

Technical Conditions of Contract (TCC) for Underground trenchless  
cable laying work by horizontal boring

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# VOLUME - IA

Technical Conditions of Contract (TCC) Underground  
trenchless cable laying work by horizontal boring, Gr.  
239, Jhansi Division

FOR


RE WORKS OF BHANDAI-UDI, BIRLANAGAR-  
ETAWAH AND FARRUKHABAD-SHIKOHABAD  
INCLUDING MAINPURI-ETAWAH

OF

NORTH CENTRAL RAILWAY

BHARAT HEAVY ELECTRICALS LIMITED

**Technical Conditions of Contract (TCC) for Underground trenchless  
cable laying work by horizontal boring**

	<b>Technical Conditions Of Contract (TCC)</b> <b>PROJECT ENGINEERING &amp; SYSTEMS</b> <b>DIVISION</b> <b>HYDERABAD</b>	Ref No: HY/PE&SD/Projects /TCC/2020- 21/Trenchless Boring works /01		
		Rev. No.	00	
<b>COPYRIGHT AND CONFIDENTIAL</b> The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED, It must not be used directly or indirectly in any way detrimental to the interest of the company.	<b>TECHNICAL CONDITIONS OF CONTRACT</b> <b>(TCC)</b>  <b>FOR</b>  <b>Underground trenchless cable laying work by</b> <b>horizontal boring</b> <b>“Gr. 239, Jhansi Division”</b>  <b>FOR</b>  <b>RAILWAY ELECTRIFICATION PROJECT IN BHANDAI-UDI, BIRLANAGAR-</b> <b>ETAWAH</b>  <b>AND SHIKOHABAD-FARRUKHABAD INCLUDING MAINPURI-ETAWAH, SECTION OF</b> <b>AGRA, JHANSI AND ALLAHABAD DIVISIONS OF NORTH CENTRAL RAILWAY</b> <b>UNDER RE PROJECT LUCKNOW, TOTAL RKM 386/440TKM</b>			
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<b>Volume-IA</b>	<b>Part-II : Technical Specifications</b>	
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# **Volume IA**

## **Part I**

### **Contract specific details**

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## Chapter I- Project Information

### 1.0 Project Details

Bharat Heavy Electricals Limited has been awarded the “The Electrification of Railway Lines of the section Birlanagar-Etawah, Bhandai-Udi and Farrukhabad-Shikohabad including Mainpuri-Etawah of North Central Railway 386 RKM/440 TKM” project on EPC basis by Central organization for railway electrification (CORE), Allahabad.

1	Customer	:	Central organization for railway electrification (CORE), Allahabad.
2	Project Information	:	Electrification of Railway Lines of the section Birlanagar-Etawah, Bhandai-Udi and Farrukhabad-Shikohabad including Mainpuri-Etawah of North Central Railway 386 RKM/440 TKM
3	Location	:	Birlanagar-Etawah, Bhandai-Udi and Farrukhabad-Shikohabad including Mainpuri-Etawah of North Central Railway 386 RKM/440 TKM, Madhya Pradesh and Uttar Pradesh.
4	Address Detail	:	Birlanagar-Etawah, Bhandai-Udi and Farrukhabad-Shikohabad including Mainpuri-Etawah of North Central Railway.
5	Nearest Railway Station	:	Agra, Etawah, Birlanagar, Shikohabad and others
6	Road Approach	:	NA
7	Nearest Air Port	:	Lucknow, Kanpur
11	Ambient Air Temperature (Average)	:	a) Maximum : 45 <sup>0</sup> C b) Minimum : 2 <sup>0</sup> C
12	Average Relative Humidity	:	40 %
13	Climatic Condition	:	Tropical Climate
14	MP Border	:	State boundary between Udi More and Phoop Station

**Bidder is advised to visit the project site and appraise himself about the local conditions and infrastructure available in the area for fulfilling their commitments under the contract. BHEL will not admit any claims whatsoever on account of Contractor’s non-familiarization of local conditions.**

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## Chapter II- Scope of Work

### SCOPE OF WORK

The work to be performed under the scope of this tender mainly consists of but not limited to complete scope of trenchless cable laying by horizontal directional drilling (HDD) method.

For detailed scope of works, please refer chapter I, technical specifications of volume IA, part II.

