VOLUME - IA

Technical Conditions of Contract (TCC) Signalling & Telecommunication (S&T) Modification Works in Stations, 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) **PROJECT ENGINEERING & SYSTEMS DIVISION** **HYDERABAD**	Ref No: HY/PE&SD/Projects/TCC/2020-21/S&T Mod_Stations/Jhansi Div Gr 239/01 Rev. No. 00

TECHNICAL CONDITIONS OF CONTRACT (TCC)

FOR

Signalling & Telecommunication (S&T) Modification Works in Stations, Gr 239, Jhansi Division

FOR

RAILWAY ELECTRIFICATION PROJECT IN BHANDAI-UDI, BIRLANAGAR-ETAWAH AND SHIKOHABAD-FARRUKHABAD INCLUDING MAINPURI-ETAWAH, SECTION OF AGRA, JHANSI AND ALLAHABAD DIVISIONS OF NORTH CENTRAL RAILWAY UNDER RE PROJECT LUCKNOW, TOTAL RKM 386/440TKM

Revisions: Refer to record of revisions	Prepared By:	Checked By:	Approved By:	Date
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12	BOQ	Annexure-1
13	Explanatory Notes	Annexure-2

Volume IA

Part I

Contract specific details

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	:	Section Shikohabad-Farrukhabad (Including Mainpuri-Etawah), Allahabad Division of North Central Zone of Indian 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 : 45^0 C b) Minimum : 2^0 C
12	Average Relative Humidity	:	40 %
13	Climatic Condition	:	Tropical Climate

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.

Chapter II- Scope of Work

2.0 SCOPE OF WORK

2.1 Scope shall be as per chapter I, Detailed scope of work, Vol IA, Part II of this TCC.

2.2 Warranty and Guarantee of the Works: The present tender is floated at risk & cost of the already working contractor due to the non-performance. The original contract covers the S&T station works scope in the following sections;

1. Birlanagar-Etawah, Gr 239, Jhansi Division
2. Mainpuri-Etawah, Gr 241A, Allahabad Division

The present tender covers the S&T station works scope in the following section:

1. Birlanagar-Etawah, Gr 239, Jhansi Division

The original contractor has completed a part of the contract and the balance part is being tendered in the present tender. However, the original contractor may keep working until the award of the present tender. The awarded quantities of the present tender shall be net of the work executed by the original tender until award of this tender. Further, as the balance work is dependent on the already executed works of the original contract, the guarantee, warrantee of the entire package (Including already executed works, supplies etc.) shall be the responsibility of the bidder.

Chapter III- Facilities in the scope of BHEL/Contractor

S. No.	Description PART I	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
3.1	**ESTABLISHMENT**			
3.1.1	**FOR CONSTRUCTION PURPOSE**:			
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	
3.1.2	**FOR LIVING PURPOSES OF THE BIDDER**			
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	
3.2.0	**ELECTRICITY**			
3.2.1	Electricity For construction purposes		Yes	
3.2.2	Electricity for the office, stores, canteen etc. of the bidder		Yes	
3.2.3	Electricity for living accommodation of the bidder's staff, engineers, supervisors etc.		Yes	
3.3.0	**WATER SUPPLY**			
3.3.1	For construction purposes		Yes	

S. No.	Description PART I	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
3.3.2	Water supply for bidder's office, stores, canteen etc.		Yes	
3.3.3	Water supply for Living Purpose		Yes	
3.4.0	**LIGHTING**			
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	
3.5.0	**COMMUNICATION FACILITIES FOR SITE OPERATIONS OF THE BIDDER**			
a	Téléphone, fax, internet, intranet, e-mail etc.		Yes	
3.6.0	**COMPRESSED AIR wherever required for the work**		Yes	
3.7.0	**Demobilization of all the above facilities**		Yes	
3.8.0	**TRANSPORTATION**			
a	For site personnel of the bidder		Yes	
b	For bidder's equipment and consumables (T&P, Consumables etc.)		Yes	

Sl. No	Description PART II 3.9.0 CONSTRUCTION FACILITIES	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
3.9.1	**Engineering works for construction:**			
a	Providing the construction drawings for all the works covered under this scope			Drawing schedule shall be submitted by bidder and approved by BHEL during kick off meeting
b	Drawings for construction methods			Drawing schedule shall be submitted by bidder and approved by BHEL during kick off meeting
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	

Sl. No	Description PART II 3.9.0 CONSTRUCTION FACILITIES	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
l	Preparation of formats for completion of activities		Yes	

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.

S.No.	Description	Minimum Quantity	Remarks
A. For S&T(C&I works)			
1	Hydra	1	Need based
2	JCB	1	Need based
3	Tractor	1	Need based
4	Cable unwinding Machines, rollers etc	1 No	
5	MC4 connector tool kit containing (1) crimping plier MC4, (2) open end spanner set MC4, (3) stripping plier MC4, (4) socket wrench insert to tighten, (5) socket wrench insert to secure, inserts for both 4 sq-mm and 6-sqmm (of both pliers).	2 Set	
6	Electrical measuring Instruments		
	a) Megger-1KV	1No	
	b) HV Tester-10KV	1No	
	d) Logic probe	1No	
	e) Modbus communication check kits	1No	
	f) Digital Multi meter	3 No	
7	Tong Testers	3 No	
8	Digital power meters	1 No	
9	Phase sequence meter	1 No	
10	OFC termination kit, Splicing kits	1 Set	
11	Primary /secondary injection kit	1 No each	Need based
12	Transformer oil filtration unit	1 No	Need based
13	Earth resistance measurement kit	1 No	
14	Lugs, glands as in scope of supply	1 set	Need based
15	Transmission line stringing equipment	1 No	
16	DG Sets	1 No	
17	Cable jointing kit and associated tools	2 Set	
18	Welding equipment	1 No	
19	Flood lights	5 No	
20	Set of screw drivers	1 Set	
21	Set of Allen keys (mm & inch)	1 Set	
22	Small size hacksaw & fraksaw	1 Set	
23	Cutting pliers	2 No	

24	Nose pliers	2No	
25	Insulation stripers	2No	
26	Dry cable jointer	1 No	
27	Number punches	1 No	
28	Alphabet punch	1 No	
29	Embossing machine with cassettes (Numbers and alphabets)	1 No	
30	Portable drilling machine up to 1-1/2”	1 Set	
31	Soldering gun	1 No	
32	Soldering Iron	1 No	
33	Continuity tester	5 No	
34	Double ended spanner Set of sizes 10-11, 12-13, 14-15, 16-17, 17-18	2 Nos each	
35	Screwdriver Set	1 Set	
36	Crimping tool with Dye range 50-400sq-mm cable, mechanical gear power, hand operated	1 Set	
37	Crimping tool up to 6 sq-mm cable	1 set	
38	Drilling machine AC, hand operated, with bit size up to 20 mm	1 set	
39	Measuring Tape, 5m	2 Nos	
40	Measuring Tape, 50 m	2 Nos	
41	Allen Key set	1 Set	
42	Adjustable spanner 2-inch size	1 No	
43	Hammer	2 Nos	
44	Rough file kit	1 Set	
45	Cutting Pliers	2 Nos	
46	Nose Pliers	2 Nos	
47	Vacuum cleaner, of industrial type, for control room sweeping / cleaning.	1 No	
48	Blowers for cleaning the panels	2 Nos	
B. For civil works			
1	Digital Concrete Mixer 2 to 4 cum with hopper/Self-loading mobile concrete mixer (Azax)with printer	2 nos.	
2	Needle Vibrator (Needle type 40mm)	4 nos.	
3	Needle Vibrator (Needle type 25mm)	2 nos.	
4	Dewatering Pump	2 nos.	
5	Earth Compactor	2 nos.	Need based
6	Theodolite with staff	2 nos.	
7	Dumpy level with staff	1 no.	

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.

Chapter V- Time Schedule

5.1 TIME SCHEDULE

5.1.1
The entire work of Signalling & Tele communication (S&T) modification as detailed elsewhere in the Tender Specification shall be completed within **45 (Forty Five) 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 site 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 Signalling & Tele communication (S&T) modification work shall be started as per directions of Construction manager of BHEL.

5.3.2
The contractor should mobilize manpower in order to complete the work in **45 (Forty Five) 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.

5.4 CONTRACT PERIOD

For the purpose of contract, the period shall be taken as **45 (Forty Five) Days.** Completion of the work shall be as per Bar Charts revised from time to time. In order to expedite the work, the contractor has to deploy work force 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.

5.7 Project Milestones

Milestone 1: Completion of-

(i) Signalling & telecommunication Balance works at Bhind, Soni, Gohad Road and Udimore stations

In all aspects, within 30 days from commencement of work.

Chapter VI- Storage and Security

Contractor shall take all necessary measures to prevent any theft, pilferage of BHEL's supplies and as well as contractor (s) supplies. In order to achieve this following shall be required to be adhered:

1. **Storage and security of contractor supplies:** Contractor shall be responsible for storage and security of works & supply except supply items mentioned in Annexure-I of price bid document of NIT till contract completion or handing over of project to Railways whichever is later.
   - 1.1 Contractor shall file FIR in case of any theft for record and purpose of insurance claim.
   - 1.2 Contractor shall liaison with insurance company and provide all necessary documents in order to facilitate insurance claim.
   - 1.3 Contractor shall keep sufficient security to prevent any kind of theft/damage at works during contract execution.
   - 1.4 In case of any theft, pilferage, damage or loss of any material, contractor shall replenish the same without any additional cost to BHEL without any time delay.
   - 1.5 Contractor shall handover the supply items mentioned in Annexure-I of price bid document of NIT to BHEL store. These items shall be issued (Except spares) on free item basis by BHEL whenever required for erection /Installation work.

2. **Storage and security of BHEL supplies:**
   - 2.1 Contractor shall draw materials supplied by BHEL from BHEL's store after due permission from store's in charge.
   - 2.2 Contractor shall be responsible for transportation (and damage etc. thereafter) of supplies from BHEL stores to works or their respective stores.
   - 2.3 Contractor shall file FIR in case of any theft for record and purpose of insurance claim.
   - 2.4 Contractor shall liaison with insurance company and provide all necessary documents in order to facilitate insurance claim.
   - 2.5 In case of any theft, pilferage, damage or loss of any material, contractor shall replenish the same without any additional cost to BHEL without any time delay. In case contractor fails to replenish the material within stipulated time, BHEL shall supply the material and cost of the same shall be recovered from contractor.
     In case of successful claim of insurance, same shall be passed on to the contractor.
   - 2.6 No extra payment for security shall be paid to contractor by BHEL as contract price is inclusive of all.
   - 2.7 Following is the tentative store location of BHEL
     a) Bhind (M.P)
     The above location is subjected to approval by Railways, finalized locations shall be informed by BHEL later.
   - 2.8 The contractor shall be responsible for the storage & security of the materials till the same is erected /incorporated in the work and finally handed over to Railways, even though payments are made against supply for the materials against the Purchase order. The contractor shall rectify/ replace all such materials, if they are being stolen, damaged or lost for any reason whatsoever before erection / incorporation in the work after being paid against supplies of the same against the Purchase order.

Chapter VII- Special Payment Conditions

1. Payment for the work shall be done as per actual measurement and certification by BHEL Engineer at site.

2. Payment shall be made separately for works being carried out in the state of Madhya Pradesh and Uttar Pradesh. For this purpose, separate measurement book will be maintained and bidder shall provide two (02) separate GST registration in respective states.

Chapter VIII- Statutory Regulation

6.2 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

Chapter I- Detailed Scope Of Work

1.0 Signaling system scope of work :

(Birlangar- Etawah, Gr.239) - SECTION

All signaling works including design of signaling plan, route control chart or selection/control table, panel diagram, wiring/circuit diagram, cable route chart, cable core diagram, termination and equipment position diagram etc. as part of the modification to the existing signaling system along with supply, installation, testing and commissioning shall be executed in accordance with the provision of IRSEM and signal and Interlocking principles issued in the form of typical designs. In addition to above, augmentation of existing service building to accommodate additional signaling equipment/racks etc. shall be carried out if required. Glued joints if any required for single rail track circuit shall be provided. The released materials shall be transported to the railway depot within the site.

