render service from other agencies at the risk and cost of the supplier. The cost difference between the alternative arrangement and existing contract value wherein default has been made will be recovered from the supplier along with the other incidental charges.

In case of procurement through alternative sources, if procurement price is lower than the existing contract value wherein default has been made, in such case no benefit on this account will be passed on to the supplier.

11. **Termination for Convenience (Foreclosure) Clause:** BNPM reserves the right to terminate the contract, in whole or in part for its (BNPM's) convenience, by serving written notice on the supplier at any time during the currency of the contract. The notice shall specify that the termination is for the convenience of BNPM. The notice shall also indicate inter-alia, the extent to which the supplier's performance under the contract is terminated, and the date with effect from which such termination will become effective.

12. **Settlement of Disputes through Arbitration:** All disputes and differences of any kind whatsoever arising out of or in connection with the contract, whether during the progress of the work or after their completion except accepted matters shall be settled through arbitration process as per the Arbitration & Conciliation Act, 1996. The venue of arbitration shall be Mysore, Karnataka.

13. **Legal Jurisdiction:** The Courts of Mysuru (Karnataka State) shall alone have jurisdiction to decide on any legal matter of dispute whatsoever arising out or in respect of the contract.

14. **Force Majeure:** In the event of any unforeseen event directly interfering with the supply of stores arising during the currency of the contract, such as war, hostilities, acts of the public enemy, civil commotion, sabotage, fires, floods, explosions, epidemics, quarantine restrictions, strikes, lockouts, or acts of God, the Contractor shall, within a week from the commencement thereof, notify the same in writing to the Purchaser with reasonable evidence thereof. Unless otherwise directed by BNPM in writing, the supplier shall continue to perform its obligations under the contract as far as reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the

    Force Majeure event. If the force majeure condition(s) mentioned above be in force for a period of 90 days or more at any time, either party shall have the option to terminate the contract on expiry of 90 days of commencement of such force majeure by giving 14 days' notice to the other party in writing. In case of such termination, no damages shall be claimed by either party against the other, save and except those which had occurred under any other clause of this contract prior to such termination.

15. **Rights of Rejection:** BNPMIPL reserves the right to reject any or all the applied bids without assigning any reason whatsoever. The enquiry can be rejected on national security grounds.

16. **Price Bid Format:**

Sl. No.	Material Description	UOM	Qty	Unit Price (INR)	** Boarding, lodging & Conveyance Charges (INR)	GST@ _____ Amount (INR)	Unit price including Boarding, lodging, Conveyance Charges & GST (INR)	Total price including Boarding, lodging, Conveyance Charges & GST (INR)	Input GST Credit (INR) {GST amount * Total quantity}	Effective price including Boarding, lodging, Conveyance Charges (INR)
A	B	C	D	E	F	G	H=E+F+G	I=H*D	J=G*D	K=I-J
1.	Preliminary survey for identification of 3 alternative routes using Google Images and Survey of India maps and finalization of most economical, optimum route showing the topographical and other features up to -----Kms on either side and indicating final selected route alignment and digital modelling in undulated hilly terrain along the proposed route using contour data from topographical map and submission of preliminary survey reports for approval as detailed in technical specifications. Plain Terrain	Kms.	3							
2.	Detailed survey along the approved route alignment after conducting the preliminary survey by using modern survey equipments like GPS/DGPS/Total Stations/Digital Tehodolites including profiling, tower spotting and optimization of locations by using computer aided techniques like ALTM as well as	Kms.	3							

	other activities as detailed in the scope of work using software and submission of draft report for approval. a) Drawing the route profile including Geographical features like Nalas, Rivers, Gardens, P&T Lines, Railway crossings etc. b) Tower Schedule c) Line Schedule d)Burgie details by using modern survey techniques and providing GPS Co-ordinates at each anchor points for identification of anchor locations including permanent marks like poles, telephone lines, buildings etc,. Plain Terrain									
3.	Providing and fixing marking stones with approved marks including painting above the ground level and yellow lettering and marking the direction of incoming line and outgoing lines are to be clearly marked on the top with red colour. If the distance between two anchors is more than 1Km, one more directional stone is to be fixed. So also for the Road crossing, Railway Crossing and Nala crossing for all on both sides.	Nos.	20							
4.	Conducting Soil Resistivity test along the selected route and submitting the test results in the form of draft report as detailed in the technical specifications	Nos.	6							

5.	Making 150mm nominal diameter bore holes at various locations in soil using suitable approved method of boring including cleaning the boreholes, collection of samples, observations of ground water level, collection of undisturbed/ disturbed sample and back filling of bore holes on completion of work as per specification and instruction of engineer in charge of work, The scope also includes the submission of final report containing the bore log details with classification of soil for the purpose of providing foundation along with GPS Co-ordinates of each bore holes.	Nos.	1							
6.	Preparation of Schedules: a) PTCC proposal: containing PTCC questionnaires, topo sheet extracts with marking of the proposed line, SR Report, tower sketch, stations single line diagram etc., (Required copies)	Nos.	1							
7.	Preparation of Schedules: b) Railway crossing proposal with drawing inclusive of graph sheets and other stationary materials, labour etc., (10 sets/crossing)	Nos.	1							
8.	Preparation of Schedules: Tree schedule: Containing the details like name of tree, girth size of tree, distance from central line of the alignment, approximate height of the tree etc., complete and submission of draft report for approval. The details shall be survey no. wise. (as per SR)	Nos.	1							