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## Chapter III- Facilities in the scope of BHEL/Contractor

S. No.	Description <b>PART I</b>	Scope / to be taken care by		Remarks
		BHEL	Bidder	
<b>3.1</b>	<b>ESTABLISHMENT</b>			
<b>3.1.1</b>	<b>FOR CONSTRUCTION PURPOSE:</b>			
a	Open space for office (as per availability)	Yes		Location will be finalized after joint survey with customer(CORE)
b	Open space for storage (as per availability)	Yes		Location will be finalized after joint survey with customer(CORE)
c	Construction of bidder's office, canteen and storage building including supply of materials and other services		Yes	
d	Bidder's all office equipment, office / store / canteen consumables		Yes	
e	Canteen facilities for the bidder's staff, supervisors and engineers etc.		Yes	
f	Firefighting equipment like buckets, extinguishers etc.		Yes	
g	Fencing of storage area, office, canteen etc. of the bidder		Yes	
<b>3.1.2</b>	<b>FOR LIVING PURPOSES OF THE BIDDER</b>			
a	Open space for labor colony (as per availability)	Yes		Can be provided as per availability
b	Labor Colony with internal roads, sanitation, complying with statutory requirements		Yes	
<b>3.2.0</b>	<b>ELECTRICITY</b>			
<b>3.2.1</b>	Electricity For construction purposes		Yes	
3.2.2	Electricity for the office, stores, canteen etc. of the bidder		Yes	
<b>3.2.3</b>	Electricity for living accommodation of the bidder's staff, engineers, supervisors etc.		Yes	
<b>3.3.0</b>	<b>WATER SUPPLY</b>			
<b>3.3.1</b>	For construction purposes		Yes	
<b>3.3.2</b>	<u>Water supply for bidder's office, stores, canteen etc.</u>		Yes	

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S. No.	Description	Scope / to be taken care by		Remarks
		BHEL	Bidder	
<b>3.3.3</b>	<u>Water supply for Living Purpose</u>		Yes	
<b>3.4.0</b>	<b>LIGHTING</b>			
a	For construction work (supply of all the necessary materials) 1. At office/storage area 2. At the preassembly area 3. At the construction site /area		Yes	
b	For construction work (execution of the lighting work/ arrangements) 1. At office/storage area 2. At the preassembly area At the construction site /area		Yes	
c	Providing the necessary consumables like bulbs, switches, etc. during the course of project work		Yes	
d	Lighting for the living purposes of the bidder at the colony / quarters		Yes	
<b>3.5.0</b>	<b>COMMUNICATION FACILITIES FOR SITE OPERATIONS OF THE BIDDER</b>			
a	Téléphone, fax, internet, intranet, e-mail etc.		Yes	
<b>3.6.0</b>	<b>COMPRESSED AIR wherever required for the work</b>		Yes	
<b>3.7.0</b>	<b>Demobilization of all the above facilities</b>		Yes	
<b>3.8.0</b>	<b>TRANSPORTATION</b>			
a	For site personnel of the bidder		Yes	
b	For bidder's equipment and consumables (T&P, Consumables etc.)		Yes	

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Sl. No	Description  <b>PART II</b>  <b>3.9.0 CONSTRUCTION FACILITIES</b>	Scope / to be taken care by		Remarks
		BHEL	Bidder	
<b>3.9.1</b>	<b>Engineering works for construction:</b>			
a	Providing the construction drawings for all the works covered under this scope		Yes	BHEL shall provide required details at the time of kick off meeting
b	Drawings for construction methods		NA	
c	As-built drawings – where ever deviations observed and executed and also based on the decisions taken at site- example – routing of small bore pipes		Yes	In consultation with BHEL
d	Shipping lists etc. for reference and planning the activities		Yes	In consultation with BHEL
e	Preparation of construction (Concreting B/W, etc.) schedules and other input requirements		Yes	In consultation with BHEL
f	Review of performance and revision of site construction schedules in order to achieve the end dates and other commitments	Yes	Yes	In consultation with BHEL
g	Weekly construction schedules based on S. No. e. hard copy to Construction manager, by email to HO.		Yes	In consultation with BHEL
h	Daily construction / work plan based on S. No. g. hard copy to Construction manager, by email to HO.		Yes	In consultation with BHEL
i	Periodic visit of senior official of the bidder to site to review the progress so that works are completed as per schedule. It is suggested this review by the senior official of the bidder should be done once in every two Weeks.		Yes	
j	Arranging the materials required for Work		Yes	
k	Coordination for inspection & checking and getting clearance from customer		Yes	
l	Preparation of formats for completion of activities		Yes	

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## Chapter IV- T&P's to be Deployed By Contractor

### **LIST OF TOOLS AND PLANT:**

The following tools and equipment but not limited to, are required for the efficient execution of the civil works. The contractor shall make them available for construction purposes, including all consumables likely to be used at his own cost at the time of mobilization.