1.1 Telecommunication scope of work :

1.1.1 Where optical fiber cable (OFC) and quad cable already exist in the section

Where optical fiber cable (OFC) and quad cable already exist in the section , scope of work includes supply , trenching and laying of 6 quad cables, jointing of quad cables for provision of emergency sockets in the section and SP/SSP/TSS /LC gates etc.(By other contractor), transferring the existing communication circuits including block on new cables, supply and installation of power supply equipment, batteries and other telecom equipment, supply and installation of SDH and PD MUX equipment and their networking with the existing OFC link for augmenting existing OFC equipment at stations in the section, supply, installation and testing and commissioning of HQ and way station control equipment for giving various control phones at stations, SP/SSP/TSS etc., augmentation of existing service buildings as required, provision of cable huts and service buildings, protection of telecom lines entering 25 KV sub-station /switching posts, and protection against surge and lightning. The scope also includes masonry works for erection and installation of telecom equipment and all types of painting as per Railway Telecom Manual and standard practices. Supply of spares to the extent of 10% (minimum 1) of each type of equipment like SDH, PDMUX, control phones, emergency sockets etc. All the materials not limited to above as required for execution of the telecom works to suit 25 KV has to be provided by the Contractor in accordance with the Good Industry Practice. The Contractor shall transport the released materials railway depot.

1.1.2 Where OFC and quad cable does not exist in the section.

Where OFC and quad cable does not exist in the section, scope of work includes supply, trenching and laying of OFC and 6 quad cables, jointing of quad cables, splicing of OFC cable, provision of emergency sockets in the section and SP/SSP/TSS /LC gates etc.(By other contractor), transferring the existing communication circuits including block on new cables, supply and installation of power supply equipment, batteries and other telecom equipment, supply and installation of SDH and PD MUX equipment and their networking with the existing

OFC link or forming new link if OFC is not existing in the section, commissioning of quad cable system , supply, installation and testing and commissioning of HQ and way station control equipment for giving various control phones at stations, SP/SSP/TSS etc., provision of cable huts and service buildings, protection of telecom lines entering 25 KV sub-station /switching posts, protection against surge and lightning . The scope also includes masonry works for erection and installation of Telecom equipment and all types of painting as per Railway Telecom Manual and Good Industry Practice.

Supply of spares to the extent of 10% (ten percent) (minimum 1) of each type of equipment like SDH, PDMUX , control phones, emergency sockets, etc. All the materials not limited to above as required for execution of the Telecom works to suit 25 KV has to be provided by the Contractor. On completion of above, the Contractor shall carry out works, testing and commissioning of entire system in totality. The Contractor shall transport the released materials to railway depot.

materials to railway depot.

Chapter II- Pre Bid Clarifications By Railways

2.0 Pre-Bid stage clarifications by Railways:

2.1 Indian Railways will show the space required for the OHE stores. Same store shall be used for all the material storage requirement including S&T. If S&T contractor wish to store the S&T items in these stores, it is contractor responsibility / own risk to retain in same store or separate store can be utilised by them separately without attaching to OHE store.

2.2 SIP's are available in the NCR website at the following link. Same shall be used for arriving the BOQ.

http://www.ncr.indianrailways.gov.in/view_section.jsp?lang=0&id=0,1,283,375,704,706

Other S&T modification requirements / documentation like Cable courage plans of the existing system will be provided at the time of execution.

2.3 In the Jhansi division (Gr.239) there is no siding at Nonera station. (It was originally indicated in bid at Schedule-B (Annex-1) document.

2.4 Indoor / outdoor circuit and propose /modified SIP will be provided at the time of execution of work.

2.5 The augmentation of existing IPS need to be considered. However, the space in the existing IPS system to accommodate additional converters is not available. Hence S&T contractor to assess and provision to be looked for accommodating the converters within the existing IPS system / room.

2.6 Existing signal feed cables for 110V AC shall be retained and new signalling cables for relays are required to be terminated in the existing location boxes except at starter signal location where new location boxes are to be used.

2.7 Existing signal feed cables (B-NX110 & B-N24V), New signal repeater relays, new signalling and power cables with HPR relays are to be terminated in the existing location boxes, except at starter signal locations where new location boxes are to be used.

2.8 New charger / batteries / chokes are to be considered. New power cable shall be used for track circuit feed chargers. The necessary power cable, other devices shall be assessed based on the site visit only.

2.9 Point motor immunization – New Point machine are to be installed of adequate immunity level for all the stations as required by S&T contractor.

2.10 Existing signalling system & point machine arrangement at the stations having SM Slides or Lever frames have to be modified to suit RE and no replacement or upgradation is required.

2.11 There is no scope of signalling work for modification in RE suit stations.

2.12 Stations with Tower wagon siding, point machines (with motor – 100V DC with 400V AC) immunity are to be provided.

2.13 Replacement of point motor in the existing system is in S&T contractor scope of supply.

2.14 Use of QBAT relay for tracks more that 350m is allowed in present scope of work.

2.15 Typical point operation circuit of existing arrangements for sections Gr-239 is available on online.

2.16 Conventional DC track circuit will be retained and only modifications are required to suit RE by S&T contractor.

2.17 Earthing & Protection: Normal earth for conventional equipment and maintenance free earth for electronic equipment & surge protection for entire signalling installation to be considered for existing surge protection for entire signalling installations are already available. Present scope includes surge protection for new installation

2.18 Shifting and re-wiring of existing IPS system are under the current scope of work at the sanichara, Malanpur, Gohadroad, Soni, Bhind stations.

2.19 Railways will provide the ABT meter.

2.20 Charges for accommodation and transportation shall not be borne by contractor for inspection agencies.

2.21 Provision of OFC repeater at Bhind is also to be included in the scope of this work.

2.22 Cable huts shall be provided with area and location at specified in the annexures.

2.23 Telecom PIJF cable is to be supplied and laid and wiring to be done for provision of Railway Auto Telephone. PIJF cable size 10 Pair with 5 Distribution points at each location shall be provided for subordinate rest house / camp office locations.

2.24 In Gr-239, Rithuakalan SSP is not required where as in Nonera halt station SSP is required.

2.25 Following stations are already electrified. There is no scope of S&T modifications works at these places / locations. However, only interfacing and augmentation required in totality as required for completeness of section (if required).

2.25.1 In Gr-239 : Birla Nagar & Etawah,

2.26 The cable quantities, BOQ's are indicative only. S&T contractor needs to do survey and arrive the actual BOQ and cables requirements.

2.27 Cable courage plans, Track bonding plan, SIP, proposed / modified SIP (where new siding or new modifications are proposed) will be provided at the time of execution.

2.28 Existing signalling system & point machine arrangement at the stations having SM slides or level frames have to be modified to suit RE and no replacement or upgradation is required for the same.

2.29 TSS are located in Gr-239 at Bhind, Milanpur; These are distributed equally two at each sections. Same shall be used for by S&T contractor in their S&T modification job.

2.30 IRS type standard mechanical lifting barrier and electric lifting barrier of Global make was available in existing system. S&T contractor shall provide the suitable provisions for RE.

~~2.31~~ In Gr-239 – 6 Quad cable scope at TSS / SP / SSP locations are required.

2.32 Following is the scope of work for OFC huts:

2.32.1 Shifting of existing telecom equipment in ASM room in OFC hut where new OFC huts are required.

2.32.2 Provision of cable termination panel and termination of cable, installation of FDMS, STM/MUX, wayside equipment wiring & communication is in the scope of augmentation of all OFC huts.

2.32.3 As part of passenger amenities scope, all the PA system equipment's are to be modified to suit RE immunisation.

2.32.4 S&T contractor shall terminate the OFC cable as per length of cable drum. Further as required at intermediate SP/SSP/TSS locations.

2.32.5 S&T contractor shall use same OFC cable trench for SCADA as well as SP / SSP / TSS requirements.

Chapter III- Miscellaneous Information about S&T Contractor Scope of Work

Miscellaneous Information for S&T Contractor Scope of work :

3.1 **Signaling**:- Trenching, laying of underground signaling cables/power cables, casting of foundations in JB's, supply of certain equipment's/materials, erection of apparatus cases and fixing of equipment wiring, testing & commissioning in connection with RE modification at MACLS/PI/RRI/EI stations & LC Gates to suit 25kV AC Traction.

3.2 **Telecom**: Trenching, laying, backfilling, jointing, terminating and testing of 6 quad cable and PIJF cable (as required) etc., supply, installation, testing and commissioning of way station equipment, HQ control equipment's, with power supply and emergency sockets etc., in SP,SSP, TSS & Station. Modification to existing PA system, supply, installation, testing and commissioning of STM and other associated equipment's.

3.3 Collection of latest SIP (Signal Interlocking Plan) and RCC (Route Control Chart or Table of Controls) from railway authorities,

3.4 Updating & submissions of SIP and RCC (or Table of controls) documents to suit for RE modifications works in the stations shall be with in the 40 days of award of contract / LOA date.

3.5 Following documents preparation are required for S&T modification works. Same were used only after prior approvals of Railway authorities:

3.5.1 Lightening, surge protection & earth plan,

3.5.2 Location of junction box lay out & wiring details,

3.5.3 Fuse Details,

3.5.4 Cable Termination Rack Diagram,

3.5.5 Equipment Rack Details,

3.5.6 Station / Gate working Rule / Rule Diagrams,

3.5.7 Circuit Diagrams,

3.5.8 Bonding plan (Station / Auto huts / gate huts / Control),

3.5.9 Track Circuit diagram (Station / auto huts / gate huts / control)

3.5.10 Equipment layout and details including cable troughs required (Station / auto huts / gate huts / control)

3.5.11 Equipment sizing (Station / auto huts / gate huts / control)

3.5.12 Power supply Diagram (Station / auto huts / gate huts / control)

3.5.13 Cable Route plan (Separate for station & block sections),

3.5.14 Cable Core chart

3.5.15 Panel / VDU diagram (station / gate huts)

3.5.16 Route Control table (Station / auto huts / gate huts),

3.5.17 Existing Signal interlocking plan (Station /auto huts / gate huts),

3.5.18 Route Control table (Station / Auto huts / gate huts),

3.6 Submission of S&T modifications proposed document to proof consultant as well as safety consultant for their approval before submitting to railway authorities (CORE PMC). Both Proof consultancy and safety consultant are appointed by BHEL as part of contract requirement.

3.7 Proof consultant is having following responsibilities

3.7.1 Evolve a systems approach with the BHEL (Design Director) so as to minimize the time required for final designs and construction drawings and

3.7.2 Proof check of the detailed calculations, drawings and designs, which have been approved by the BHEL (Design Director) fit for submission for Railways for approval.

3.8 **Safety** consultant to carryout safety audit at the design stage of the railway project in accordance with applicable laws and good industry practices.

3.9 Completion of all the outdoor activities in parallel with material procurement like:

3.9.1 Preparation & laying of foundations for new JB's in field,

3.9.2 Laying of Track crossing pipes,

3.9.3 Foundation of Electrical lifting barriers,

3.9.4 Completing the earthing pits etc.,

3.9.5 Digging of the cable trench wherever possible to meet the targeted schedules,

3.9.6 Foundation of Signals (If required).,

3.9.7 Signal screening activities completion,

3.9.8 Insulator for mechanical gates etc.,

3.10 Procurement of all the material (RDSO Approved items) except signal cables. Signal cables BOQ shall be shared to BHEL along with probable vendors and technical specification; so that it can be arranged by BHEL.