9.	Preparation of Schedules: d)Preparation of Detailed land schedule along the Right of way.	Nos.	1							
10.	Submission of Detailed consolidated report on the surveying work done appending all approved draft reports including all relevant information collected during survey, calibration certificates of the instruments used for the work, photos taken at site and submitting softcopies of all documents and reports in 6sets. The detailed report shall contain following approved draft reports.	Nos.	2							
11.	Preliminary report/Detailed survey report/Soil resistivity report/ Soil classification report with location wise/ Tree schedules/Line schedules/Land schedules/Burgie details/Digitized contours / Digitized village map geo referenced and superimposed on the line corridor.	Nos.	2							
Total Effective Price for Detailed Survey for shifting existing 220KV line outside BNPM Premises at BNPM Plant, Mysuru (INR)										

Note:

1. Evaluation shall be done on the basis of Total Effective Price (i.e. considering all the line items together) to arrive at L-1 status.
2. ** Includes all the miscellaneous charges which shall be applicable apparat from survey charges.
3. Bidder shall note that no extra charges shall be payable over and above the charges mentioned here in the price bid.

We hereby confirm that

1. We accept all the terms & conditions mentioned in the enquiry.
2. Payment Terms: 100% after successful completion of work & submission of Report to BNPMIPL, Mysuru and based upon certification of user dept.
3. Price quoted is inclusive of P&F, Insurance, Freight and GST on F.O.R Basis, BNPM Plant, Mysuru.
4. Bid validity: 30 days from the date of enquiry closing date.
5. HSN Code: ……..
6. Delivery period: …… (Days / Weeks)
7. Warranty Period: Not Applicable
8. Bank Details: Acc. No. ……..; Bank Name: ……; Branch name: ……..; Branch Code: ……; IFSC: ……..;
9. MSME / NSIC status: …….. (If yes, then supporting document to be submitted along with the offer)
   (Please fill above: MSI – For Micro Enterprises; SSI – For Small Enterprises; MED.SI – For Medium Enterprises; NSIC – For National Small Industries Corporation regd. firm)

Signature of bidder: ……..

Contact Person: ……..

Contact Number: ……

Email id: ……..

Name of the Firm with Address: ……..

……

……

Seal of the firm: ……..

GST No.: ……..

Technical Specification for 220KV Transmission Line Survey:

TECHNICAL SPECIFICATIONS

FOR DETAILED SURVEY OF 220 KV TRANSMISSION LINES

1.0 General Information & Scope of Work

1.1 The technical specifications cover detailed survey including route alignment, profiling, tower spotting, contouring and soil investigation. **The scope of work inter-alia shall include the following:**

a) Route alignment using **satellite imageries of NRSA, Google images** and Survey of India maps, inter-alia including:

i. Identification of three alternative route alignments & selection of optimized route alignment in consultation with the owner. This shall be done **using low resolution satellite imageries of NRSA, Google images** and Survey of India maps. The output shall be in the form of digitized route alignment drawing with latest topographical and other details/features up to **5 kms**. on either sides of selected route alignment **(both in hard and soft copies).**

ii. Digital terrain modeling along the selected route using contour data from topographical maps.

iii. Associated field work.

b) Detailed Survey using GPS, DGPS, Total Stations, long range scanners & Digital theodolites of reasonable accuracies or alternatively using ALTM, (Airborne Laser Terrain Modeling) techniques, inter-alia including:

i. Digitized profiling along the selected route along with plan details using **Power Line Systems Computer Aided Design and Drafting (PLS-CADD).**

ii. Computer aided tower spotting & optimization.

iii. Soil resistivity measurement along the route.

c) Digitized contouring at undulated/hilly tower locations.

d) Integrating and superimposing the selected route on the digitized land survey maps of GOK.

e) Tree enumeration along the corridor of selected route using satellite imageries and also by conducting walk over survey and estimation of the probable cost of tree and crop compensation.

f) **Soil investigation along the selected route.**

g) Preparation of Survey reports including estimation of Bill of Quantities, identification and explanation of route constraints, infrastructure details available enroute etc.

h) Soil resistivity tests along the selected route.

1.2 All the bidders shall present their proposed methodology for execution of the work as per specifications and details of the equipment and facilities including soft wares available with them, based on which the owner may issue suitable amendments. A pre bid conference if required shall also be held.

1.3 The Provisional quantities for the scope of work are indicated in relevant Price Schedules of Bid Proposal Sheets. The final quantities for route alignment & detailed survey (quantities in "kms" unit) shall be the route length along the approved route alignment. The route alignment, detailed survey, including profiling & tower spotting, contouring, soil investigation etc. shall be carried out by the Contractor as per the technical specifications stipulated herein.

1.4 The Contractor must note that the Owner shall not be responsible for loss or damage to properties, trees etc. due to contractor's work during survey. The Contractor shall indemnify the Owner for any loss or damage to properties, trees etc. during the survey work

1.5 The Contractor should note that Owner will not furnish the NRSA satellite imageries or topographical maps prepared by survey of India but will render available assistance that may be required in obtaining these by providing letters of recommendation to the concerned authorities. Further, in case the contractor opts for use of ALTM techniques for detailed survey, he shall be responsible for obtaining necessary clearance/ permission as may be required from concerned authorities. The Owner will provide assistance that may be required in obtaining these clearance/permissions by providing letters or recommendations to the concerned authorities

1.6 The Bidders shall give along with their bid clause by clause commentary indicating their confirmation/comments/observations in respect of all clauses of technical specification.

