

TENDER SPECIFICATION

NO: BHE/PW/PUR/BWT6-GEO/1443

**GEO- TECHNICAL INVESTIGATION AND TOPOGRAPHICAL
SURVEY**

AT

1X 660 MW BHUSAWAL 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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For Bharat Heavy Electricals Limited

AGM (Purchase)
Place: Nagpur
Date

GEO TECHNICAL INVESTIGATION AND TOPOGRAPHICAL SURVEY FOR 1X660MW BHUSAWAL SITE						
SL. No.	ITEM DESCRIPTION	UNIT	QTY.	Rate in figures (In Rs)	Rate in words (In Rs)	Total Amount (In Rs)
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			
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						
IN WORDS Rs. ONLY						

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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 equipment to be deployed as per Appendix - I of Tender Specification. Any additional equipments if required shall be mobilized as per the directions of the BHEL Engineer to match the work schedule without extra cost	LS	1			
2(a)	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 1m interval down to 10m depth below ground level and at every 1.5m interval beyond 10m depth, at change of strata and at depths wherever undisturbed soil samples could not be collected; collection of undisturbed soil samples at every 1m interval down to 10m depth below ground level and at every 1.5m interval beyond 10m depth and at change of strata; 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.	RM	80			

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2(b)	Core drilling (Nx size) in rock up to a maximum of 25m depth below ground level 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	780			
3	Excavating trial pit (TP) of size 3m x 3m at various locations upto 4m 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 at 1m interval and at final depth 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 engineer-in-charge.	CuM	810			
4	Conducting plate load test (PLT) 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.3	Each	5			
5	Conducting cyclic plate load test (CPLT) 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.3	Each	4			

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SL. No.	ITEM DESCRIPTION	UNIT	QTY.	Rate in figures (In Rs)	Rate in words (In Rs)	Total Amount (In Rs)
6	Conducting cross hole shear wave test (CHSWT) in bore hole in all types of strata at all depths such as 2m, 4m, 6m, 8m, 10m, 13m, 16m, 19m, 22m, 25m, 28m, 31m, 34m, 37m & 40m below ground level including preparation of borehole, 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. Cost of the borehole and backfilling etc shall be paid separately as per item no.2a & 2b above.	Each	4			
10	Conducting electrical resistivity test (ERT) at various locations complete as per specification, drawings and as directed by the engineer-in-charge.	Each	20			
7	Conducting pump in type field permeability test (FPT) 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.2a & 2b above.	Each	10			
8	Conducting pressuremeter test (PMT) in various bore holes in all types of strata at all depths such as 2m, 5m, 8m, 11m, 14m, 17m, 20m, 23m, 26m, 29m, 32m, 35m, 38m & 40m below ground level including preparation of bore hole of required size 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.2a & 2b above.	Each	4			
9	Conducting seismic refraction test (SRT) at various locations complete as per specification, drawings and as directed by the engineer-in-charge.	RM	1000			
10	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.					

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SL. No.	ITEM DESCRIPTION	UNIT	QTY.	Rate in figures (In Rs)	Rate in words (In Rs)	Total Amount (In Rs)
	a)Bulk density and moisture content	Each	25			
	b)Sieve analysis	Each	45			
	c)Hydrometer analysis	Each	15			
	d)Liquid limit and plastic limit	Each	50			
	e)Shrinkage limit	Each	25			
	f)Specific gravity	Each	15			
	g) Swell pressure	Each	10			
	h) Free swell index	Each	10			
	i) Relative density	Each	10			
	j) Unconfined compressive strength	Each	15			
	k) Direct shear test	Each	10			

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SL. No.	ITEM DESCRIPTION	UNIT	QTY.	Rate in figures (In Rs)	Rate in words (In Rs)	Total Amount (In Rs)
	l)unconsolidated undrained test	Each	15			
	m) One dimensional consolidation test	Each	15			
	n) Standard Proctor compaction test	Each	5			
	o) CBR test at					
	(i) soaked condition	Each	10			
	(ii) un-soaked conditions	Each	10			
	p) Chemical analysis	Each	10			
11	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	60			
	b)Specific gravity, Hardness	Each	60			
	c)Slake durability index	Each	50			
	d)Unconfined compressive strength (both at saturated and in-situ water content)	Each	80			

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SL. No.	ITEM DESCRIPTION	UNIT	QTY.	Rate in figures (In Rs)	Rate in words (In Rs)	Total Amount (In Rs)
	e)Point load strength	Each	40			
12	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	10			
17	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)						
IN WORDS Rs. ONLY						
TOTAL OF SECTION A & SECTION-B IN RS						