3.11 Storing of material at convenient locations by S&T contractors,

3.12 Completion of S&T modification works (supply, erection, commissioning and handing over to Railway authorities) as required for each station, LC gates and ***handing over to Railway authority.***

3.13 Attachments / Annexures:

The detailed scope of work, scope of supply, spares list, number of stations/ LC Gates / TSS / SP / SSP / other facilities for each GROUP are enclosed in the enclosed annexures.

Chapter IV- Objective of S&T Contractor's Services

1 **Objective of S&T sub-contractor services:**

S&T Sub-contractor shall have the following objectives:

4.1 To implement the S&T sub contractor shall do the modifications job in conformity with Railways' rules and regulations; and codes Local laws, bye laws, regulations, rules etc.

4.2 Total compliance of technical specifications and various other requirements contained in the RDSO, CORE etc., and standards.

4.3 High standards of quality assurance system complying ISO 9001 in the S&T sub-contractor as well as the works and activities of the Contractor(s).

4.4 That copies of all reference documents, specifications, drawings, management procedures, method statements, work procedures, inspection and testing procedures in a systematic manner to be maintained and adequate copies are provided to site supervision personnel.

4.5 Modern safety practices in execution of works at project sites for ensuring complete safety to works, workers, running trains, general public, and structures and properties adjacent to work sites.

4.6 Proper interface and coordination among the Railway, CORE PMC agency, BHEL PMC agency, Proof consultant, Safety consultant and other consultants/ agencies and local bodies/ state government.

4.7 Full documentation of the completed works by the contractors including applications for various approvals shall be passed through proof consultants, safety consultants via BHEL PMC.

4.8 Completion of project milestones / project within the schedule agreed with Railways.

4.9 Assistance to the BHEL up to the end of `Defect Liability Period' under the Contract. This may include coordination with Electrical Inspector of Govt. (E.I.G) and Commissioner of Railways Safety (CRS) in accordance with rules for opening of new railway lines.

4.10 That all its Personnel are experienced in modern methods of construction management, monitoring and supervision.

4.11 Compliance of all rules of railways related to the execution of the project. Special care will be taken in imposing necessary speed restriction, caution, arranging necessary traffic blocks & OHE blocks, where necessary etc., in order to ensure safety at all times.

4.12 Implementation of environmental mitigation measures

4.13 Minimizing claims disputes and assist in resolving them.

4.14 Wherever applicable, necessary CRS sanctions are obtained before starting of the work by contractor(s).

4.15 Optimal utilization of resources/contractual provisions with a view to bring economy in execution.

4.16 Implementation of various Labour Rules, Regulations and welfare measures as per the rules in force and laid down provisions in the Agreement.

4.17 All mandatory testing as per the nodal provision and instructions for P. way, signalling & electrical work and Environmental monitoring Plan are being conducted and records of such test be preserved for future.

4.18 A bidder shall not have a conflict of interest that affects the bidding process. Any bidder found to have a conflict of interest shall be disqualified.

4.19 Bidders are encouraged to submit their respective Bids after visiting the Project site and ascertaining for themselves the site conditions, traffic, location, surroundings, climate, availability of power, water and other utilities for construction, access to site, handling and storage of materials, weather data, applicable laws and regulations, and any other matter considered relevant by them.

4.20 S&T contractor shall fully aware the procedures and conditions as required by the railway authority for carrying out the activities at different stages. It includes documentation preparation, documents submission for approvals, documents required for seeking the approval of the commissioner of the railway safety, documents required for closing the punch list and final handing over for opening to traffic and as else in the process of handing over to railway authorities.

4.21 In case the S&T contractor is offering alternative specifications, materials and standards, the same should be already in use on a passenger carrying service anywhere in the world at speed more than 100 KMPH and are also in operation for more than 2 years. It shall be adopted on Indian Railway using the concept of cross approval / cross acceptance, which form part of the type approval guidelines already being followed by RDSO. The process shall also require validation from an independent safety accessor (ISA). Further, the safety integrated requirement / level of the system being offered should be SIL-4.

4.22 Railways will provide power blocks or traffic blocks or both during day or night as the case may be to enable the contractor to execute the construction works of overhead equipment, or such other works as may be determined by the Railways. S&T contractor shall take necessary steps for completion of the

4.23 The BHEL shall not be liable for any omission, mistake or error in respect of any of the above or on account of any matter or thing arising out of or concerning or relating to RFP, RFQ, the Bidding Documents or the Bidding Process, including any error or mistake therein or in any information or data given in the enquiry

4.24 BHEL right to reserve termination of contract if the following aspects are made by vendor:

- 4.24.1 At any time a material misrepresentation is made or uncovered,
- 4.24.2 Bidder doesn't provide the information sought by BHEL/Railways as requested by Railways during approval / inspection process,
- 4.24.3 Mis-representation / improper response to the BHEL (or) Railway authorities,
- 4.24.4 Bidder is unable to withdraw the duties / meets the targeted scheduled activities.

Chapter V- Technical Details

Bill of Quantities for Signal and telecommunication works:	
General Instructions:	
1	Bill of Quantities (BOQ) are generated based on the Central Organization of Railway Electrification (CORE)-Allahabad requirement, existing Signaling Interlock Plan (SIP) and site survey. BOQ line items shall be read along with explanatory notes which will have detailed scope of work / item requirements. S&T contractor shall offer the complete section requirement in the form of above said BOQ items as a minimum. Contractor responsibility lies till complete section is handing over to Railway after final inspection by CRS.
2	The Bill Of Quantities (BOQ) shall be quoted by contractor with due considerations of the following - instruction to bidders, general conditions of contract, special conditions of the contract, scope of work requirements, Technical conditions of the contract, Explanatory notes against each line item, Payment conditions of the contract etc., Further, if any post enquiry addendum and corrigendum, clarification and confirmations during technical offer evolution to be considered prior to price bid opening stage.
3	S&T Contractor to consider all the items / equipment's / systems as a lump-sum package along with Erection / installation, commission & handing over to Railways in all respects under S&T modification job in the complete section. Price bid BOQ items are used for brief scope of list of items (Supply, spares, works). New BOQ line items are not accepted in price bid schedule.
4	The contractor shall retain sufficient engineering spares for prompt replacement, installation or re-installation of any defective items of S&T modification during commissioning as well as during defect liability period. All such engineering spares to be taken over by contractor after section was handed over to railways.
5	If any BOQ quantities which have been supplied by the contractor and paid by BHEL are determined to be surplus by the Engineer (Except those quantities which become surplus due to change in scheme/document by Railway / BHEL) during the progress of the work or at the completion of the work, same shall be return back to the contractor and the payment made for such material shall be recovered from the pending claims of contractor. The materials which have become surplus due to change in scheme/dwg's by Railways / BHEL and are still in usable condition shall be taken over by Railway / BHEL and any part payment still to be made shall be released to the contractor based on the payment conditions.
6	The S&T contractor expected that he is more conversant with latest RDSO, CORE, ACTM & other railway standards/manuals/guidelines and drawings. All works shall be strictly executed as per railway standards and drawings. The contractor is requested to arrange railway RDSO standards and drawings on his own cost and no standards will be provided by BHEL / Railways.
7	All the items supplied by the contractor shall be as per RDSO/CORE/Railway Vendor List. In case of non-availability of vendor list for any of the item / equipment / system, the contractor shall inform the same to the purchaser for approval.
8	The contractor shall submit the GA/ Installation drawings /approved QAP / any other drawing of equipment/item/system for approval/information / inspection by Railways / BHEL whenever required.
9	In case of any discrepancies in the approved documents vs execution of work with respect to RDSO/CORE/Railway standards, specifications and guidelines, it shall be responsibility of the contractor to inform the same to the purchaser before executing the work in order to take up with the railway authority.

10	The unused cable cut-pieces generated during laying shall not be measured. Cable cut-pieces shall be the property of the S&T contractor and the payment made for such cut-pieces shall be recovered from the pending claims. Hence, Wastage of cable shall be as minimum as possible during erection, laying and termination.
11	No later than 90 (ninety) days prior to the Project Completion Date, the Contractor in consultation with the purchaser, develop an equipment specific maintenance manual for new technology equipment's i.e., "Maintenance Manual" for the regular operation and maintenance of such equipment in conformity with safety requirements, Good Industry Practice. The selected items shall not be currently in use by Railways. Further, such Maintenance Manual and manufacturer's manuals shall be provide with 10 (ten) sets of hard copies and 2 (two) sets of DVD's thereof to the BHEL/Railways.
12	The unit prices in the billing consists of all-inclusive prices like material, RITES / RDSO / Railway inspection charges, incidental charges (if any), transport, storage, loading / unloading, handling, provision for losses, insurance during transit etc., The unit prices also include cost of works and tuning that may become necessary during or after the commissioning test.
13	Any charges are levied by railway authority on BHEL, same charges will be adjusted / recovered back to back with S&T contractor through their bills. Example: penalty due to cable cut/damages.
14	BHEL will place the site office with competent authority engineer who will direct priorities of work from the contractor. The direction includes work locations, priority stations which will meet the targeted milestones with Indian railway RE works.
15	Arrangement of water for execution of different works shall be made available by the Contractor at his/her own cost.
16	Even though RVNL is not part for present project execution, dwgs and documents reference numbers are presented in the explanatory notes for ready reference purpose only. However, Indian Railway published, generate dwg's and documents, latest changes in slips shall be used strictly and same dwg's and documents shall be used while executing the contract.
17	Augmentation of existing building, provision of new cable hut / repeaters etc., consisting of civil buildings are part of BHEL scope.
18	S&T contractor to coordinate with other vendors / contractors such as SP, SSP, TSS, SCADA, Cable hut, service buildings, quarters etc. in order to fulfill the signal and telecom requirements in those areas. SP, SSP and TSS are provided with OFC/Quad cable laying and terminations with suitable connectors for SCADA and telephone requirements till the mounting locations in respective buildings. For service buildings, cable has to be laid up to building premises.
19	Order received contractor shall visit BHEL-PE&SD-Hyderabad office for Kick off Meeting with in two weeks of the PO Placement or LOA issued. Following documents / discussions will be the agenda in the meeting. a. Handing over of approved LOP to contractor, b. Handing over of existing SIP's (already Part of enquiry). c. Contractor to provide the procurement plan of each line item with vendor, delivery date, vendor contact details etc., d. Contractor to provide Man power mobilization and execution plan which is inclined to achieve the targeted milestones of the BHEL set by PE&SD (Head Quarters). e. Contractor to provide the list of documents exchange / collected to and from Railways etc., f. Discussion on documents and data exchange for interfacing with other scope of contractors – service buildings, SCADA, and other activities if any.
20	Following documents to be submitted by contractor within one month of order placement / LOA: a. Updated SIP to suit RE,

	b. Material procurement plan for all the items/components/equipment's used for executing the contract. c. Additional cable quantities over and above the enquiry indicated cable qunaitites. d. Schedule plan for execution – Separately for telecom work and signaling work. e. Man power mobilization plan for executing the S&T work. f. Detailed documentation exchange and their schedules between S&T Contractor, Proof consultant (Part of BHEL) and Railways.
21	Following cables are supplied as a loose by BHEL. They are requested to draw from the BHEL stores as and when required by S&T Contractor. ***Gr: 239 / Birlanagar - Etawa – Jhansi Division – 115 RKM – 128 RKM*** a) Signalling Cable – 18C x 1.5 MM2 b) Signalling Cable – 12C x 1.5 MM2 c) Signalling Cable – 6C x 1.5 MM2 d) Signalling Cable – 2C x 2.5 MM2 e) Power Cable – 2C x 2.5 MM2 f) Power Cable – 2C x 25 MM2 g) Power Cable – 2C x 50 MM2 h) Power Cable – 2C x 70 MM2 i) 6 QUAD Cable Above quantity includes main supply as well as spares which are handing over to Railways. If the above cable quantity is not sufficient to execute the work, same to be intimated back to Purchaser within one months from date of PO on S&T contractor. Other than above cables, no other type of cables supplied by neither by BHEL nor Railways to S&T contractor. Hence, S&T Contractor to consider all other items / equipment's / systems / other cables with Erection + Commission activities etc., as a mandatorily to commission & handing over to Railways in all respects under S&T modification job.
22	Following are the minimum CORE – Allahabad requirement of Jhansi Division S&T modification job.
22.a	**Signaling scope of work:** 1. They are six stations are there in this section scope of work. All other are halt stations: a. Sanichara – Mechanical Interlocking b. Malanpur- Mechanical Interlocking c. Gohad Road- Mechanical Interlocking d. Soni- Mechanical Interlocking e. Bhind- Mechanical Interlocking f. Udi- Panel interlocking - Panel Interlocking - (M/s. Siemens make) 1. All are with Metal to carbon relays. Whichever is applicable same to be replaced to suit RE. 2. Existing signaling system & point machines arrangement at the stations having SM Slides (or) Lever frame have to modify to suit RE. 2. 2x70 sqmm Al-XLPE- 2 no's between SM room to relay room. 3. Tele cable (6Quad/PIJF) for CHLR, magneto phone 4. Tele cable (6Quad/PIJF) for BPAC/UFSBI 5. Single rail circuit to be modified/updated wherever glued joint are provided. There are 18 no. of glued joint in this section. 6. Augmentation of existing service buildings 7. Modification of mech/electric lifting barrier to suit RE 8. Normal earth to conventional equipment, maintenance free earth to electrical equipment, surge protection for entire signaling installation