1.7 The work shall be carried out by the contractor using modern surveying techniques. The bidder shall indicate in his offer, the detailed description of the procedure to be deployed. The details of the equipment & facilities including software's for image processing, computer aided tower spotting etc. available with the bidder or his associates shall also be furnished with the bid

1.8 The contractor shall also engage services of a reputed geo-technical consultant or experts from independent educational /research institutions for examining stability aspects of the selected transmission line route /locations in hilly terrain wherever required.

1.9 After carrying out the detailed survey and soil investigations, the contractor shall estimate complete BOQ of the transmission lines and submit the same to the Owner.

1.10 No technical deviations what so ever to certain conditions of the bidding documents permitted by the owner and therefore, the bidders are advised that while making bid proposals and quoting prices these conditions may appropriately be taken into consideration.

The bidder shall complete all the schedules and annexures in the bid proposal sheets, technical data sheets specified elsewhere.

This specification covers detailed survey of **220 KV** Transmission Line and handing over of final survey report to KPTCL including complete data.

2.0 Route Alignment

2.1 Route Alignment shall be done using satellite imageries of NRSA (PAN & LISS-III merged product of minimum resolution corresponding to 1 :25,000 scale) and Survey of India topographical maps (scale 1: 50,000). In case the required Survey of India maps are available in digitized form, the same shall be procured and used by the Contractor. The Google Imageries, if required may also be used route alignment. The contractor shall identify & examine three alternative route alignments and suggest to the Owner the optimal route alignment between the terminal points.

2.2 Requirement of Transmission Line Routing

a) The alignment of the transmission line shall be most economical from the point of view of construction and maintenance.

b) Routing of transmission line through protected /reserved forest area should be avoided. In case it is not possible to avoid the forests or areas having large trees completely, then keeping in view of the overall economy, the route should be aligned in such a way that cutting of trees is minimum.

c) The route should have minimum crossings of Major Rivers, Railway lines, National / State highways, overhead EHV power lines and communication lines.

d) The number of angle points shall be kept to a minimum.

e) The distance between the terminal points specified shall be kept shortest possible, consistent with the terrain that is encountered.

f) Marshy and low lying areas, river beds and earth slip zones shall be avoided to minimize risk to the foundations and towers.

g) It would be preferable to utilize level ground for the alignment.

h) Crossing of power lines shall be minimum. Alignment shall be kept at a specified distance from existing lines considering ROW and tower falling distances.

i) Crossing of communication line shall be minimized and it shall be preferably at right angle. Proximity and parallelism with telecom lines shall be eliminated to avoid danger of induction to them.

j) Areas subjected to flooding such as nalla shall be avoided.

k) Restricted areas such as civil and military airfield shall be avoided. Care shall also be taken to avoid aircraft landing approaches.

l) All alignment should be easily accessible both in dry and rainy seasons to enable maintenance throughout the year.

m) Certain areas such as quarry sites, coffee, tea, tobacco and saffron fields and rich plantations, gardens & nurseries which will present the Owner problems in acquisition of right of way and way leave clearance during construction and maintenance should be avoided.

n) Angle points should be selected such that shifting of the points within 100 m radius is possible at the time of construction of the line.

o) The line routing should avoid large habitations, densely populated areas forest, animal/ bird sanctuary etc., to the extent possible.

p) The areas requiring special foundations and those prone to flooding should be avoided.

2.3 For examination of the alternatives & identification of the most appropriate route, besides making use of information's /data /details available/extracted through Survey of India Topographical maps, Google Images and computer-aided processing of NRSA's satellite imagery, the contractor shall also carryout reconnaissance /walk over survey/ preliminary survey as may be required for verification & collection of additional information/data/details.

2.4 The contractor shall submit his preliminary observations & suggestions along with various information's/data/details collected and also processed satellite imagery data, topographical map data marked with the alternative routes etc. The final evaluation of the alternative routes shall be conducted by the contractor in consultation with Owner's representatives and optimal route alignment shall be proposed by the Contractor. Digital terrain modeling using contour data from topographical maps as well as processed satellite data shall be done by the contractor for the selected route. A fly through perspective using suitable software(s) shall be developed for further refinement of the selected route, if required. Site visit and field verification shall be conducted by the Contractor jointly with the Owner's representative for the proposed route alignment.

2.5 Final digitized route alignment drawing with latest topographical and other details/features including all rivers, railway lines, canals, roads etc. up to **5 kms.** on either side of selected route alignment shall be submitted by the Contractor for Owner's approval along with report containing other information's/details as mentioned above. Changes in the route alignment, if any, during detailed survey, shall be incorporated in the final digitized route alignment drawing.

3.0 Detailed Survey

3.1 The detailed survey shall be carried out using DGPS, Total Stations, digital theodolites etc. along the approved route alignment. As an alternative, the contractor may also use ALTM (Air borne Laser Terrain Modeling) techniques of equal or better accuracy for the detailed survey.

3.2 **Soil resistivity,** along the route alignment shall be measured in dry weather by four electrode method keeping inter-electrode spacing of 50 mtrs. For calculating soil resistivity formula 2 ∏ ar (where a = 50 m and r = megger reading in ohms) shall be adopted. Measurement shall be made at every 2KM along the length of route. In case the soil characteristics changes within 2 KM, values shall have to be measured at intermediate locations also. Megger reading and soil characteristics should also be indicated in the soil resistivity results.

