



**BHARAT HEAVY ELECTRICALS LIMITED**  
**CENTRALISED STAMPING UNIT & FABRICATION PLANT**  
**Jagdishpur**

**TENDER FOR LANDSCAPPING AND  
HORTICULTURE WORK  
AT JAGDISHPUR**

**Tender Enquiry No: BHE/FP/CVL/008**

**SECTION V**

**TECHNICAL SPECIFICATION**

**PART A: SPECIFIC TECHNICAL REQUIREMENTS**

**BHARAT HEAVY ELECTRICALS LIMITED**  
**(A GOVERNMENT OF INDIA UNDERTAKING)**  
**CSU & FP**  
**Industrial Area**  
**Jagdishpur (UP) 227817**

**SECTION V****PART - A****SPECIFIC TECHNICAL REQUIREMENTS****1.0 GENERAL**

Part-A covers specific technical requirements of contract and should be read in conjunction with BOQ, Part-B and other sections of the contract. In case of any conflict between the contents of BOQ and Part-A & B then BOQ will prevail over Part-A & B. In case of any conflict between Part-A and Part-B, Part-B will prevail over Part-A.

**2.0 FREE ISSUE MATERIALS**

Nothing shall be supplied as free issue material by BHEL.

**3.0 DISMANTLING OF EXISTING STRUCTURES**

The contractor will have to carryout dismantling of buried/ semi buried structures, if any, encountered within the battery limit and disposal of it within plant boundary as directed by BHEL at no extra cost to BHEL.

**4.0 STATUTORY REQUIREMENTS**

Bidder shall comply with all the applicable statutory rules pertaining to Factories Act, Fire Safety Rules of Tariff Advisory Committee, Water Act for pollution control, Explosives Act, etc.

Provisions of safety, health and welfare according to Factories Act shall be complied with. These shall include provision of continuous walkway minimum 500 wide along the crane-girder level on both sides of building, comfortable approach to EOT crane cabin, railing, fire escape, locker room for workmen, pantry, toilets, rest room, etc.

Provisions for fire proof doors number of staircases, fire separation wall, lath plastering/encasing the structural members (in the fire prone areas), type of glazing etc. shall be made according to the recommendations of Tariff Advisory Committee.

Statutory clearances and norms of State Pollution Control Board shall be followed.

Bidder shall obtain approval of Civil/Architectural drawings from concerned authorities before taking up the construction work.

**5.0 LAYOUT**

Before starting the work, the Contractor shall carry out the setting out of foundation and structures and provide levels, with reference to general existing grid and bench mark. If the contractor uses the grid, , bench mark and reference pillar made by other Contractors, he shall coordinate with the Contractor and shall satisfy himself

of the accuracy of the reference marks. If he is required to set out the foundation afresh, he shall do so independently with reference to the one existing grid and bench mark which has been followed by other agency at the instruction of the Engineer. In case any discrepancy be found, it shall be immediately brought to the notice of the engineer for any rectification/modification necessary. No complaint shall be entertained at a later stage. The Contractor shall accurately set out the position for holding down bolts and inserts.

If required, in the opinion of the Engineer, he shall construct and maintain pillars for Grid, references and bench marks and maintain them till the completion of the construction. He shall also help the Engineer with instruments, materials and labours for checking the detailed lay outs and levels. The Contractor shall be solely responsible for the correctness of the layout and levels, and Engineer's approval shall not be deemed to imply any warranty in carrying out the work correctly.

## **6.0 WORKMANSHIP**

Workmanship shall be of the best possible quality and all work shall be carried out by skilled workmen except for those which normally require unskilled persons. Welding shall be done by experienced and certified welders in proper sequence using necessary jigs and fixtures. Fabrications shall be done in shops having proper equipment for accurate edge planning and milling of column shall ends, base late surfaces etc. and shaping and dimensioning of anchor bolt assembly, inserts and other misc. items. In addition to the requirement specified above, if the bye-laws of the local Govt., Municipal or other authorities require the employment of licensed or registered workmen for various traders, the contractor shall arrange to have the work done by such registered or licensed personnel. In case of manufactured materials, the Contractor shall have, with no additional cost the owner, the services of the supervisors of the manufacturers to achieve that the work is being done according to the manufacturer's specifications.

## **7.0 TEMPORARY WORK**

All scaffoldings, staging, temporary bracing and other necessary temporary work required for proper execution of the Contract shall be provided by the Contractor at his own cost and inclusive of all materials, labour, supervision and other facilities.