	9. Shifting , rewiring and Augmentation of Existing IPS at Sanichara , Malanpur, Gohad road, Soni and Bhind stations. 10. Existing NBT/push button B1 to be replaced with Diado to suit 25 KVA RE 11. Provision of signaling arrangement at tower wagon shed at Malanpur and Bhind to be provided 12. Udi Road- 4 platform, STD IIR, PI Station (M/s. Siemens Make), Junction station, Metal to Metal relays are used. Same to be modified to suit RE 13. Udi Road: Electric lifting barrier to be modified to suit RE 14. Udi Road: Existing BPAC with HASO AC, Diado BI to be modified to suit RE 15. Wherever Tower wagon siding & other siding , complete signaling & telecom scope of new set to be considered. 16. Separate sidings for Tramway type OHE to be provided with S&T equipment's /cables for length of not less than 1.48 KMs.

22.b	**Telecom scope of work:** **a) Quad cable work** **1.** Detailed scope of work includes supply, trenching, laying & jointing of separate 6 quad cable for TSS/SP/SSP etc. **2.** Supply & fixing of Rail post & provision of emergency sockets, telecom related equipment for communication including earthing arrangement. **3.** SSE (sig) office, SSE(Tele) office, Stores, OHE and PSI Depot., and 8 Numbers of quarters in Bhind location; OHE and PSI depot., and 7 numbers of quarters in Malanpur location shall be provided with telecom equipment's including cabling & trenching works. For quarters, telecom cables as required in trench shall be laid up to the quarter ground floor. **4.** Scope also includes masonry works for erection & installation of telecom equipment & all types of painting as per Railway latest manual. **5.** Quad cable should not be laid in such a manner that it doesn't fall with in the alignment of doubling work to avoid damage during doubling. **6.** On completion of above works, testing and commissioning of entire system in totality shall be carried out by the contractor. **b) Optical Fiber cable work** 1. New 24 Core OFC cable for entire section to be laid. 2. Supply, trenching, laying of HDPE duct & blowing of 24 fiber OFC cable, splicing of OFC cable in the entire section, as well as to SP/SSP/TSS. Father, installation of power supply equipment, batteries and other telecom equipment. 3. Supply installation, testing & Commissioning of SDH ADD/DROP MUXS (STM-1), Digital primary drop insert MUXs (fully wired for 30 voice/data channels and suitable interface for SCADA as per latest RE requirement) and other associated equipment by augmenting the existing OFC Huts as per site requirement. 4. Civil building of Cable huts are provided in Birlanagar, Bhandrouli, Sanichara, Malanpur, Gohad Road, Soni, Ashok Khar, Phop and Etawah. Cable repeater is in Mainpuri location in the section. In which OFC cables to be laid and terminated in the cable huts. Note that, the length of the OFC cable termination is same as OFC cable drum length. 5. Supply, installation and testing & commissioning of HQ, way station control equipment for giving various control phones at stations, SP/SSP/TSS etc. including augmentation of existing service building as required, protection of telecom lines entering 25 KV area against surge and lightning. 6. The scope includes masonry work for erection and installation of Telecom equipment and all types of paining as per railway telecom manual. 7. TPC phone shall be provided at TSS, SP, SSP, OHE depot, tower wagon shed/siding and newly constructed offices 8. Aux Trafo supply shall be extended for OFC room by supplying and laying suitable Power cable. 9. One nos. NMS to be provided at divisional HQ offices. 10. Testing and commissioning of entire section in totality shall be carried out by the contractor. 11. Standard work involves trenching, laying of PIJF cable through HDPE conduit on platforms wherever required. 12. Earthing & protective work for all the Amenities works, tele-com and signaling works.

22.c	**Passenger Amenities System** 1. Scope of work includes provision of modification in existing passenger amenities system i.e., PA system 2. Bhind and Sanichara yards- PA system to be modified to suit RE.
23	It is S&T contractor responsibility to complete the job in time as per Purchase Order delivery schedules. In case delivery extensions / amendments is essential, then those part of change in items, delay in days by BHEL/Railways only will be provided without disturbing existing order. In any case BHEL is final authority to decide to provide amendment / delivery extension or not.
24	**Attachments:** 1. Bill of Quantity (BOQ)- Annexure-1 2. Explanatory notes- Annexure-2 3. Existing Signal Interlocking Plan- Annexure-3

Chapter VI- Quality

5.0 Introduction

This part of the specification covers the sampling, testing and quality assurance requirement for all S&T works covered in this specification.

This part of the technical specification shall be read with other parts of the technical specifications, general condition of contract and special condition of contract, which covers common QA requirements. Wherever RDSO standards have been referred, they shall be the latest revisions.

The QA and QC activities in all respects as specified in the technical specifications/ drawings / data sheets /quality plans / contract documents shall be carried out at no extra cost to the owner. The contractor shall prepare detailed construction and erection methodology scheme which shall be compatible to the requirements of the desired progress of work execution, quality measures, prior approvals if any and the same shall be got approved by the BHEL and Railway. If required, work methodology may be revised/reviewed at every stage of execution of work at site, to suit the site conditions by the contractor at no extra cost to the owner.

5.1 QA and QC Manpower

The contractor shall appoint adequate work force at site. Contractor shall give details organization chart and appointed manpower details for BHEL approval /acceptance. The contractor shall appoint a dedicated, experienced and competent QA&QC in charge at site. The contractor shall nominate one overall QA coordinator for the contract detailing the name, designation, contact details and address at the time of post bid discussions. All correspondence related to Quality Assurance shall be addressed by the contractors QA coordinator to BHEL. BHEL shall address all correspondence related to Quality issues to the contractors QA coordinator.

5.2 Quality Assurance And Supervision

The contractor shall follow the annexure-1 for the S&T works only and submit documents & take approval from BHEL and Railway as per annexure-1.

5.3 Sampling And Testing of Construction Materials

The method of sampling for testing of construction materials and work / job samples shall be as per the relevant IS / RDSO standards in line with the requirements of the technical specification / quality plans. The contractor shall carry out testing in accordance with the RDSO standards in line with the requirements of the technical specifications and quality plans.

Where no specific testing procedure is mentioned, the tests shall be carried out as per the best prevalent engineering practices and to the directions of the Engineer. All testing shall be done in the presence of the engineer or his authorized representative.

5.4 Purchase And Service

All Material shall be procured from RDSO/CORE approved vendor list.

5.5 Field Quality Plan

The contractor shall prepare the FQP in line with RDSO standard and take prior approval from BHEL and Railway.

5.6 General QA Requirements

The contractor shall ensure that the works, BOIs and services under the scope of contract at site or at any other place of work are in accordance with the BHEL technical specification, RDSO standards, approved drawings / data sheets / quality plans and BOQ. All the works, BOIs and services shall be carried out as per the best prevalent engineering practices and to the directions of the Engineer.

The contractor shall Maintain records of all testing, including cross referencing to items of work to which each test refers and the location from which any samples were obtained for testing.

5.7 Special Quality and inspection requirements

5.7.1 Ensure that the procurement of materials and equipment are from the authorised sources and are duly inspected by the nominated agencies.

5.7.2 Inspect and accept all materials received at site proposed to be incorporated in works.

5.7.3 Inspect the quality of the works with regard to workmanship, compliance with the specifications and all necessary testing required for acceptance of any item of work.

5.7.4 Maintain records of all testing, including cross referencing to items of work to which each test refers and the location from which any samples were obtained for testing.

5.7.5 Assist the contractor at any time during audit and inspection for the S&T‘s quality of the works by Railway.

5.7.6 Prepare methodology for executing the works, to be submitted 15(fifteen) days prior to the commencement of construction for Railway review.

5.7.7 Preparation of Field quality assurance plan and field inspections as and when required by Railway / BHEL.

5.7.8 Preparation and submission of documents for Railways/BHEL approval/review.

ANNEXURE 01

QUALITY ASSURANCE AND SUPERVISION

11.1 Quality of Materials and workmanship

11.1.1 The Contractor shall ensure that the Construction, Materials and workmanship are in accordance with the requirements specified in this Agreement, Specifications and Standards and Good Industry Practice.

11.1.2 The Contractor warrants that all Materials shall be new, unused, not reconditioned and in conformity with Specification and Standards, Applicable Laws and Good Industry Practice, and that the Contractor shall not use any materials which are generally recognised as being deleterious under Good Industry Practice.

11.2 Quality control system

11.2.1 The Contractor shall establish a quality control mechanism to ensure compliance with the provisions of this Agreement (the "**Quality Assurance Plan**" or "**QAP**") in accordance with ISO-9001.

11.2.2 The Contractor shall, within 30 (thirty) days of the Appointed Date, submit to the Authority's Engineer its Quality Assurance Plan which shall include the following:

(a) organisation, duties and responsibilities, procedures, inspections and documentation;

(b) quality control mechanism including sampling and testing of Materials, test frequencies, standards, acceptance criteria, testing facilities, reporting, recording and interpretation of test results, approvals, check list for site activities, and proforma for testing and calibration in accordance with the Specifications and Standards and Good Industry Practice; and

(c) internal quality audit system.

11.2.3 The Authority's Engineer shall convey its comments to the Contractor within a period of 21 (twenty-one) days of receipt of the QAP stating the modifications, if any, required, and the Contractor shall incorporate those in the QAP to the extent required for conforming with the provisions of this Clause 11.2.

11.2.4 The Contractor shall procure all documents, apparatus and instruments, fuel, consumables, water, electricity, labour, Materials, samples, and qualified personnel as are necessary for examining and testing the Works, Materials and workmanship in accordance with the Quality Assurance Plan.

11.2.5 The cost of testing of Construction, Materials and workmanship under this Article 11 shall be borne by the Contractor.

11.3 Methodology

The Contractor shall, at least 15 (fifteen) days prior to the commencement of construction, submit to the Authority's Engineer for review the methodology proposed to be adopted for executing the Works, giving details of equipment to be deployed, traffic management and measures for ensuring safety. The Authority's Engineer shall complete the review and convey its comments, if any, to the Contractor within a period of 10 (ten) days from the date of receipt of the proposed methodology from the Contractor. For the avoidance of doubt, the Parties agree that the methodology for executing critical works such as laying foundations, erection of masts and stringing of conductors shall ordinarily rely on mechanised means. For the avoidance of doubt, the Contractor shall use auger machine for excavation of foundations, wiring trains for stringing of conductors and mechanised equipment for erection of steel structures, or any equivalent thereof.