3.3 Route Marking

a) The route of the transmission line shall be recorded using DGPS of positional accuracy less than 3mtr.

b) The co-ordinates of all the angle points as well as other important crossings, landmarks etc. shall be recorded using DGPS for easy relocating. *In addition the angle point locations etc shall be marked using marking stones of size 200 x 200 x 1000 mm, with approved marks including painting above the ground level and yellow lettering and marking the direction of incoming and out going lines are to be marked clearly on the top with red color. If the distance between such anchor points is more than 1KM one more directional stone is to be fixed. So also for the road crossings, railway crossing and nala crossings on both the sides.*

c) At the starting point of the commencement of route survey the coordinates shall be recorded. The co-ordinates of the location of the survey instrument shall also be recorded. Further, the co-ordinates at prominent position at intervals of not more than 750 mtr. Along the transmission line to be surveyed up to the next angle point shall also be recorded. Wherever the line alignment crosses the EHT line, railway line, P & T line or roads, the contractor shall record co-ordinates on the points of crossing. Wherever line route alignment passes over permanent land marks such as rock, boulders, culverts etc. suitable white paint marks with directional and KPTCL markings shall be made and co-ordinates recorded.

3.4 Profiling

a) The complete profiling along the route shall be carried out using modern surveying equipments viz, total stations, DGPS, digital theodolite, long range scanners etc. Reference levels at every 20 meters along the route are to be recorded. In case of hilly terrain/undulations RL shall also be measured for 10mtr on either side of center line in lateral direction (perpendicular to the line).R/L's at other undulations along the route as well as in the route plan and other enroute details viz. Crossings, building & structure, trees & other infrastructure etc. shall also be recorded. Areas along the route, which in the view of the contractor, are not suitable for tower spotting, shall also be marked.

b) The complete profiling details shall be digitized and the data shall be prepared & stored in the format compatible to computer-aided tower spotting software.

c) A printed/plotted output of the digitized profiling shall be submitted by the contractor to Owner's site-in-charge for review before taking up computer-aided tower spotting.

3.5 Optimization of Tower Location/Tower Spotting.

a) Optimization of tower locations shall be done by the contractor using computer-aided tower spotting software- PLS-CADD. In order to verify the results of computer aided tower spotting, **the contractor shall furnish sample calculations and manual tower spotting drawings for some typical sections.**

b) The sag-tension characteristics of the conductor as well as tower spotting data shall be furnished by the contractor for the owner's approval before execution. Sag template curves, shall be prepared by the contractor **on acrylic sheet indicating cold curve, hot curve, ground clearance curve and support footing curve and the same shall be submitted to the owner.**

3.6 Tower Spotting.

While, profiling and spotting the towers the following shall be borne in mind.

a) Span:

The maximum length of a section shall be **3.20 Km or sum of 10 spans whichever is less.** A section point shall comprise of tension point with DB/B type or DC/C type or DD/D type towers as applicable. The normal span shall be considered as **320 Mtrs.**

b) Extension / Truncation

An individual span shall be as near to the normal design span as possible. In case an individual span becomes too short with normal supports on account of undulations in ground profile, one or both the supports of the span may be extended by inserting standard body/leg extension. In case of locations where the ground clearance is available, truncated towers may be spotted. The provisions kept in the design of towers w.r.t. body /leg extns, truncations shall be considered by the contractor during execution stage.

c) Loading

There shall not be any upward force on suspension towers under normal working conditions and the suspension towers shall support at least the minimum weight span as provided in the designs. In case uplift is unavoidable, it shall be examined if the same can be overcome by adding standard body extensions to the towers failing which tension towers designed for the purpose shall be employed at such positions.

d) Road Crossing

At all important road crossings, the tower shall be fitted with double suspension or tension insulator strings depending on the type of tower but the ground clearance at the roads under maximum temperature and in still air shall be such that even with conductor broken on adjacent span, ground clearance of the conductor from the road surfaces shall not be less than **12.00 mtrs.** At all national highways tension towers shall be used and crossing span shall not be more than **250 meters.**

e) Railway Crossings

All the railway crossings coming-enroute the transmission line shall be identified by the Contractor. At the time of detailed survey, the railway crossings shall be finalized as per the regulation laid down by the Railway Authorities. The following are the important features of the prevailing regulations (revised in 1987).

i. The crossings shall be supported on DD/D type tower on either side depending on the merits of each case.
ii. The crossing shall normally be at right angle to the railway track.
iii. The minimum distance of the crossing tower shall be at least equal to the height of the **tower plus 6 mtrs** away measured from the centre of the nearest railway track.
iv. No crossing shall be located over a booster transformer, traction switching station, traction sub-station or a track cabin location in an electrified area.
v. Minimum ground clearance above rail level of the lowest portion of any conductor under condition of maximum sag shall be maintained at **15.40 mtrs.**
vi. The crossing span shall be limited to **200 mtr.**

f) River Crossings

In case of major river crossing, towers shall be of suspension type (River crossing tower) and the anchor towers (Balancing towers) on either side of the main river crossing shall be DD/D type tower with zero degree deviation. Clearance required by navigation authority shall be provided. For non-navigable river, clearance shall be reckoned with respect to highest flood level (HFL).

g) Power line Crossings

Where this line is to cross over another line of the same voltage or lower voltage, DD/D type tower with suitable extensions shall be used. Provisions to prevent the possibility of its coming into contact with other overhead lines shall be made in accordance with the Indian Electricity Rules, 1956/ Indian Electricity Act 2003 as amended up to date.
Minimum clearance in mtr. Between lines when crossing each other

Sl. No.	Nominal System Voltage	66/110 KV	220 KV	400 KV
1.	66/110 KV	3.05	4.58	5.49
2.	220 KV	4.58	4.58	5.49
3.	400 KV	5.49	5.49	5.49

For power line crossings of voltage level of 66 KV and above, an angle towers shall be provided on either side of DD/D type tower which can be temporary dead end condition with proper guying.