The layout and details of such Temporary work shall have the prior approval of the Engineer as agreed, but the Contractor shall be responsible for proper strength and safety of the same. All Temporary work shall be so constructed as not to interfere with any permanent work or with the work by other agencies. If it is necessary to remove any of the temporary work at any time to facilitate execution of the work or with the work of other agencies, such removal and re-erection, if required, shall be carried out by the Contractor at the discretion of the Engineer without any delay and any extra cost on this account shall be borne by the Contractor.

## **8.0 INTERFACE WITH STRUCTURES UNDER OTHER'S SCOPE**

a) In cases of interface e.g. structures under other's scope of supply being supported on structures under scope of this contractor, the same will be discussed and suitably addressed.

b) Modification in layout of foundation/structure during detail engineering stage may be necessary to avoid fouling with those under other's scope. Necessary changes on this account will be made without any extra cost to Owner.

c) Necessary engineering is to be done and provisions are to be kept accordingly by the Contractor to construct foundations/underground structures, etc. without disturbing/ endangering the constructions done under the scope of other contracts.

## 9.0 INSPECTION, TESTING AND QUALITY CONTROL FOR CIVIL WORKS

Sampling and testing for major items of civil works viz earthwork, concreting, structural steel work (including welding) etc. shall be carried out in accordance with the requirements of this specification and field quality plan (FQP).

The bidder shall submit for BHEL's approval a detailed field quality assurance programme for civil works before starting of the construction work. This shall include frequency of sampling and testing nature/type of test, method of test, setting of a testing laboratory, arrangement of testing apparatus/equipment, deployment of qualified/experienced manpower, preparation of format for record, Field Quality Plan, etc. Tests shall be done in the field and/or at a laboratory approved by the Engineer and the Bidder shall submit to the Engineer, the test results in triplicate. In addition, the bidder shall furnish the original test certificate from the manufacturer's of various materials to be used in the construction.

If any work found to be of inferior quality or sub-standard, the same shall be dismantled and shall be redone as per approved quality or relevant standard. BHEL reserve the rights to reject the work of inferior quality. All expenses on account of dismantling and rework shall be born by contractor.

**Contractor shall arrange for conducting the initial and field CBR test for the road construction as per latest IRC/ MOT guidelines. The contractor's finally accepted rates shall include cost of such field tests with standard equipments and IMTEs.**

## 10.0 CONSTRUCTION / ERECTION METHODOLOGY

- Construction excavation activities shall be fully mechanized from the start of the work.
- All excavation and backfilling work shall be done using excavators, loaders dumpers, dozers, poclains, excavator mounted rock breakers, rollers, sprinklers, water tankers, etc. Manual excavation can be done only on isolated place with specific approval of engineer.
- Dewatering shall be done using the combination of electrical and stand-by diesel pumps.
- For concreting, weigh batching plants, transit mixers, concrete pumps, hoists, etc. shall be used.
- All fabrication and erection activities of structural steel shall be carried out using automatic submerged arc welding machines, cutting machine, gantry cranes, crawler / wheel mounted heavy cranes and other equipments like heavy plate bending machines, shearing machines, lathe, milling machines etc. Use of derricks shall not be permitted.
- All handling of materials shall be with cranes. Heavy tailors shall be used for transportation.

- Mechanized modular units of scaffolding and shuttering shall be used.
- Grouting shall be carried out using hydraulically controlled grouting equipment.
- Roadwork shall be done using pavers, rollers and premix plant.
- All finishing items shall be installed using appropriate modern mechanical tools.
- Manual punching etc. shall not be permitted.
- Heavy duty hoist for lifting of construction materials shall be deployed.
- Compressors for cleaning of foundations and other surfaces shall be used.
- Field laboratory shall be provided with all modern equipment for survey, testing of aggregates, concrete, welding etc. For testing of steel works, ultra sonic testing machines, radiographic testing machines, dye penetration test equipment, destruction testing equipment, etc shall be deployed.
- All persons working at site shall be provided with necessary safety equipment and all safety aspects shall be duly considered for each construction/erection activity. Moreover, only the persons who are trained in the respective trade shall be employed for executing that particular work.
- Fabrication and Erection of all fabricated columns shall be done in single piece unless otherwise provided for in the approved drawings. Main columns of the power house building can have maximum of one number of the erection splice. All shop and site splice shall suitably staggered. The erection splice shall be provided with full strength splice cover plate over the butt weld. Contractor shall submit the erection scheme for the erection of all type of structures and carryout the erection work only after approval of the scheme by the owner.