11.4 Inspection and review by the Authority

The Authority or any representative authorised by the Authority in this behalf may inspect and review the progress and quality of the construction of Works and issue appropriate directions to the Authority's Engineer and the Contractor for taking remedial action in the event the Works are not in accordance with the provisions of this Agreement.

11.5 External technical audit

At any time during construction, the Authority may appoint an external technical auditor to conduct an audit of the quality of the Works. The findings of the audit, to the extent accepted by the Authority, shall be notified to the Contractor and the Authority's Engineer for taking remedial action in accordance with this Agreement. The Contractor shall provide all assistance as may be required by the auditor in the conduct of its audit hereunder.

11.6 Inspection of records

The Authority shall have the right to inspect the records of the Contractor relating to the Works.

11.7 Inspection of Works

11.7.1 The Authority's Engineer and its authorised representative shall at all times:

(a) have full access to all parts of the Site and to all places from which natural Materials are being obtained for use in the Works; and

(b) during production, manufacture and construction at the Site and at the place of production, be entitled to examine, inspect, measure and test the Materials and workmanship, and to check the progress of manufacture of Materials.

11.7.2 The Contractor shall give the Authority's Engineer and its authorised agents access, facilities and safety equipment for carrying out their obligations under this Agreement.

11.7.3 The Authority's Engineer shall submit a monthly inspection report (the "**Inspection Report**") to the Authority and the Contractor bringing out the results of inspections and the remedial action taken by the Contractor in respect of Defects or deficiencies. For the avoidance of doubt, such inspection or submission of Inspection Report by the Authority's Engineer shall not relieve or absolve the Contractor of its obligations and liabilities under this Agreement in any manner whatsoever.

11.8 Monthly progress reports

During the Construction Period, the Contractor shall, no later than 10 (ten) days after the close of each month, furnish to the Authority and the Authority's Engineer a monthly report on the progress of Works and shall promptly give such other relevant information as may be required by the Authority's Engineer.

11.9 Samples

The Contractor shall submit the following samples of Materials and relevant information to the Authority's Engineer for review:

(a) manufacturer's test reports and standard samples of manufactured Materials; and

(b) samples of such other Materials as the Authority's Engineer may require.

11.10 Tests

11.10.1 For determining that the Works conform to the Specifications and Standards, the Authority's Engineer shall require the Contractor to carry out or cause to be carried out tests, at such time and frequency and in such manner as specified in this Agreement, and in accordance with Good Industry Practice for quality assurance. The Contractor shall, with due diligence, carry out all the tests in accordance with the Agreement and furnish the results thereof to the Authority's Engineer. Of the total tests for each category or type to be undertaken by the Contractor under the provisions of this Agreement and Good Industry Practice, the Authority's Engineer shall (a) carry out or cause to be carried out, test checks equal to about 10% (ten per cent) of the number of the tests required to be undertaken by the Contractor; and (b) witness or participate in at least 10% (ten per cent) of the number of such tests conducted or caused to be conducted by the Contractor.

11.10.2 In the event that results of any tests conducted under this Clause 11.10 establish any Defects or deficiencies in the Works, the Contractor shall carry out remedial measures at its own cost and furnish a report to the Authority's Engineer in this behalf. The Authority's Engineer shall require the Contractor to carry out or cause to be carried out tests to determine that such remedial measures have brought the Works into compliance with the Specifications and Standards, and the procedure shall be repeated until such Works conform to the Specifications and Standards.

11.11 Examination of work before covering up

In respect of the work which the Authority's Engineer is entitled to examine, inspect, measure or test before it is covered up or put out of view or any part of the work is

placed thereon, the Contractor shall give notice to the Authority's Engineer whenever any such work is ready and before it is covered up. The Authority's Engineer shall then either carry out the examination, inspection or testing without unreasonable delay, or promptly give notice to the Contractor that the Authority's Engineer does not require to do so. Provided, however, that if any work is of a continuous nature where it is not possible or prudent to keep it uncovered or incomplete, the Contractor shall notify the schedule of carrying out such work to give sufficient opportunity, not being less than 3 (three) business days' notice, to the Authority's Engineer to conduct its inspection, measurement or test while the work is continuing. Provided further that in the event the Contractor receives no response from the Authority's Engineer within a period of 3 (three) business days from the date on which the Contractor's notice hereunder is delivered to the Authority's Engineer, the Contractor shall be entitled to assume that the Authority's Engineer would not undertake the said inspection.

11.12 Rejection

11.12.1 If, as a result of an examination, inspection, measurement or testing, any Plant, Material, design or workmanship is found to be defective or otherwise not in accordance with the provisions of this Agreement, the Authority's Engineer may reject such Plant, Material, design or workmanship by giving notice to the Contractor, with reasons. The Contractor shall then promptly make good the Defect and ensure that the rejected item complies with the requirements of this Agreement.

11.12.2 If the Authority's Engineer requires a Plant, Material, design or workmanship to be retested, the tests shall be repeated on the same terms and conditions, as applicable in each case. If the rejection and retesting cause the Authority to incur any additional costs, such costs shall be recoverable by the Authority from the Contractor and may be deducted by the Authority from any monies due to be paid to the Contractor.

11.12.3 The Contractor shall not be entitled to any extension of time on account of rectifying any Defect or retesting as specified in this Clause 11.12.

11.12.4 No examination, inspection, measurement or testing of any Plant, Material, design or workmanship by the Authority's Engineer or its failure to convey its observations or to examine, inspect, measure or test shall relieve the Contractor of its obligations and liabilities under this Agreement in any manner nor shall the Authority be liable for the same in any manner.

11.13 Remedial work

11.13.1 Notwithstanding any previous test or certification, the Authority's Engineer may instruct the Contractor to:

(a) remove from the Site and replace any Plant or Materials which are not in accordance with the provisions of this Agreement;

(b) remove and re-execute any work which is not in accordance with the provisions of this Agreement and the Specification and Standards; and

(c) execute any work which is urgently required for the safety of the Railway Project, whether because of an accident, unforeseeable event

11.13.2 If the Contractor fails to comply with the instructions issued by the Authority's Engineer under Clause 11.13.1, within the time specified in the Authority's Engineer's notice or as mutually agreed, the Authority's Engineer may advise the Authority to have the work executed by another agency. The cost so incurred by the Authority for undertaking such work shall, without prejudice to the rights of the Authority to recover Damages in accordance with the provisions of this Agreement, be recoverable from the Contractor and may be deducted by the Authority from any monies due to be paid to the Contractor.

11.15 Quality control records

The Contractor shall hand over to the Authority's Engineer a copy of all its quality control records and documents before the Completion Certificate is issued

11.16 Video recording

During the Construction Period, the Contractor shall provide to the Authority for every calendar quarter, a video recording, which will be compiled into a 3 (three) hour digital video disc or any substitute thereof, covering the status and progress of Works in that quarter. The video recording shall be provided to the Authority no later than 15 (fifteen) days after the close of each quarter after the Appointed Date.

11.17 Suspension of unsafe Construction Works

11.17.1 Upon recommendation of the Authority's Engineer to this effect, or on its own volition in cases of emergency or urgency, the Authority may by notice require the Contractor to suspend forthwith the whole or any part of the Works if, in the reasonable opinion of the Authority's Engineer or the Authority, as the case may be, such work threatens the safety of the Users and or other persons on or about the Railway Project.

11.17.2 The Contractor shall, pursuant to the notice under Clause 11.17.1, suspend the Works or any part thereof for such time and in such manner as may be specified by the Authority and thereupon carry out remedial measures to secure the safety of suspended works, the Users, other persons and vehicles on or about the Railway

Project. The Contractor may by notice require the Authority's Engineer to inspect such remedial measures forthwith and make a report to the Authority recommending whether or not the suspension hereunder may be revoked. Upon receiving the recommendations of the Authority's Engineer, the Authority shall either revoke such suspension or instruct the Contractor to carry out such other and further remedial measures as may be necessary and reasonable and the procedure set forth in this Clause 11.17 shall be repeated until the suspension hereunder is revoked.

Chapter VII- Documentation Requirement

6 Documentation requirements:

6.1 The documents required for the S&T modifications to be completely developed by S&T contractor.

6.2 The necessary SIP's are enclosed for preliminary information. However, after award of contract, it is S&T contractor responsibility to obtain the latest SIP as well as RCC from railway authority and prepare the downstream engineering documents, submitted for proof consultant, safety consultant, and followed by CORE PMC.

6.3 As preparation & approval of all the S&T documents are in the scope of S&T contractor, prior to work, the documentation shall be provided in advance, so that the necessary approvals internally from different agencies (Proof consultant, safety consultant etc.,) will be completed by BHEL.

6.4 The detailed list of documents as a minimum are as mentioned in the "Miscellaneous information on scope of work".

6.5 Loose items supply by BHEL: Vendor to specify the exact quantities for the following items which are loosely supplied by BHEL to vendor.

Cable BOQ			
Sr. No.	**Description of materials**	**Unit**	**Quantity**
1	Signalling cable 18C x1.5 Sqmm	Kms	(Vendor to provide)
2	Cable signalling 12C x 1.5 Sqmm	Kms	(Vendor to provide)
3	Cable signalling 2Cx1.5 Sqmm	Kms	(Vendor to provide)
4	Cable signalling 2C x2.5 Sqmm	Kms	(Vendor to provide)
5	Power cable 2C x 2.5sqmm	Kms	(Vendor to provide)
6	Power cable 2C x 25 Sqmm	Kms	(Vendor to provide)
7	Power cable 2C x50 Sqmm	Kms	(Vendor to provide)
8	Power cable 2C x70 Sqmm AL EXPE Two nos.	Kms	(Vendor to provide)
9	6- Quad jelly filled U/G cable 0.9mm dia copper	Kms	(Vendor to provide)

7.8 CHECK LIST

Vendor shall submit the following documents mandatorily as part of COMPLTE technical offer.

Enquiry No. / Date :
Name of the Bidder :
Project Name :
Item Description :

S. No	Document	Bidder confirmation (Yes/No)	Remarks
1	Technical offer complies with the specifications and its associated annexures, pre-bid clarifications in Toto and there are no technical deviations. Signed and stamped copy of this specification along with annexures enclosed along with technical offer.		
2	In case of deviation, vendor to confirm that these are technically not feasible deviations and same are submitted in BHEL format. In case technically feasible deviations are proposed by the bidder and subsequently withdrawn, no commercial implications can be claimed by the bidder		
3	All items are manufactured conforming to latest version of material grade standard and manufacturing standard mentioned in this specifications		
4	Bidder to quote as per BHEL price format only. No other format is acceptable. Bidder to attach un-priced price bid format by indicating "QUOTED" against each item and submit with technical offer duly signed & stamped.		
5	For addition/reduction of quantity, unit rate quoted in the present offer shall be considered during ordering and shall be valid up to execution of the contract to the extent of + 10% and -30% of order Value.		
6	Bidder to agree that Bill of materials / list of equipment furnished in the offer is only for information; Vendor shall supply all the material to meet the performance, sizing & technical requirement as per specification & its Annexures, scope matrix etc.		
7	Check list, Deviation format, All Prices in PRICE SCHEDULE, BOQ with unit rates, Signed copy of total technical specification, Pre-qualification criteria required supporting documents, Detailed techno-commercial offer are enclosed as a minimum part of offer submission.		