The angle of crossing has to be preferably 90 degree and at any time should not be below 60 degree

h) Telecommunication Line Crossings

The angle of crossing shall be as near to 90 degree possible. However, deviation to the extent of 30 degree may be permitted under exceptionally difficult situations.

When the angle of crossing has to be below 60 degree, the matter will be referred to the authority in-charge of the telecommunication System. On a request from the Contractor, the permission of the telecommunication authority may be obtained by the Owner.

Also, in the crossing span, power line support will be as near the telecommunication line as possible, to obtain increased vertical clearance between the wires.

i) Details Enroute

All topographical details, permanent features, such as trees, building, land survey nos. etc. **17.50 mtr. on either side** of the alignment shall be detailed on the profile plan. All the topographical details (trees, buildings, permanent structures, including open land) survey no. wise shall be included in the report.

3.7 Clearance from Ground, Building, Trees etc.

Clearance from ground, buildings, trees and telephone lines shall be provided in conformity with the Indian Electricity Rules, 1956 / Indian Electricity Act 2003as amended up to date.

a) The Contractor shall estimate/enumerate numbers of trees that are to be cut within right of way of transmission line along the proposed route alignment. Contractor may please note that Owner will not pay any compensation for any loss or damage to the properties or for tree cutting due to Contractor's survey work.

b) The trees and bushes existing within **17.50 mtr. on either side** of the central line alignment shall be estimated/enumerated by the contractor and marked with quality paint serially from angle point 1 (One) onwards. The trees list should contain the following:

   i. Approx. Girth (circumference) measured at a height of 1 mtr. from Ground level.
   ii. Approximate height of the tree with an accuracy of + 2 metres.
   iii. Name of the type of the species/tree.

c) The bushy and undergrowth encountered in the **17.50 mtr. belt on either side** of the central line alignment should also be evaluated with its type, height and girth clearly indicating in the tree /bush statement. The tree/bush statement should also approximately indicate the percentage area within right of way where tree/bush exist.

d) The contractor shall also intimate the Owner, his assessment about the likely amount of tree & crop compensation etc. required to be paid by the Owner during execution stage **for trees in 35 mtr. belt.** This assessment shall be done considering prevailing practices/guidelines, local regulations and other inquiries from local authorities.

e) The contractor shall also identify the forest/non-forest/**deemed forest/private land/Government land** areas involved duly authenticated by concerned authorities.

   i. A statement of forest areas with survey/compartment nos. (all type of forest /RF /PF Acquired forest/ Revenue forest/Private forest/forest as per dictionary meaning of forest etc.)
   ii. A statement of non-forest areas with survey/compartment nos.
   iii. Tree cutting details (Girth wise & species wise).
   iv. Marking of forest areas with category on topo- sheets 1:250,000 showing complete line route, boundaries of various forest divisions and their areas involved.
   v. Village forest maps of affected line and affected forest areas and marking of the same.
   vi. Forest division map showing line and affected forest areas.

vii. The contractor shall furnish village Revenue survey map duly mentioning the survey nos., name of the owner (to be collected through RTC-record of rights and tenancy certificate) along the proposed corridor width.

viii. The village Revenue survey map is to be certified by Govt. Surveyor and countersigned by Revenue Inspector/Village Accountant.

ix. The village Revenue survey map is to be digitized and Geo referenced and superimposed on the selected corridor duly indicating the survey no of lands coming under the corridor.

f) The contractor shall finalize the forest clearance proposal on the prescribed format duly completed in all respects for submission by the owner to the forest department.

3.8 Preliminary Schedule

The profile sheets showing the locations of the towers together with preliminary schedules of quantities indicating tower types, wind & weight spans, angle of deviation, crossing & other details etc. shall be submitted by the contractor for review & approval by Owner's site-in-charge.

3.9 Detailed Survey of Tower Locations.

a) The detailed survey shall be conducted for spotting the tower locations on ground conforming to the approved profile and tower schedule.

b) The co-ordinates of all the tower locations shall also be recorded using DGPS of positional accuracy less than 3mtr. For easy relocating. The position of all tower locations shall be marked in the final digitized route alignment drawing with relative distance from any permanent benchmark in the area.

c) The contractor shall also collect required data at each tower location in respect of soil strata, ground water level, history of water table in adjacent areas/surface water and classify the suitable type of foundation at each location and detailed soil investigations carried out at selected locations etc.

3.10 Contouring at hilly / undulated locations

a) The levels up or down of each pit center with respect to center of tower location shall be recorded at intervals of **2 mtrs** using total stations / DGPS / digital theodolite and digitized contour plans shall be made. Based on the digitized elevation plans, the quantities of benching & protection work vis-a.-vis possible unequal leg extensions shall be optimized using suitable computer-aided techniques/ software's. Required tower and foundation details, cost data for comparative evaluation of benching & protection work vis-a.-vis unequal leg extensions shall be provided by the contractor to the owner before execution stage.

3.11 The changes desired by the Owner in the preliminary tower schedule or as may be required based on detailed survey of tower locations & contouring by the contractor, shall be carried out by the contractor and the final tower schedule shall be submitted for approval of Owner. The tower schedule shall show

position of all type of towers, span length, type of foundation for each tower, benching & revetment requirement, unequal leg extensions, deviation at all angles, crossing & other details etc.

