

TENDER SPECIFICATION

NO: BHE/PW/PUR/BWT6-GEO/1478

**GEO- TECHNICAL INVESTIGATION AND TOPOGRAPHICAL
SURVEY**

AT

1X 660 MW BHUSAVAL TPS

MAHARASHTRA

VOLUME – II

PRICE BID SPECIFICATION



Bharat Heavy Electricals Limited

(A Government of India Undertaking)

Power Sector - Western Region

345-Kingsway, Nagpur-440001

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TENDER SUBMISSION:

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For Bharat Heavy Electricals Limited

AGM (Purchase)
Place: Nagpur
Date

BHEL, PS-WR: NAGPUR
PART-II: PRICE BID (SCHEDULE OF RATES & QUANTITIES)
T.S No. BHE/PW/PUR/BWT6-GEO/1478

**GEO TECHNICAL INVESTIGATION AND TOPOGRAPHICAL SURVEY FOR 1X660MW
BHUSAWAL SITE**

SL. No.	ITEM DESCRIPTION	UNIT	QTY.	Rate in figures (In Rs)	Amount (In INR)	Remarks
	SECTION A - TOPOGRAPHICAL SURVEY					
1	Carrying out bench mark from the nearest GTS bench mark or any other available source as approved by the engineer-in-charge to different locations in the project area including clearing of jungles and/or cutting trees and any other works required for completion of the said item etc all complete as per specification and instructions of the engineer-in-charge. (Construction of bench mark pillar to be paid separately)	km	5			
2	Carrying out topographical survey of plant and allied areas showing all permanent & general features and detailed contour survey by taking spot levels at 25m interval, carrying out cross section of canal/nallah by taking spot levels at 5m interval or less including clearance of jungles and cutting of trees etc which are interfering with the survey works and any other field works necessary for the completion of the said item, preparation and submission of all plans (maps), reports, floppy and originals etc all complete as per specification and instructions of the engineer-in-charge.	Hectare	150			

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3	Construction of bench mark pillar/reference pillar/grid pillar at different locations including clearing of jungles, excavation, supply of materials, pillar marking, backfilling, white washing, painting on MS plate etc all complete as per specification, drawings and instructions of the engineer-in- charge.					
	a) Bench mark pillar	Each	4			
	b) Grid/reference pillar	Each	30			
	TOTAL OF SECTION-A					
	SECTION B - SOIL INVESTIGATION					
1	Mobilisation of necessary equipments, men and materials to the project site for carrying out the geotechnical investigation and demobilisation of the same after completion of all the field works etc all complete as per specification, drawings and as directed by the engineer-in-charge. 1 (one) set comprising of minimum indicative list of equipments to be deployed as per Appendix-I of tender Specification. Any additional equipments if required shall be mobilized as per the directions of BHEL Engineer to match the work schedule without any extra cost.	LS	1			

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2	<p>Making 150mm nominal diameter bore hole up to a maximum depth of 20 m below ground level at various locations in all types of soil including laterite using suitable approved method of boring including chiselling, cleaning, providing casing pipes as required or as directed; performing standard penetration test at every 1 m interval alternate to collection of undisturbed soil samples up to 10 m depth below ground level and at every 1.5 m interval alternate to collection of undisturbed soil samples beyond 10 m depth, at change of strata and at depths wherever undisturbed soil samples could not be collected; collection of undisturbed sample (UDS) at every 1 m interval alternate to conducting standard penetration test up to 10 m depth below ground level and at every 1.5 m interval alternate to conducting standard penetration test beyond 10 m depth; collection of disturbed soil samples and water samples, sealing and packing of samples, observation such as ground water table etc; transportation of all the collected samples to the laboratory and back filling of boreholes with sand on completion of the same etc all complete as per specification and as directed by the engineer-in-charge for depth below ground level as given below .</p>	RM	158			
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3	Core drilling (Nx size) in rock using hydraulic feed rotary drill and double tube core barrel with diamond bit including collection of core samples, performing SPT at locations where core recovery is less than 20%, maintaining continuous record of core recovery and RQD, keeping the cores in wooden core boxes, transporting the cores to laboratory, back filling the holes with 1 part of cement : 3 part of sand grout on completion of the same etc all complete as per specification, drawings and as directed by the engineer-in-charge.	RM	1297			
4	Excavating trial pit of size 3m x 3m at various locations up to a maximum depth of 3m depth below ground level in all types of soil and weathered rock which can be excavated with pick axe/crow bar etc including sheeting or shoring the sides for the purpose of stability, dewatering and maintaining the pit dry at all times, collecting disturbed/undisturbed samples and conducting field density test at 1m interval, starting from 1m depth below ground level and transporting all the collected samples to the laboratory; backfilling of the pit with excavated material etc all complete as per specification and as directed by the engineering-charge.	CuM	1134			