(Bidder's Signature and stamp with date)

7.9 **DEVIATION FORMAT**

Enquiry No.:
Item:
Name of Bidder:
Offer Ref. No.:

Sl. No.	Clause no. & Spec. no.	Description as per Specification	Deviation taken	Nature of Deviation	Remarks

NOTES:

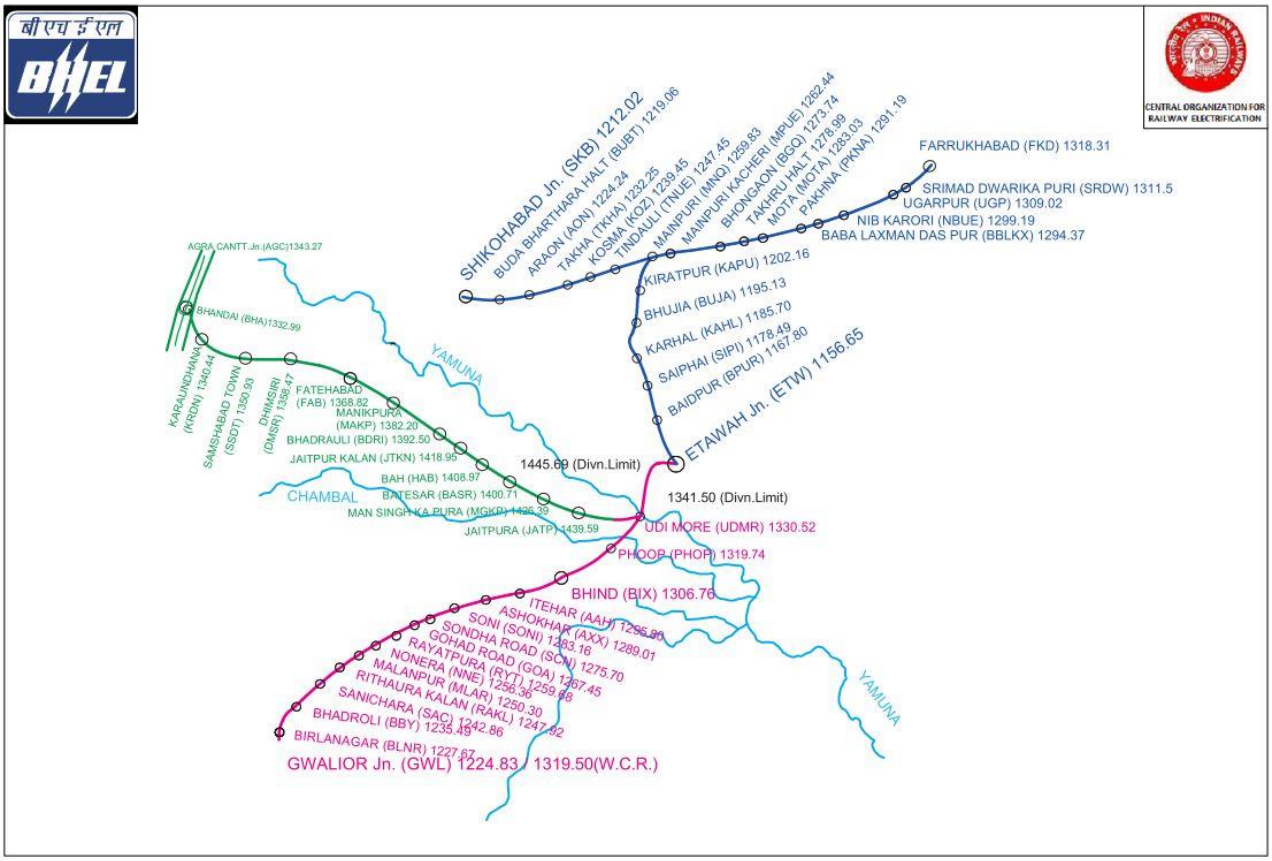
1. Technical offer of the bidder will be evaluated only on the basis of Deviation Schedule. Deviation Schedule constitutes this sheet (with these Notes) duly signed and stamped.
2. Deviations, if any, shall be clearly brought out only in this format. Deviations mentioned / taken elsewhere or in any other format will be ignored.
3. Additional sheets in the same format can be attached by the vendor, if necessary.
4. Nature of Deviations shall only be of Design / Manufacturing constraints and non-availability of items / components / makes in market.
5. No price implications shall be entertained for deviations withdrawn during the technical scrutiny. If any deviations are accepted by BHEL during technical scrutiny then also there will be no price implication. Hence, in no case there will be consideration of Price implications.
6. Reasons for the deviations shall be specified in the Remarks column.
7. If there are no deviations from the specifications, bidder still has to submit the signed copy of this format by writing "NO Deviations" on this format.
8. If the "Deviation Schedule" is not submitted along with the offer, the bidder's offer is likely to be rejected without any further interaction with the bidder. Only the accepted deviations in conjunction with the original tender shall constitute the contract document for the award of job to the bidder

SIGNATURE OF THE BIDDER_____
NAME _____

DESIGNATION _____

COMPANY SEAL
DATE _____

Chapter VIII: Indicative Map



Chapter IX-Annexure I

S&T Works Jhansi Division

Annexure-A

3.18 Signaling system (for electrification works)

3.18.1 Modification to existing MACLS/PI/RRI/EI systems and modification in signaling system of LC gates

1. (Birlangar- Etawah, Gr.239)

All signaling works including design of signaling plan, route control chart or selection/control table, panel diagram, wiring/circuit diagram, cable route chart, cable core diagram, termination and equipment position diagram etc. as part of the modification to the existing signaling system along with supply, installation, testing and commissioning shall be executed in accordance with the provision of IRSEM and signal and Interlocking principles issued in the form of typical designs.

In addition to above, augmentation of existing service building to accommodate additional signaling equipment/racks etc. shall be carried out if required. Glued joints if any required for single rail track circuit shall be provided. The released materials shall be transported to the railway depot within the site, as nominated by the Authority's Engineer.

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Schedule-B

3.18.1 (a) Modification in existing Semaphore/MACLS/PI/RRI/EI systems

1. Birlanagar (Ex)-Etawah (Ex) section (Gr. 239)

SN	Description of work	Name of station		No. of lines	Std of interlocking	Major (Junction)/ Wayside station	Relay type (metal to metal or metal to carbon)	Cable (Sig/Tele)	Type of Signal feed (Local or remote) (local or remote)	Type of train detection system (relay, AC AFTC Etc.)	Point motor immunization	Type of Lifting barrier & locking arrangement	Earthing and protection work	Power supply	Block working	Details of siding	Any other requirement
1	Survey, Design, Supply, Installation, Testing, supply of manuals for new technology equipment for each place, supply of completion drawings and commissioning of	Birlanagar	RE suit station														
		Sanichara		2	Std I MACLS	Way side station	Metal to Carbon	A) Signalling cable for RE modification works of Signalling installations. b) 2X70 Sq mm AL XLPE two nos. are to be laid from SM's' office changeover panel to relay room/ power equipment room. C) Tele cable (6Quad/PUF) for CHLR, Magneto telephone etc. B) Tele cable (6quad/ PUF) for BPAC/UFSBI.	Remote feed	Conventional DC Track ckt.	To be provided as per IRSEM Pt. II Para 22.8.2	Mechanically /Electrically operated lifting Barrier (MLB/ELB) to be modified.	Normal earth for conventional Equipment and maintenance free earth for electronic equipment and surge protection for entire signalling installation	Existing IPS power supply should be augmented	Existing NBT/Push button BI to be replaced by Daido to suit 25 KV AC RE		Glued joint as required for single rail track circuiting and continuity of traction return current , augmentation of existing service building as per site requirement shall be provided. Entire station and section should be made fit for RE as per IRSEM & CORE & Railways practice and RDSO & Railway Board's circulars/ guidelines.
		Malanpur		2													
		Nonera halt		-												Provision of Signalling arrangement at Tower Wagon sidings shall be provided	
		Gohad Road		2													
		Soni		2													
		Bhind		3												Provision of Signalling arrangement at Tower Wagon sidings shall be provided	

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SN	Description of work	Name of station	No. of lines	Std of interlocking	Major (Junction)/ Wayside station	Relay type (metal to metal or metal to carbon)	Cable (Sig/Tele)	Type of Signal feed (Local or remote)	Type of train detection system (relay, AC AFTC Etc.)	Point motor immunization	Type of Lifting barrier & locking arrangement	Earthing and protection work	Power supply	Block working	Details of siding	Any other requirement
		Etawah														
1	Survey, Design, Supply, Installation, Testing, supply of manuals for new technology equipment for each place, supply of completion drawings and commissioning of	Udi Road	4	Std II R PI (SIEMENS)	JN station	Metal to Metal	A) Signalling cable for RE modification works of Signalling installations. b) 2X70 Sq mm AL XLPE two nos. are to be laid from SM's office changeover panel to relay room/ power equipment room. C) Tele cable (6Quad/PIJF) for CHLR, Magneto telephone etc. 8) Tele cable (6quad/ PIJF) for BPAC/UFSBI.	Remote feed	Conventional DC Track ckt.	To be provided as per IRSEM Pt. II Para 22.8.2	Electrically operated lifting Barrier (ELB) to be modified.	Normal earth for conventional Equipment and maintenance free earth for electronic equipment and surge protection for entire signalling installation	Existing IPS power supply should be augmented	Existing BPAC with UFSBI, HASDAC, Dadio BI to be modified to suit 25 KV AC RE		Glued Joint as required for single rail track circuiting and continuity of traction return current, augmentation of existing service building as per site requirement shall be provided. Entire station and section should be made fit for RE as per IRSEM & CORE & Railways practice and RDSO & Railway Board's circulars/ guidelines.	Any other requirement

RE suit station

Supply of signalling spares for Stations
1. Birlanagar(Ex)-Etawah (Ex) section (Gr. 239)

	Supply of signalling spares	Name of station	Quantity with unit
2	2.1 Electronic interlocking or Relay Interlocking equipment.	NA	
	2.2 Power supply system	Lump sum quantity for all stations as mentioned at Sr. No. 1	Compatible to IPS: (i) DC-Dc converter 24-32V, 5Amp.-03 No. (ii) DC-Dc converter 24-40 V, 10Amp.-01 No. (iii) DC-Dc converter 24-40 V, 1Amp.-01 No. (iv) DC-Dc converter 100-150 V, 1Amp.-01 No.
	2.3 Data logger system	-------	-------
	2.4 Axle counter system	-------	-------
	2.5 Signalling cables	Lump sum quantity for all stations as mentioned at Sr. No. 1	12CX1.5SQmm-3 Km, 19CX1.5SQmm-1 Km
	2.6 Power cables	Lump sum quantity for all stations as mentioned at Sr. No. 1	2CX25SQmm(Al)-1 Km
	2.7 Relays	Lump sum quantity for all stations as mentioned at Sr. No. 1	(i) 110 V AC LED ECR-05 Nos. (ii) QTA2 9 ohm 4F,2B-19 Nos. (iii) Key lock relay (KLCR)-01 No (iv) QNA1 8F/8B-07 No. (v) QSPA1-19 No. (vi) QBAT-01 No.
	2.8 Point Machines with accessories	-------	-------
	2.9 Train Detection system	Lump sum quantity for all stations as mentioned at Sr. No. 1	(i) TF charger 110V AC/1-4 cell 80 AH, 10A-19 Nos. (ii) LM secondary cell 80AH-54 Nos.
	2.10 Any other item/items for functioning of signalling system as per contract requirement	Lump sum quantity for all stations as mentioned at Sr. No. 1	(i) LED/ route/'C' on signal-02 Nos. (ii) LED Red-02 No. (iii) LED Yellow-02 No. (iv) LED Green-02 No. (v) B Type Choke-22 No. (vi) Filter Unit-02 No. (vii) Wire Insulator-04 No. (viii) TX/RX set for Daiado-01 No. each (ix) Earth Pipe-10 Nos. (x) Maintainers/Office furniture of Godrej make or similar – 14 Set (each set consist of (i) Executive revolving bearing series low back-floating chair with normal arms cushioned chair- 01 No. (ii) Executive Table size 72x36x30 or higher with 3 drawers one side lockers cabinet on other side -01 No. (iii) Visitor chair seat & back cushion with high density foam with plastic PVC handle capsule type painted back -03 No.)