3.12 Survey Methodology & Precision

a) All elevations shall be referenced to benchmarks established by the survey of India. Leveling operations shall begin and end at benchmarks approved by the Owner.

b) During the leveling of the profile, check surveys will be effected at intervals not exceeding **50 kms**. With benchmarks of known elevations. The difference in elevations as surveyed by the contractor and as declared by Survey of India for these benchmarks shall not exceed the precision required for 3rd order surveys $e \leq 24k$ where k is the distance between benchmarks in km and e is the difference between elevations in mm.

c) In the absence of suitable benchmarks the leveling shall be done by two independent leveling parties working in opposite directions along the same line. The difference in elevations between the two surveys shall not exceed the precision required for 3rd order surveys as stated above.

d) All important objects and features along the transmission line centerline (railways, highways, roads, canals, rivers, transmission lines, distribution lines, telephone lines etc.) shall be surveyed and located with a positional accuracy of 1:2000 between points of known horizontal position.

3.13 Survey Report

a) Complete BOQ of the transmission lines as per the technical specifications shall be furnished in the survey report.

b) Each angle point locations shall be shown with detailed sketches showing existing in the close vicinity permanent land marks such as specific tree(s), cattle shed, homes, tube wells, temples, electric pole/tower, telephone pole, canal, roads, railway lines etc. The relative distance of land marks from the angle points and their bearings shall be indicated in the sketch. These details shall be included in the survey report.

c) Information w.r.t. infrastructure details available enroute, identification and explanation of route constraints, etc shall also be furnished in the Survey report and shall inter-alia include the following:

   i. Information regarding infrastructural facilities available along the final route alignment like access to roads, railway stations, construction material sources (like quarry points for stone, sand and availability of construction water), labour, existing transport facilities, fuel availability etc. shall be furnished in the survey report.

ii. All observations which the Contractor thinks would be useful to the construction of the transmission lines mentioned under scope of work are to be reported.

iii. Suggestions regarding the number of convenient zones (line segments/portions) in which the entire alignment can be divided keeping in view the convenience of line construction, operation, maintenance etc. are to be given.

iv. Suggestions regarding location for setting up stores during line construction in consultation with Owner representatives shall also be provided by the Contractor.

v. Working months available during various seasons along the final route alignment, with period, time of sowing & harvesting of different type of crops and the importance attached to the crops particularly in the context of way leave problems and compensation payable shall be stated by the Contractor.

vi. Availability of labour of various categories and contractors of civil works shall also be reported.

vii. Some portions of the line may require clearance from various authorities. The Contractor shall indicate the portion of the line so affected, the nature of clearance required and the name of concerned organizations such as local bodies, municipalities, P&T (name of circle), Inland navigation, Irrigation Department, PGCIL Zonal railways, Divisional Forest Authorities, Military, Civil and Defence Authorities etc.

d) All the requisite data for processing the case of statutory clearances such as PTCC, Forest, Railway and Highway Authority shall be provided along with the report.

e) The contractor shall also collect & report details pertaining to pollution levels envisaged along the transmission line.

f) Six copies of survey reports (Hard & soft) and all documents shall be furnished by the contractor to the Owner.

4.0 Geotechnical Investigations

4.1 General

a) The scope of work includes detailed soil investigation at various selected tower locations as approved/desired by the owner such as selected angle points, railway crossings, road crossings, power line crossings, river crossings etc. In addition soil investigation may be required to be carried out at other locations at the discretion of the owner.

b) These specifications provide general guidelines for geotechnical investigation of normal soils. Cases of marshy locations and those affected by salt water shall be treated as special locations and the corresponding description in these specifications

shall apply. Any other information required for such locations shall be obtained by Contractor and furnished to Owner.

4.2 Scope

a) The scope of work includes detailed soil investigations and furnishing bore log data at various tower locations. However, during actual execution of work, the locations shall be decided by the Engineer-in-Charge, depending upon the soil strata, terrain and other factors. Based on the bore log data/soil parameter/soil investigation results, the Contractor shall recommend the type of foundations suitable for each locations and the same shall be got approved by the Owner.

b) These specifications cover the technical requirements for a detailed Geotechnical investigation and submission of a detailed Geotechnical Report. The work shall include mobilization of all necessary tools and equipment, provision of necessary engineering supervision and technical personnel, skilled and unskilled labour, etc. as required to carry out the entire field investigation as well as laboratory tests, analysis and interpretation of data collected and preparation of the Geotechnical Report. Contractor shall also collect data regarding variation of subsoil water table along the proposed line route. The aforementioned work shall be supervised by a graduate in Civil Engineering having at least 5 years of site experience in geotechnical investigation work.

c) Contractor shall make his own arrangements to establish the co-ordinate system required to position boreholes, tests pits and other field test locations. Contractor shall determine the reduced levels (R.L.'s) at these locations with respect to benchmarks used in the detailed survey. Two reference lines shall be established based on survey data/details. Contractor shall provide at site all required survey instruments to the satisfactions of the Owner so that the work can be carried out accurately according to specifications and drawings. Contractor shall arrange to collect the data regarding change of course of rivers, major natural streams and nallas etc., encountered along the transmission line route from the best available sources and shall furnish complete hydrological details including maximum velocity discharge, highest flood level (H.F.L.), scour depth etc. of the concerned rivers, major streams and nallas (canals).

d) The field and laboratory data shall be recorded on the proforma recommended in relevant Indian Standards. Contractor shall submit to Owner two copies of field bore logs and all the field records (countersigned by the Owner) soon after the completion of each boreholes/test.