#### **11.0 FIELD LABORATORY FACILITIES AT SITE FOR MATERIAL TESTING:**

Contractor shall provide field testing facilities at site laboratory built by the contractor as per list of apparatus at annexure-A-1.

#### **12.0 MAKE OF BOUGHT OUT MATERIAL:**

Contractor shall supply bought out items as per the list attached at annexure-A-2 of this section.

#### **13.0 SPECIFIC REQUIREMENTS FOR ROADS AND DRAINS**

##### **13.1 Drains**

- 300mm diameter NP2 RCC Hume pipe shall be laid from Man-holes to drain out water out side the Production Hall.
- Open drains shall be with brick work laid on CC plastered with neat coat of cement as described in the following sections.

##### **13.2 Apron and Surface Drain**

- 1 meter wide 40mm thick apron laid in 1:2:4 cement, coarse sand and 20mm gauge stone ballast laid in panels separated by glass strips over 100mm thick base concrete in 1:4:8 cement, sand and 40mm gauge over burnt brick ballast all round the Production hall. With a floating coat of neat cement punning on top.

##### **13.3 Roads & Drains**

- 15 meter wide roads shall be of Bituminous Macadam 7.5 cm thick finished with Asphaltic Concrete 2.5 cm thick laid over 25 cm thick sub-base of 25 cm thick water bound and 8 cm thick built up spray grout surface.

- Drains shall be of brick masonry in 1:4 cement mortar made in slope of 1 in 360, connected to outside drain or rain harvesting pit.

#### 14.0 GENERAL NOTES ON REINFORCEMENT CONCRETE WORK

##### 14.1 General -

- All dimensions are in MM. Unless specified. Do not scale. Only figured dimensions be followed.
- Drawing is based on Architectural drawings. Dimensions be compared with the Architectural drawings. In case of any in-consistency, refer for correction.
- All RCC work shall be in M-20 concrete unless otherwise mentioned.
- All Reinforced Concrete work shall be carried out as per IS: 456-1978.
- Controlled concrete mix shall be used in all RCC work. Concreting should be continuous.
- All steel in reinforcement shall be High Yield Strength Deformed Bars, confirming to IS : 1979.
- Clear cover to reinforcement shall be : -
 

(a) Beams .....	25mm	(b) Slabs .....	20mm
(c) Columns .....	40mm	(d) Footings .....	40mm
- Bending and fixing of bars in reinforcement be done as IS: 2502 and IS : 5525.
- Lap length for joining the bars shall not be less than the development length for deformed bars. Development length for deformed bars. In general the lap length shall be 50x dia. of the reinforcement bar.

##### 14.2 Important Notes -

- Top of the beams shall be kept at same level except the area of Toilet as Marked (X) where bottom of Slab shall be at level matching with bottom of Beam. However, a 25 dia. pipe be inserted in the beam to drain out trapped water.
- Cubes 15 cm x 15 cm x 15 cm be moulded and tested for M-20 concrete before actual concreting is carried out to ascertain the strength achieved.
- Alternate bars to be bent up at 0.2x L (Span) and be carried over to 0.3xL (Span) as shown in the drawing given below.
- Slab which are continuous over various spans, the reinforcement, be carried over to the adjoining slab so that the moment is carried over to other slab at supports.
- Column ends from where beam originates, the reinforcement of beam should be inserted in the column up to development length.

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**ANNEXURE – “A-1”****BIDDER SHALL PROVIDE MINIMUM FOLLOWING FACILITIES IN SITE IN THE FIELD LABORATORY FOR MATERIAL TESTING****General Equipment**

<b>Sl.No</b>	<b>Description</b>	<b>Sl.No</b>	<b>Description</b>
1.	Balances	10.	Burette stand
2.	Drier	11.	Pipette
3.	Thermometer	12.	Wooden mallet
4.	Hydrometer	13.	Hair brush
5.	Hand-scoop	14.	Wire Brush
6.	Glass beakers	15.	Buckets
7.	Measuring Cylinder	16.	Test Tubes
8.	Desiccator	17.	Working platforms
9.	Burette	18.	Alcometer

**Soil testing apparatus for conducting the following tests:**

Particle size analysis and index properties of soil

Moisture-density relations of soil

Specific gravity of soil

Density of soil in place by sand replacement method

**Annexure-“A-2”****INDICATIVE LIST OF APPROVED MAKE OF BOUGHT OUT MATERIAL TO BE ARRANGED BY THE CONTRACTOR AT HIS OWN COST**

The following list may be read in conjunction with the relevant make/ makes of materials mentioned in the BOQ or elsewhere in this tender document.