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	2.11 Testing and measuring tool and equipments as determined in accordance with the manufacturer's manuals	Lump sum quantity for all stations as mentioned at Sr. No. 1	(i)	Tools Kit for maintenance with small size canvas bag with following items :- 1. Combination Plier 8" , 2. Long Nose Plier (Round nose) 6" , 3. Wire Striper Plier 6" , 4. Screw Driver set (5 Piece) , 5. Hexa with frame 12" , 6. Double Open end D spanner set (6 to 32 mm) , 7. Adjustable Spanner set 8" , 8. Ball pin Hammer (200 gm) , 9. Side Cutting Plier 6" , 10. Soldring iron (Soldron make or similar) 11. Torch cell LED (3 cell) (Eveready/ Geep or similar) , 12. Auto Ranging Digital Multimeter (Mecoo / Rishabh or similar) 13. Krone Tool (Krone make or similar) , All Tool Item 1 to 9 of Taparia/Gedor/ Jhalani make or similar-20 set. (ii) Cable insulation tester(Megger 500 V DC)-07 nos. (iii) Cable Fault Locater to localize the faults of underground cables. Aplab make (Model No.3049) or similar from any reputed make. It also includes supply of all accessories required to localize faults of underground cable.-03 Nos. (iv) Cable Tracer kit comprising of cable avoidance tool CAT 33 XD, SGV digital signal generator, signal CLAMP, accessories , carry bag -03 nos. (v) Rubber Hand gloves suiatable for 1500 volts ISI marked tested certificate to IS:4770-1968-91 as per IS:13774-1993-50 pair. **NOTE:- Standard insulated tools and above instruments of reputed make shall be provided.**
3	Integrated testing and commissioning	Lump sum quantity for all stations as mentioned at Sr. No. 1		Each station including adjacent block section for block modification

3.18.1 (b)

1. Modification in existing LC gate: Birlanagar (Ex)-Etawah (Ex) section (Gr. 239) -NA

SN	Description of work	Details of modification						
		LC gate No.	Type of lifting barrier & locking arrangement	Cables (Sig/Tele)	Type of signal feed (local or remote)	Earthing and protection	Power supply	Any other requirement
	NIL							

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Supply of signalling spares for LC gate

1. Birlanagar (Ex)- Etawah (Ex) section (Gr.239): NA.

	Supply of signalling spares	LC Gate No.	Quantity with unit
2	2.1 Electronic interlocking or Relay Interlocking equipment.	-------	-------
	2.2 Power supply system	-------	-------
	2.3 Date logger system	-------	-------
	2.4 Axle counter system	-------	-------
	2.5 Signalling cables	-------	-------
	2.6 Power cables	-------	-------
	2.7 Relays (QNA1, 8F.8B)	-------	-------
	2.8 Train Detection system	-------	-------
	2.09 Any other item/items for functioning of signalling system as per contract requirement	-------	-------
	2.10 Testing and measuring tool and equipments as determined in accordance with the manufacturer's manuals	-------	-------
3	Integrated testing and commissioning	-------	-------

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3.18.2 Commissioning of new Panel Interlocking

1. Birlanagar (Ex)- Etawah (Ex) section (Gr.239):

All signaling works including design of signaling plan, route control chart or selection/control table, panel diagram, wiring/circuit diagram, cable route chart, cable core diagram, termination and equipment position diagram etc. as part of the detail design along with supply, installation, testing and commissioning shall be executed in accordance with the provision of IRSEM and signal and interlocking principles issued in the form of typical designs.

In addition to above, provision of new service buildings to accommodate signaling equipment, power supply equipment etc., shall be carried out. Glued joints required for track circuit shall be provided. Releasing and transporting the released materials to railway depot nominated by the Authority's Engineer.

3.18.2 Commissioning of new Panel Interlocking/Route Relay Interlocking

S N	Description of work	Details of Major/junction or Wayside stations											Any other requirement
		Name of station	No. of Lines	Std. of Interlocking	Type of signalling	Junction (major)/ Wayside station	Type of block working	Type of train detection system	Type of point operation & locking arrangement	Type of lifting barrier & locking arrangement	Details of siding	Junction arrangement with adjacent stations	
1	Survey, Design, Supply, Installation, Testing, supply of manuals for new technology equipment for each place, supply of completion drawings and commissioning of	NIL											

2	**Supply of signalling spares**	Name of station	Quantity with unit
	2.1 Electronic Interlocking or Relay Interlocking equipment	NIL	NIL
	2.2 Power supply system		
	2.3 Data logger system		
	2.4 Axle counter system		
	2.5 Signalling cables		

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	2.6 Power cables		
	2.7 Relays		
	2.8 Point Machine with accessories		
	2.9 Train Detection system		
	2.10 On board (Cab) equipment for TPWS system		
	2.11 Line Side equipment for TPWS system		
	2.12 TMS (with remote operation system)		
	2.13 Any other item items for functioning of signaling system as per contract requirement.		
	2.14 Testing and measuring tools and equipment as determined in accordance with the manufacturer's manuals		
3	Integrated testing and commissioning		

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3.19 Telecommunication (for electrification works)

3.19.1

a) Where optical fiber cable (OFC) and quad cable already exist in the section

Where optical fiber cable (OFC) and quad cable already exist in the section , scope of work includes supply , trenching and laying of 6 quad cables, jointing of quad cables for provision of emergency sockets in the section and SP/SSP/TSS /LC gates etc., transferring the existing communication circuits including block on new cables, supply and installation of power supply equipment, batteries and other telecom equipment, supply and installation of SDH and PD MUX equipment and their networking with the existing OFC link for augmenting existing OFC equipment at stations in the section, supply, installation and testing and commissioning of HQ and way station control equipment for giving various control phones at stations, SP/SSP/TSS etc., augmentation of existing service buildings as required, provision of cable huts and service buildings, protection of telecom lines entering 25 KV sub-station /switching posts, and protection against surge and lightning. The scope also includes masonry works for erection and installation of telecom equipment and all types of painting as per Railway Telecom Manual and standard practices. Supply of spares to the extent of 10% (minimum 1) of each type of equipment like SDH, PDMUX, control phones, emergency sockets etc.

All the materials not limited to above as required for execution of the telecom works to suit 25 KV has to be provided by the Contractor in accordance with the Good Industry Practice. The Contractor shall transport the released materials railway depot nominated by the Authority's Engineer.

b) Where OFC and quad cable does not exist in the section.

Where OFC and quad cable does not exist in the section, scope of work includes supply, trenching and laying of OFC and 6 quad cables, jointing of quad cables, splicing of OFC cable, provision of emergency sockets in the section and SP/SSP/TSS /LC gates etc., transferring the existing communication circuits including block on new cables, supply and installation of power supply equipment, batteries and other telecom equipment, supply and installation of SDH and PD MUX equipment and their networking with the existing OFC link or forming new link if OFC is not existing in the section, commissioning of quad cable system , supply, installation and testing and commissioning of HQ and way station control equipment for giving various control phones at stations, SP/SSP/TSS etc., provision of cable huts and service buildings, protection of telecom lines entering 25 KV sub-station /switching posts, protection against surge and lightning . The scope also includes masonry works for erection and installation of Telecom equipment and all types of painting as per Railway Telecom Manual and Good Industry Practice. Supply of spares to the extent of 10% (ten percent) (minimum 1) of each type of equipment like SDH, PDMUX , control phones, emergency sockets, etc. All the materials not limited to above as required for execution of the Telecom works to suit 25 KV has to be provided by the Contractor.

On completion of above works, testing and commissioning of entire system in totality shall be carried out by the Contractor. The Contractor shall transport the released materials to railway depots nominated by the Authority's Engineer.

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3.19.2 Quad cable work

1.GROUP 239 (BLNR-ETW):

The detailed scope of work includes Supply, trenching, laying and jointing of separate 6 Quad cables for location of TSS/SP/SSP etc., Supply and fixing of Rail posts and provision of Emergency sockets, Telecom related equipments for communication, including necessary earthing arrangements. The scope also includes masonry works for erection and installation of Telecom equipments and all types of painting as per railway Telecom manual and good industry practice. The entire work should be suitable for 25KV charging. The scope also includes provision of spares as indicated in the table. As far as possible, Quad cable should be laid in such a manner that it doesn't fall within the alignment of doubling work to avoid damage during doubling.

On completion of above works, testing and commissioning of entire system in totality shall be carried out by the Contractor. The Contractor shall transport the released materials to railway depots nominated by the Authority's Engineer.

Details of 6 Quad telecom cable system

S N	Description of work	Chainage		Name of stations		LC gate No.	Loc of TSS/SP/SSP	Any other details
		From	To					
1	Survey, Design, Supply,Installation, Testing,Supply of manuals for new technology equipment for each place, Supply of completion drawings, and commissioning of 6 Quad telecom cable System	1227.67	1236.46	Birhanagar	Sanichara	4	SP,SSP	(i)OHE depot. at Bhind and Nonera . (ii) Tower wagon Siding at Bhind and Nonera halt and Bhind .All Telecom installation to be modified for 25 KV AC traction as per, CORE and Railway Policy. Shifting of existing telecom utilities as per site requirement
		1236.46	1250.30	Sanichara	Malanpur	15,16,17,20	SSP	
		1250.30	1275.50	Malanpur	Gohad Road	23,28	TSS	
		1275.50	1283.00	Gohad Road	Soni	----	SSP,SSP	
		1283.00	1306.76	Soni	Bhind	40,41,43,44,45,50	SP,SSP	
		1306.76	1319.76	Bhind	Phuph	---	TSS	
		1319.76	1330.52	Phuph	Oodi	-----	SSP,SSP	
		1330.52	1343.15	Oodi	Etawah	-----		
		1343.15	-----	Etawah	---------	---	SP	
2	Supply of communication spares:	**Quantity with unit**						
	2.1 Six quad telecom cable and accessories	5km						
	2.2 Emergency sockets with box and pins	10 nos						
	2.3 Any other item/items for functioning of telecommunication system as per contract requirement	10 nos portable emergency telephone 4W/2W ,30 nos. of thermo shrinking jointing kit, 25 Nos VF transformer, 01 Nos VHF Set (25 watt), 05 Nos VHF Set (5 watt), 01 no. Leakage Clamp Meter, 20 pair pvc switch board cable- 500 mtr.						
	2.4 Testing and	**1.** Rubber Hand gloves suitable for 1500 volts ISI marked tested certificate to IS:4770-1968-91 as per IS:13774-1993-**20 pair.**						

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	measuring tools and equipment as determined in accordance with the manufacturer's manuals	**2.** Digital Earth clamp meter model DECT-2 MOTWANI or similar display 4 digit large LCD, Long Jaw85x32 mm phai ,range 0.01 ohm to 1000 ohms, resolution 0.001 ohm, over range (OL ohms) as well as low range (L 0.01 OHMS) indication, low battery indication- **02 Nos.** **3.** Cable Fault Locater to localize the faults of underground cables. Aplab make (Model No.3049) or similar from any reputed make. It also includes supply of all accessories required to localize faults of underground cable-**01 No.** **4.** Cable Tracer kit comprising of cable avoidance tool CAT 33 XD, SGV digital signal generator, signal CLAMP, accessories , carry bag etc. make STANLAY or Superior-**01 No.** **5.** Transmission Measuring Set along with all accessories as per RDSO Speen.No.IRS: TC- 43/87 or latest-2 **Nos.** **6.** Tools Kit for maintenance with small size canvas bag with following items :- 1. Combination Plier 8", 2. Long Nose Plier (Round nose) 6" , 3. Wire Striper Plier 6" , 4. Screw Driver set (5 Piece) , 5. Hexa with frame 12" , 6. Double Open end D spanner set (6 to 32 mm) , 7. Adjustable Spanner set 8" , 8. Ball pin Hammer (200 gm) , 9. Side Cutting Plier 6" , 10. Soldring iron (Soldiron make or similar) 11. Toreh cell LED (3 cell) (Eveready/ Geep or similar) , 12. Auto Ranging Digital Multimeter (Mecco / Rishabh or similar) 13. Krone Tool (Krone make or similar) , All Tool Item 1 to 9 of Taparia/Gedore/ Jhalani make or similar.– **08 set.** 7. Digital multimeter fluke/Rishab make with latest model available in the market-**02 Nos.** **8.** Cable insulation tester (Megger 500 V DC)= 2 Nos. **NOTE:- Standard insulated tools and above instruments of reputed make shall be provided.**
3	Integrated testing and commissioning	Yes

3.19.3 Optical Fiber Cable work

1. GROUP 239 (BLNR-ETW)

The detailed scope of work includes Supply, trenching, laying of HDPE duct and blowing of 24 Fiber OFC cable, splicing of OFC cable in the entire section and SP/SSP/TSS, installation of power supply equipment, batteries and other telecom equipment, supply installation, testing & commissioning of SDH ADD/DROP MUXS (STM-1), digital primary drop insert MUXs (fully wired for 30 voice/data channels and suitable interface for SCADA as per latest RE requirement) and other associated equipments by augmenting the existing OFC Huts as per site requirement, supply, installation and testing and commissioning of HQ , way station control equipment for giving various control phones at stations, SP/SSP/TSS etc including augmentation of existing service buildings as required, protection of telecom lines entering 25 KV area against surge and lightning. The scope also includes masonry works for erection and installation of Telecom equipments and all types of painting as per railway Telecom manual and good industry practice.