e) Whenever Contractor is unable to extract undisturbed samples, it shall be immediately informed to the Owner. Payment for boring charges shall be subject to Owner being satisfied that adequate effort has been made to extract undisturbed samples. Special care shall be taken for locations where marshy soils are encountered and Contractor in such cases shall ensure that specified

numbers of vane shear tests are performed and the results correlated with other soil parameters.

f) One copy of all field records and laboratory test results shall be sent to Owner on a weekly basis. Owner may observe all the laboratory testing procedures.

g) The Contractor shall interact with the Owner to get acquainted with the different types of structures envisaged and in assessing the load intensities on the foundation for the various types of towers in order to enable him to make specific recommendation for the depth, founding strata, type of foundation and the allowable bearing pressure.

h) After reviewing Contractor's geotechnical investigation draft report. Owner will call for discussions, in order to comment on the report in the presence of Contractor's Geotechnical Engineer. Any expenditure associated with the redrafting and finalizing the report, traveling etc. shall be deemed included in the rates quoted for the geotechnical investigations.

i) Contractor shall carry out all work expressed and implied in **Clause 4.1(b)** of these specifications in accordance with requirements of the specification.

j) The Contractor shall prepare and submit soil profile along the transmission line route (in digitized form, with digitized route alignment drawing as base) indicating salient soil characteristics/features, water table etc. based on detailed soil investigations and other details/information collected during detailed survey.

4.3 General Requirements

a) Where ever possible, Contractor shall research and review existing local knowledge, records of test pits, bore holes etc. types of foundations adopted and the behavior of existing structures, particularly those similar to the present project.

b) Contractor shall make use of information gathered from nearby quarries, unlined wells, excavation etc. Study of the general topography of the surrounding areas will often help in the delineation of different soil types.

c) Contractor shall gather data regarding the removal of overburden in the project area either by performing test excavations, or by observing soil erosion or landslides in order to estimate reconsolidation of the soil strata. Similarly, data regarding recent landfills shall be studied to determine the characteristics of such landfills as well as the original soil strata.

d) The water level in neighboring streams and water courses shall be noted. Contractor shall make enquiries and shall verify whether there are abandoned

underground works e.g. worked out ballast pits, quarries, old brick fields, mines, mineral workings etc.

e) It is essential that equipment and instruments be properly calibrated at the commencement of the work. If the Owner so desires. Contractor shall arrange for having the instruments tested at an approved laboratory at its cost and shall submit the test reports to the Owner. If the Owner desires to witness such tests, Contractor shall arrange for the same.

4.4 Codes and Standards for Geotechnical Investigations.

a) The Geo-technical investigations and report shall conform to all standards, specifications and IS codes of practice (shall be the latest editions including all applicable official amendments and revision). In case of conflict between the present specifications and those referred to herein, the former shall prevail. Internationally accepted standards which ensure equal or higher performance than those specified shall also be accepted.

4.5 Field investigation for soils.

Detailed soil investigation and tests like bores, augher boring, shell and auger boring, SPT, Vane shear test, Dynamic cone penetration test, etc and other test not specifically mentioned and report of which are required for designing tower foundations shall be carried out by the contractor as per the relevant IS codes in force and detailed report shall be submitted to the owner for approval and records.

4.6 Essential Requirements

a) Depending on the types of substrata encountered, appropriate laboratory tests shall be conducted on soil and rock samples collected in the field. Laboratory tests shall be scheduled and performed by qualified and experienced personnel who are thoroughly conversant with the work. Tests indicated in the schedule of items shall be performed on soil, water and rock samples as per relevant IS codes. One copy of all laboratory test data records shall be submitted to owner progressively every week. Laboratory tests shall be carried out concurrently with the field investigations as initial laboratory tests results could be useful in planning the later stages of field work. A schedule of laboratory tests shall be established by Contractor to the satisfaction of the Owner within one week of completion of the first borehole.

b) Laboratory tests shall be conducted using approved apparatus complying with the requirements and specification of Indian Standards or other approved standards for this type of work. It shall be checked that the apparatus are in good working conditions before starting the laboratory tests. Calibration of all the instruments and their accessories shall be done carefully and precisely at an approved laboratory.

c) All samples, whether undisturbed or disturbed shall be extracted, prepared and examined by competent personnel properly trained and experienced in soil sampling, examination, testing and in using the apparatus in conformance with the specified standards.

d) Undisturbed soil samples retained in liners or seamless tube samplers shall be removed, without causing any disturbance to the samples, using suitably designed extruders just prior to actual testing. If the extruder is horizontal, proper support shall be provided to prevent the sample from breaking. For screw tube extruders, the pushing head shall be free from the screw shaft so that no torque is applied to the soil sample tube shall be cut by means of a high speed hacksaw to proper test length and placed over the mould before pushing the sample into it with a suitable piston.

e) While extracting a sample from a liner or tube, care shall be taken to assure that its direction of movement is the same as that during sampling to avoid stress reversal.