<b>S.No.</b>	<b>Description</b>	<b>Minimum Quantity</b>	<b>Remarks</b>
1	Horizontal directional drilling (HDD) machine	1 nos.	

BHEL will not provide any tool, plants or any testing facility/apparatus for the work. It will be contractor's responsibility to arrange all required tools, plants and other testing apparatus, etc. at their own cost. The prices quoted & finalized are inclusive of the charges towards providing such T&P. No extra payment will be entertained on account of this.

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## Chapter V- Time Schedule

### 5.1 TIME SCHEDULE

#### 5.1.1

The entire work as detailed elsewhere in the Tender Specification shall be completed within **30 Days** from the date of commencement of work at site.

#### 5.1.2

During the total period of contract, the contractor has to carry out the activities in a phased manner as required by BHEL and the program of milestone events.

#### 5.1.3

The work shall be commenced on the mutually agreed date between the bidder and BHEL engineer. The decision of BHEL in this regard shall be final and binding on the contractor. The scope of work under this contract is deemed to be completed only when so certified by the site Engineer.

### 5.2 COMMENCEMENT OF CONTRACT PERIOD

The date of commencement of contract period shall be the mutually agreed date between the bidder and BHEL engineer to start the work. In case of discrepancy, the decision of BHEL engineer will be final.

### 5.3 MOBILISATION

#### 5.3.1

The activities for work shall be started as per directions of Construction manager of BHEL.

#### 5.3.2

The contractor should mobilize man power in order to complete the work in **30 Days**.

#### 5.3.3

Requisite Material, men and machinery should be arranged in order to complete the project within stipulated time.

#### 5.3.4

The contractor has to augment his resources in such a manner that following major milestones of the project are achieved on specified schedules:

In order to meet above schedule in general, and any other intermediate targets set, to meet project, contractor shall arrange & augment all necessary resources from time to time on the instructions of BHEL.

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## 5.4 CONTRACT PERIOD

For the purpose of contract, the period shall be taken as **30 Days**. Completion of the work shall be as per BHEL Bar Charts revised from time to time. In order to expedite the work, the contractor has to deploy manpower as per site requirement without any extra cost to BHEL.

## 5.5 PROTECTION OF WORK

The contractor shall have total responsibility for protecting his works till it is taken over by the Employer. No claim will be entertained by the Employer or the representative of the Employer for any damage or loss to the Contractor's works and the Contractor shall be responsible for complete restoration of the damaged works to original conditions to comply with the specification and drawings. Should any such damage to the Contractor's Works occur because of other party not being under his supervision or control, the Contractor shall make his claim directly with the party concerned.

If disagreement or conflict or dispute develops between the Contractor and the other party or parties concerned regarding the responsibility for damage to the Contractor's Works the same shall be rectified. The Contractor shall not cause any delay in the repair of such damaged Works because of any delay in the resolution of such disputes. The Contractor shall proceed to repair the Work immediately and no cause thereof will be assigned pending resolution of such disputes.

## 5.6 GUARANTEE PERIOD

The guarantee period of twelve months shall commence from the date of completion of all works as certified by the BHEL site engineer

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## Chapter VI- Statutory Regulation

7.0 BUILDING & OTHER CONSTRUCTION WORKERS (REGULATION OF EMPLOYMENT AND CONDITIONS OF SERVICE) ACT, 1996 (BOCW Act) AND RULES OF 1998 READ WITH BUILDING & OTHER CONSTRUCTION WORKERS CESS Act, 1996 & CESS RULES, 1998 and INTER-STATE MIGRANT WORKMEN ACT, 1979 (IN CASE BIDDER ENGAGE MANPOWER FROM OTHER STATE)

In case any portion of work involves execution through building or construction workers and/or inter-state migrant workmen, then compliance to the above titled Acts as applicable shall be ensured by the contractor and contractor shall obtain license and deposit the cess under the Act. In the circumstances, it may be ensured as under:-

It shall be the sole responsibility of the contractor in the capacity of employer to forthwith (within a period of 15 days from the award of work) apply for a license to the Competent Authority under the BOCW Act and/or ISMW Act as applicable and obtain proper certificate thereof by specifying the scope of its work. It shall also be responsibility of the contractor to furnish a copy of such certificate of license / permission to BHEL within a period of one month from the date of award of contract.