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5	Conducting plate load test in various locations at specified depth complete as per specification, drawings and as directed by the engineer-in-charge. Payment for making the pit of suitable size, maintaining it dry and backfilling etc shall be paid separately as per item no.4.	Each	11			
6	Conducting cyclic plate load test in various locations at specified depth complete as per specification, drawings and as directed by the engineer-in-charge. Payment for making the pit of suitable size, maintaining it dry and backfilling etc shall be paid separately as per item no.4.	Each	6			
7	Conducting electrical resistivity test at various locations complete as per specification, drawings and as directed by the engineer-in-charge.	Each	26			
8	Conducting pump in type field permeability test by constant head or falling head method (suitability of type of test shall be as per site conditions) in various boreholes at specified depth including providing packers as required etc all complete as per specification, drawings and as directed by the engineer-in-charge. Cost of the borehole and backfilling etc shall be paid separately as per item no.2.	Each	20			

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9	Conducting pressure meter test in bore hole at 2m, 4m, 6m, 8m, 10m, 12m, 15m, 18m and 20m depth below ground level in all type of strata (soil & rock) including drilling and preparation of bore hole of required size etc all complete as per specification, drawings and as directed by the engineer-in-charge.	Each	6			
10	Conducting seismic refraction test at various locations complete as per specification, drawings and as directed by the engineer-in-charge.	RM	2000			
11	Conducting cross hole shear wave test in bore hole in all types of strata at 2m, 4m, 6m, 8m, 10m, 12m, 15m, 18m and 20m depth below ground level including drilling and preparation of required number of bore holes, providing PVC liner, grouting and backfilling with sand after completion of the test etc all complete as per specification, drawings and as directed by the engineer-in-charge.	Each	6			
12	Conducting laboratory test on soil samples at an approved laboratory including preparation of soil samples to determine the following properties etc all complete as per specification.					
	a)Bulk density and moisture content	Each	50			
	b)Sieve analysis	Each	90			

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	c)Hydrometer analysis	Each	30			
	d)Liquid limit and plastic limit	Each	100			
	e)Shrinkage limit	Each	40			
	f)Specific gravity	Each	30			
	g) Swell pressure	Each	25			
	h) Free swell index	Each	20			
	i) Relative density	Each	20			
	j) Unconfined compressive strength	Each	25			
	k) Direct shear test	Each	25			
	l)Triaxial shear test i) unconsolidated undrained test	Each	30			
	m) One dimensional consolidation test	Each	30			

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	n) Standard Proctor compaction test	Each	15			
	o) CBR test	Each	20			
	p) Chemical analysis	Each	10			
13	Conducting Laboratory Test on rock samples including preparation of the samples to determine the following properties etc all complete as per specification.					
	a)Moisture content, porosity & density	Each	120			
	b)Specific gravity	Each	120			
	c)Slake durability index	Each	100			
	d)Unconfined compressive strength (both at saturated and in-situ water content)	Each	120			
	e)Point load strength	Each	40			

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14	Conducting chemical test on water samples to determine the carbonate, sulphate, chloride and nitrate contents, pH value, turbidity, organic matter and any other chemicals harmful to foundation material etc all complete as per specification.	Each	20			
15	Preparation and submission of draft report in 3 copies and final report in 5 hard copies and 2 soft copies on CD after the approval of draft report including all field records, laboratory test results, graphs, analysis of test results, photo graphs showing details of field tests/soil/rock samples/Trail pits and recommendation etc all complete as per specification.	LS	1			
	TOTAL OF SECTION-B (In Rs)					
	TOTAL OF SECTION A & SECTION-B IN RS					