<b>S.NO.</b>	<b>MATERIAL NAME</b>	<b>MAKE</b>
1.	GI & MS PIPES	SURYA, PRAKASH, JINDAL-HISSAR, TATA
2	CEMENT	JP BUNIYAD, MAIHAR CEMENT , ULTRATECH , L&T OR EQUIVALENT
3	REINFORCEMENT STEEL	TATA-TMT, SAIL, OR EQUIVALENT
4	STRUCTURAL STEEL	TATA, SAIL
5	COARSE SAND	BADA/KALPI /DUDHI
6	LOCAL SAND	GHAGHARA/ GANGA
7	STONE BALLAST FOR BASE CONCRETE	SHANKERGARH/ DALA OR EQUIVALENT
8	STONE GRIT, 20MM, 12MM, 8MM FOR RCC WORK	JHANSI/ BHARATKROUP



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**SECTION V**

**PART B**

**STANDARD TECHNICAL SPECIFICATION FOR LANDSCAPPING AND  
HORTICULTURE WORK**

**BHARAT HEAVY ELECTRICALS LIMITED  
(A GOVERNMENT OF INDIA UNDERTAKING)  
CSU & FP  
Industrial Area  
Jagdishpur (UP) 227817**

## **LANDSCAPING WORKS**

### **SPECIFICATION FOR LANDSCAPING**

1. At least 225mm garden soil/red earth for lawn area & Farm yard manure as per the Horticulturist recommendations shall be provided by the contractors.
2. The contractor shall arrange his own Trees and plants required for development as well as maintenance period as mentioned in the tender schedule.
3. Tree / Shrub / Creeper / Hedge plant shall be approved by the Engineer-in-Charge.
4. Uprooting weeds from the trenched area after 10 to 15 days of its flooding with water including disposal of uprooted weeds.
5. Fine levelling the ground to levels specified.
6. Mixing earth, sand and manure in proportion and thickness as specified.
7. Providing and spreading manure or / and good earth in required thickness.
8. Treat the soil with chemicals (Pesticide / Fungicide) to control soil pests.
9. Providing and planting Korean / buffalow / Doob grass including watering and maintenance of the lawn till the grass forms a thick lawn free from weeds and fit for moving including good earth if needed.
10. Preparation of beds for hedging and shrubbery by excavating to specified depth and trenching the excavated base to a further depth of 30 cm. Refilling the good earth after breaking clods and mixing with manure in the ratio as specified flooding with water, filling with earth if necessary, watering and finally fine dressing, leveling etc. including stacking and disposal of materials declared unserviceable and surplus earth by spreading and leveling as directed, within a lead of 50m, lift up to 1.5m complete.
11. Digging pits in ordinary soil and refilling the same with the good earth mixed with manure in the ratio as specified flooding with water dressing including removal of rubbish and surplus earth if any with all leads and lifts (cost of manure, sludge or extra good earth if needed to be paid for separately).
  - i) Tree shall be planted in a pit of size 60 x 60 cm.
  - ii) Tree should be staked properly.
12. Supplying best quality container grown healthy trees / plants specified height. All trees to be approved before planting.

**General:**

All plant materials shall be healthy, sound, vigorous, free from plant diseases insects, pests, or their eggs, and shall have healthy, well-developed root systems. Replacement of dead or decayed plants by new ones whenever necessary at free of cost and maintaining ever fresh look garden landscape and keeping them in good condition till the entire maintenance period. All plants shall be hardy under climate conditions similar to those in the locality of the project. Plants supplied shall conform to the names listed on both the plan and the plants list. No plant material will be accepted if branches are damaged or broken. Plants should have specified height. All material must be protected from the Sun and Weather until planted.

All nursery stock shall be inspected and approved by the landscape horticulturist / Engineering-in-Charge.

All plants shall conform to the requirements specified by the landscape architect except that plants larger than specified may be used if approved but use of such plant shall not increase the contract price.

If the use of the large plant is approved, the spread of roots or ball of earth shall be increased in proportion to the size of the plant. Deliver plants with legible identification labels.

Required quantity of watering for each plant at every time shall be done by the contractor. Removal of extraneous matter, debris collection should be dumped outside the campus as directed.

**TOPSOIL: (good earth)**

Topsoil or good earth shall be a friable loam typical. It shall be free of subsoil stones, earth clods, stubbles, weeds or other objectionable with extraneous matter or debris. It shall contain no toxic material. No topsoil shall be delivered in a muddy condition. The pH value of the soil in between 6.5 to 7.5, which shall be ensured by the contractor by random testing of soil in NPCIL laboratory or any other reputed laboratory.