It shall be the sole responsibility of the contractor as employer to ensure compliance of all the statutory obligations under these acts and rules including that of payment / deposit of cess as per the applicability under above referred Acts within a period of one month from the receipt of payment.

It shall be the responsibility of the sub-contractor to furnish the receipts / challans towards deposit of the cess together with the number, name and other details of beneficiaries (building/Inter-state Migrant workmen) engaged by the sub-contractor during the preceding month.

It shall be the absolute responsibility of the sub-contractor to make payment of all statutory payments & compensations to its workers including that is provided under the Workmen's Compensation Act, 1923.

# **Volume IA**

## **Part II**

### **Technical Specification**

# Technical Conditions of Contract (TCC) for Underground trenchless cable laying work by horizontal boring

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## Chapter I- Technical Specification

### 1.0 INTENT OF SPECIFICATION:

This specification governs the requirements of underground drilling via horizontal direction for trenchless cables laying purpose in NCR Division located at Gr239, Gr240, Gr 241 & Gr 241 sections. [OFC Cable, Quad cable will be free issued by BHEL].

### 2.0 TECHNICAL REQUIREMENTS:

Execution of trench less horizontal boring work (boring size up to 125 mm) up to a depth of minimum 1.00 mtr from the ground level at location, as per direction of engineer in charge. This includes supply & laying of DWC / HDPE pipe (as per specification No. IS 14930 part II or latest of 120 mm OD/103 mm ID). This includes all accessories and tools required to do the trenchless horizontal boring. Further, laying of BHEL free issued cables are included in the scope of work.

The steps involved in the works as follows:-

- a) Drilling of bore path at a depth of min. one mtr from ground level / Rail flange / Road level / Bottom of water level in canals/ rivers etc., Depth of drilling, from/to locations will be intimated by engineer-in-charge. All tools, tackles, skilled & unskilled manpower are to be arranged by contractor.
- b) Reaming of the bore path shall be done in order to enlarge the size of bore path to a size sufficient to safely install the HDPE / DWC pipe of size 120mmOD / 103 mm ID.
- c) Contractor shall supply HDPE/DWC Pipe of size 120mmOD / 103 mm ID, along with suitable couplers for jointing. Complete length from one end to other end between drilled locations to form as a casing with tightened and leak proof. The requisite materials shall be procured from railway suppliers and they will be inspected by RDSO prior to dispatch.
- d) Following material will be free issued to Contractor by BHEL for laying the same through tightened and leak proof HDPE / DWC pipe:
  - 1 Six Quad Cable,
  - 2 HDPE Duct of size 40MM OD along with accessories,
  - 3 24 Fiber Optical Cable (Shall be blown through above sl no.(2) HDPE Duct.)
- e) Scope of work includes laying and jointing of the HDPE duct (40MM OD) through underground boring, make joints with accessories (couplers) and conduct DIT (Duct Integrity Test) from one end to other end. After completion, blowing of OFC cable to be carried out through HDPE duct. In addition, six quad cable also needs to be laid through the tightened and leak proof HDPE / DWC pipe.
- f) BHEL free issued material requires jointing viz., Quad cable through thermo-shrinkable joint kit, OFC jointing through OFC protection chamber are part of BHEL scope (Separately executed by

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other agency). Contractor requested to avoid such joints going inside the underground boring area as much as possible.

g) The BHEL free issued materials as specified in above sl no.(1), (2) & (3) shall be transported from BHEL stores to site locations by contractor.

h) Bidder quoted price shall include the all the above scope of work activities, loose supplies etc.,

### 3.0 **BILL OF MATERIAL:**

The length of the Trenchless cable laying through horizontal drilling work shall be as per enquiry.

### 4.0 **INSPECTION & TESTING**

- a. The Contractor's work will be inspected jointly by BHEL / RE / Div Rly representatives.
- b. Contractor procured HDPE pipe (Min size with inner Dia 103.5mm and outer Dia 120mm) shall be inspected by RDSO at OEM works.
- c. BHEL free issued materials are already RDSO inspected and available at BHEL stores.

### 5.0 **PACKING & DISPATCH**

Self-lubricated HDPE pipe (Min size with inner dia 103.5mm and outer dia 120mm) packing and dispatch in such way that, while transportation same will not be broken. Any broken item / unfit for the execution of work shall be replaced with new items without time and commercial implications.

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## Chapter II: Indicative Map