4.7 Geotechnical Investigation Report

a) General

i. Contractor shall submit a formal report containing geological information of the region, procedures adopted for geotechnical investigation, field observation, summarized test data, conclusions and recommendations. The report shall also include detailed bore logs, subsoil sections, field test results, laboratory observations and tests results both in tabular as well as graphical form practical and theoretical considerations for the interpretation of test results, supporting calculations for the conclusions drawn etc. initially, Contractor shall submit three copies of the report in draft form for Owner's review.

ii. Contractor's Geotechnical engineer shall visit Owner's Corporate Office for a detailed review based on Owner's comments in order to discuss the nature of modifications, if any, to be done in the draft report. Contractor shall incorporate in the report the agreed modifications and resubmit the revised draft report for approval. Ten copies of the detailed final approved report shall be submitted to Owner together with one set of reproducible of the graphs, tables etc.

iii. The detailed final report based on field observations, in – situ and laboratory tests shall encompass theoretical as well as practical considerations for foundations for different types of structures.

b) Data to be furnished:

The report shall also include the following:

i. A plot plant/location plan showing the locations and reduced levels of all field test e.g. boreholes trial pits etc. properly drawn to scale and dimensioned with reference to the established grid lines.

ii. A true cross section of all individual boreholes and test pits with reduced levels and co-ordinates showing the classification and thickness of individual stratum, position of ground water table, various in – situ tests

conducted, samples collected at different depths and the rock stratum, if encountered.

iii. Geological information of the area including geomorphology, geological structure, lathe logy, stratigraphy and tectonics, core recovery and rock quality designation (RQD) etc.

iv. Observations and data regarding change of course of rivers, velocity, scour depths, silt factor etc., and history of flood details for mid-stream and river bank locations.

v. Past observations and historical data, if available, for the area or for other areas with similar soil profile, or with similar structures in the surrounding areas.

vi. Results of all laboratory test summarized for each sample, for each layer, along with all the relevant charts, tables, graphs, figures, supporting calculations, conclusions and photographs of representative rock cores.

c) Recommendations

Recommendations shall be provided for each tower location duly considering soil type and tower spotting data. The recommendations shall provide all design parameters and considerations required for proper selection, dimensioning and future performance of tower foundations and the following:

i. The subsurface material must provide safe bearing capacity and uplift resistance by incorporating appropriate safety factors thereby avoiding rupture under ultimate loads.

ii. Movement of the foundation, including short and long term components under transient and permanent loading, shall be strictly controlled with regard to settlement, uplift, lateral translation and rotation.

4.8 Rates and Measurements

a) Rates

The contractor's quoted rate shall be inclusive of making observations, establishing the ground level and co-ordinates at the location of each borehole, test pit etc. No extra payments shall be made for conducting Standard Penetration Test, collecting, packing, transporting of all samples and cores recording and submittal of results on approved formats.

4.9 Specific Requirements for Geotechnical Investigation at River Crossings.

a) The entire soil investigation work at river crossing locations (if required) shall be carried out in accordance with the relevant parts of the specifications for geotechnical investigation modified to the extent given below.

b) Requirements.

i. Boreholes shall be executed to specified depth of 40m . If refusal strata is reached (i.e. SPT-N value is greater than 100 continuously for 5m depth) with characteristics of rock the borehole may be terminated at shallower depth i.e. at 5m in refusal strata, with prior approval of the Owner.

ii. Laboratory testing shall be conducted on all soil samples to determine grain size distribution, liquid limit and plastic limit of the different soil strata encountered.

iii. Geotechnical Report must furnish the following:

- Geotechnical investigation schemes.
- Bore-logs indicating soil stratification, with IS classification, sampling details and SPT 'N' values.
- Soil cross-sections along various boreholes in two orthogonal directions indicating soil stratification based on field and laboratory tests.
- Grain size distribution curves.
- IS classification of soils.
- Shear tests (UU) to be done on saturated soil samples
- Bearing capacity of soil at different levels.
- Scouring depth of river.
- Highest flood level (H.F.L.).
- Maximum discharge, velocity etc. (from authenticated source such as CWC or appropriate State authorities).
- Recommendations regarding type of foundation to be adopted at the location.

c) A check list for reporting results of river crossings locations details, detailed soil investigation and river values for river crossing locations shall be furnished to the owner.

4.10 Special Terms and conditions for Geotechnical Investigation in the River bed.

a) Contractor is required to mobilize a suitable arrangement (floating pontoon, plant, equipment etc.) to carry out geotechnical investigation work in creek/river locations identified by the Owner.

b) In the event of storm or stoppage of work etc., Contractor shall not be paid extra for mobilization/remobilization of floating pontoon, plant equipment etc.

c) Contractor shall fully satisfy himself about the conditions of creek/river (depth of water, wave currents, wind conditions etc.) prevailing in the area of proposed investigation and plan the necessary tools and plant to be deployed before quoting. Any claim resulting from lack of data collection in this respect shall not be entertained.

d) Contractor shall make his own arrangements for locating the coordinates and position of boreholes in creek/river with respect to two grid-lines indicated by Purchaser.

e) Boring in creek or river shall be payable only below the bed level and no payment shall be made for lowering the casing in water.

f) Contractor shall arrange for necessary transportation on water (e.g. motor boat) to facilitate the supervision of work by officials of Purchaser at its own cost.

g) Full details of the construction plant, proposed working method for boring and sampling in water shall be submitted along with the Tender.

5.0 STATUTORY REGULATIONS AND STANDARDS

5.1 Contractor is required to follow statutory regulations stipulated in Electricity (Supply) Act 1948, Indian Electricity Rules, Indian Electricity Act 2003 and other local rules & regulations.

5.2 The codes and standards referred to in these specifications shall govern. In case of a conflict between such codes/standards and these specifications, the provisions of the specifications shall prevail. Such codes, standards referred to shall mean latest revisions, amendments, changes adopted and published by relevant agencies.

5.3 Other Internationally acceptable standards which ensure equivalent or better performance than those specified shall also be acceptable.