**MANURE:**

Well decomposed farm yard manure/organic manure shall be used. It shall be free from sticks, paddy strain stones, earth, weed, seed, extraneous matter, harmful bacteria. insects or chemicals.

**ROOT SYSTEM:**

The root system shall be conducive to successful transplantation. Where necessary, the root-ball shall be preserved by support with hessian or other suitable material. On soils where retention of a good ball is not possible. The roots should be stable/protected in some other way which should not cause any damage to roots. The roots system should free from nematodes and other pests.

## **FERTILIZER:**

Fertilizing shall be carried out by application in rotation of the following fertilizers every days from the beginning of the monsoon till the end of winter:

Organic well-rotted dry farmyard manure 0.05 cum. Per tree.

Nitrogen - 15 lbs/1000 Sq.feet  
Phosphorus - 30 lbs/1000 Sq.feet  
Potash - 15 lbs/1000 Sq.feet

In the absence of rain, in the Monsoon the lawn shall be watered with sprinklers system. Hence the contractor shall design, supply and lay the requisite pipeline and sprinkler system under this tender. To reduce the wastage of water sufficient care shall be taken to throttle the pressure and also use shower rose at the end of the water hose.

Damage, failure or dying back of grass due to heat, pest, decease and deficiency etc. shall be the responsibility of the Contractor.

The Contractor is to exercise care in the use of rotary cultivator and mowing machines to reduce to a minimum the hazards of flying stones and brickbats. All rotary mowing machines are to be fitted with safety guards.

## **LAWN GRASS:-**

### **a) Planting / dibbling of lawn grass**

After preparation of land watering should be done regularly to allow the weeds to grow and remove the weeds for 15 days time. The grass should be separated and planting done in the spacing of 7-10 cm. After that watering and weeding should be done regularly.

### **b) Turfing of lawn grass:-**

After preparation of land it should be leveled properly and watering and consolidation should be done. Spreading of thin layer of sand shall be done. Laying of grass shall be done in the uniform level.

## **PLANTING OF SHRUBS / TREES:**

Planting shall be done at the specified spacing as directed by the Engineer-in-Charge. For planting the plants shall be removed from the containers such as the root ball is not broken. Plants with broken root balls will be rejected.

The plants shall be planted plumb and shall be centered in the planting pit (or) trench. Backfilling shall be done immediately after planting. Any excess soil which is not used to backfill the planting pits may be evenly distributed in the landscape areas. Immediately after planting, all plants shall be thoroughly irrigated until the backfill soil around and below the roots or the root ball of each plants is saturated. Stacking shall be done immediately after planting.

## **MAINTENANCE OF LAWNS / DOOB GRASS / KOREAN GRASS:**

The lawn shall be regularly mowed with lawn mower without appearing dry patches. The side grass should be trimmed with grass cutter. All garden equipment like power lawn mowers, sprayers, grass cutter, garden shears and small garden implements for day to day use required for maintenance will have to be arranged by the successful tenderer.

1. When power lawn mower is to be used required fuel should also be procured at tenderer's cost.
2. Pruning of shrubberies should be done with proper hedge trimmer or garden shear only.

The Height of the grass shall not be allowed to increase beyond 60mm. The minimum height of grass shall be maintained as 25mm. The height shall be measured from top of the soil surface. The grass shall also be kept free from all kinds of weeds, pests and diseases.

The grass lawns shall be kept constantly rolled to give cushioning effect to the grass. Manuring of the grass lawns shall also be done regularly so as to keep the grass green.

## **TREES:**

Staking should be done immediately after planting. Form the tree basin around the tree. The area around the tree plants upto a minimum of two feet from trunk of the tree plants shall be kept free from grass and all kinds of weeds. Training and pruning shall be done regularly. Hoeing of the area around the trees shall be done regularly. The plants shall also be watered regularly as required and as directed by the Engineer-in-Charge. Hoeing shall also be done after every watering as per the direction of Engineer-in-Charge. For proper upkeep of the trees unwanted branches of the trees/tree plants shall be cut and removed at regular intervals as required and as directed by the Engineer-in-charge. The tree plants/trees shall also be kept free of any disease, insects or pest by regularly spraying insecticides as required and as directed by the Engineer-in-Charge. The appropriate insecticide along with the spraying machine and manpower required shall be provided by the contractor. To keep the tree plants healthy manure should be applied based on the tree plant requirement.