TPC phone shall be provided at TSS, Switching stations, OHE depot, Tower wagon shed/ Siding and newly constructed offices.

AT supply shall be extended for OFC room by supplying and laying of suitable Power cable. One nos. NMS to be provided at divisional HQ offices .

On completion of above works, testing and commissioning of entire system in totality shall be carried out by the Contractor. The Contractor shall transport the released materials to railway depots nominated by the Authority's Engineer.

S. N	Description of work	Chainage		Name of stations		OF Cable	Details of OFC system							
		From	To				Type of STM equipment		Type of Multiplexer	Power Supply	Control office equipments with power supply			Any other details
							Short Haul	Long Haul			Way station	HQ	EC equipt.	
1	Survey, Design, Supply, Installation, Testing, Supply of manuals for each place, Supply of completion drawings, and commissioning of optical fibre cable communication system.	1227.67	1236.46	Birlanagar	Sanichara	New OFC to be laid	1	Nil	PD MUX	1	TPC	Nil	Nil	All Telecom installation to be modified for 25 KV AC traction as per IRTM, CORE and Railway Policy. Shifting of existing telecom utilities as per site requirement
		1236.46	1250.30	Sanichara	Malanpur		1	Nil	PD MUX	1	TPC	Nil	Nil	
		1250.30	1275.50	Malanpur	Gohad Road		1	Nil	PD MUX	1	TPC	Nil	Nil	
		1275.50	1283.00	Gohad Road	Soni		1	Nil	PD MUX	1	TPC	Nil	Nil	
		1283.00	1306.76	Soni	Bhind		1	Nil	PD MUX	1	TPC	Nil	Nil	
		1306.76	1319.76	Bhind	Phaph		1	Nil	PD MUX	1	TPC	Nil	Nil	

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	1319.76	1330.52	Phuph	Oodi		1	Nil	PD MUX	1	TPC	Nil	Nil		
	1330.52	1343.15	Oodi	Etawah		1	Nil	PD MUX	1	TPC	Nil	Nil		
	1343.15	-----	Etawah	---------		1	Nil	PD MUX	1	TPC	Nil	Nil		
	1127.72		Jhansi			1	Nil	PD MUX	1	TPC	1	Nil		
2	**Supply of communication spares**	**Quantity with unit**												
	2.1 Optical fibre cable with accessories	1 km												
	2.2 HDPE duct with accessories	Nil												
	2.3 Optical fibre Digital equipments (STM with accessories)	01 nos. of STM - 1, FC-PC Patch cord (10m long)- 5 nos.												
	2.4 Digital multiplexer equipments (PDH with accessories)	01 nos. of PD Mux with interface cards												
	2.5 Power supply of STM/PDH with accessories	01 nos. of SMPS Charger 48 V , 01 nos. of battery set of 48 V DC 120 AH capacity (24 cells of 2.0 volts)												
	2.6 Control office equipments with accessories	Nil												
	(a) Way station	03 nos												
	(b) HQ	01 nos												
	2.7 Emergency communication with accessories	Nil												
	2.8 Any other item/items for functioning of telecommunication system as per contract requirement.	Maintainers furniture of Godrej make or similar and each set consist of (i) Executive revolving bearing series low back-floating chair with normal arms cushioned chair- 01 NO. (ii) Executive Table size 72x36x30 or higher with 3 drawers one side lockers cabinet on other side -01 No. (iii) Visitor chair seat & back cushion with high density foam with plastic PVC handle capsule type painted back -03 No. **=08 Set**												
	2.9 testing and measuring tools and equipments as determined in accordance with the manufacture's manuals	Optical Power meter EXFO make Model FPM 302x or similar-01 Nos , Optical power source EXFO make Model FLS 300-23BL or similar -01 Nos , OTDR meter-EXFO make Model 710B or similar, Optical Fiber Splicing Machine EXFO make Model IFS10-INNO or similar-01 No .												
3	Integrated testing and commissioning .	Yes												

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3.19.4 Modification in Passenger amenity works

1.GROUP 239 (BLNR-ETW):

The detailed scope of work includes Provision of modification in existing Passenger amenities systems i.e, PA system, Train indication board, clock, etc. to suit 25 KV RE standard work involving trenching, laying of PIJF Cable on platforms where ever required, supply & fixing of PVC conduit, supply & laying of twin core screened cable through conduit and its protection, earthing and protective works.

The scope also includes masonry works for erection and installation of Telecom equipments and all types of painting as per railway Telecom manual and good industry practice. The entire work should be suitable for 25KV charging

The scope also includes provision of spares as indicated in the table.

On completion of above works, testing and commissioning of entire system in totality shall be carried out by the Contractor. The Contractor shall transport the released materials to railway depots nominated by the Authority's Engineer

S N	Description of work	Details of 6 Quad telecom cable system															
		Station	L C gate	Mobile radio communication system	CCTV	PA system	Passenger information display system	Electronic exchange	Digital clock	Master clock system	Video surveillance system	Telephone exchange	EC socket	LC gate telephones	Earthing arrangements	Power supply equipment with protection	Any other details
1	Survey, design, supply,installation,testing, supply of manuals for new technology equipment for each place, supply of completion drawings, and commissioning of telecommunication equipments	Bhind	--	--- ---	---	To be modified	---- ----	--- -----	---- ---	----- ----	---- ----	---- ----	----	----	All telecom gears as per RE has to be earthed	--- ---	All Telecom installation to be modified for 25 KV AC traction as per IRTM, CORE and Railway Policy. Shifting of existing telecom utilities as per site requirement

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		Sanichara	--	--- --	---	To be modified	---- ----	----- ---	--- ----	---- -----	---- ----	---- ----	----	----	All telecom gears as per RE has to be earthed	--- --	All Telecom installation to be modified for 25 KV AC traction as per IRTM, CORE and Railway Policy. Shifting of existing telecom utilities as per site requirement

2	**Supply of communication spares**	**Quantity with unit**
	2.1 Mobile radio comm. System	Nil
	2.2 CCTV system	Nil
	2.3 Electronic exchange system	Nil
	2.4 Public address system	Nil
	2.5 Passenger information display system	Nil
	2.6 Digital clock system	Nil
	2.7 Master clock system	Nil
	2.8 Video Surveillance	Nil
	2.9 Telephone exchange	Nil
	2.10 EC socket	Nil
	2.11 LC gate telephones	Nil
	2.12 Any other item/items for functioning of telecommunication system as per contract requirement	500 mtr cable- (Two Core Size 24/0.20 mm), Multi core screened cable PVC insulated bare copper conductor core twisted and tapped polyester film and braded with tinned copper wire and sheathed , shielded screened two core size 24/ 0.20 mm.
	2.13 Testing and measuring tools and equipments as determined in accordance with the manufacturer's manuals.	Nil
3	Integrated testing And commissioning	Yes

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Chapter X-Annexure II

Infrastructure Details: Jhansi Division

INTRODUCTION

1. Site

The Site of the Railway Project comprises the section Birla Nagar-Etawah commencing from km 1228/.67to km 1332/.99 i.e. the section in the State of U.P &M.P in the North Central Railway zone, Bhandai-Udi Comencing From Km 1332/.99 To Km 1445/726 The section in the State of U.P in the North Central Railway Zone, Farukhabad - Shikohabad &Mainpuri-Etawah KM 1312/02 TO 1214/02 and KM 3/02 TO 49/02 in the North central Railway Zone. The land and other structures comprising the Site are described below:

2. Route Length: Not Applicable The route length of the Railway Project comprises the section as described below:

S. no	Name of location From	Name of location To	Start Chainage (km)	End Chainage (km)	Length (km)	Remarks
Not Applicable						

3. Land : Not Applicable

The Site of the Railway Project comprises the land described below:

S. No	Name of location From	Name Of location To	Start chainage (km)	End chainage (km)	Land width (m)	Remarks
Not Applicable						

4. Details of existing structures and facilities on adjoining railway track (For doubling or 3rd line projects or electrification)

4.1 Permanent Way

Details of the Permanent Way on the Right of Way are:

SN	No. of railway line	km from	km to	Route km	Min and Max Implantation (if electrified)	Remarks
1	Single line	1228/.67	1332/.99	115	Not Electrified	Birla Nagar-Etawah
2	Single line	1332/.99	1445/726	113	Not Electrified	Bhandai-Udi
3	Single line	1312/02 &3/02	1214/02 &49/02	158	Not Electrified	Farrukhabad-Shikohabad & Mainpuri-Etawah

4.2 Important Bridges

TUNNELS, FLYOVERS, ROB's

150	165	1310/7-8	OPEN	CC	ARCH	1	0.61	6.1
151	166	1311/3-4	OPEN	CC	ARCH	2	0.91	6.1
152	167	1312/10-1	OPEN	CC	ARCH	1	0.91	6.1
153	168	1312/12-1	OPEN	CC	RCC SLAB	1	1.83	6.1
154	170	1315/6-7	OPEN	CC	ARCH	1	1.83	6.1
155	171	1316/9-10	OPEN	CC	ARCH	1	0.91	6.1

4.5 Tunnels:

SN	Block Section	km from	km to	Remarks
(A)Birla Nagar-Etawah - **NIL** (B) Bhandai-Udi - **NIL** (C) Farrukhabad-Shikohabad & Mainpuri-Etawah - **NIL**				

4.6 Railway Flyovers

The Site includes the following Railway Fly Over:

SN	Block Section	Bridge No and location (Km)	Type of Structure			Span (Nos. × length)	Width (m)
			Foundation	Sub-structure	Super-structure		
(A)Birla Nagar-Etawah - **NIL** (B) Bhandai-Udi- **NIL** (C) Farrukhabad-Shikohabad & Mainpuri-Etawah- **NIL**							

4.7 Road under-bridges (RUB) / road over-bridges (ROB)

The Site includes the following RUB (Road under railway line)/ ROB (road over railway line):

SN	Block-section	Bridge No. and location(Km)		Type of Structure		Span (no. x length)	Width (m)	height (m)	ROB/ RUB
		Bridge No.	Location (Km)	Foundation	Superstructure				
(A)Birla Nagar-Etawah									
1	Birla Nagar-Etawah	1307/1A	1307.964	RCC	Girder	1	2.44	6.1	FOB
2		1237/1A	1237/7-8	RCC	PSC Girder			6.1	ROB
3		1325/1A	1325.078	RCC	RCC T-Beam slab	1	12.40	6.1	ROB
4		1329/1	1329.493	RCC	RCC T-Beam slab	1	15.33	6.1	ROB
5		1339/1	1339.246	RCC	RCC BOX	2	9.15	6.1	RUB
(B) Bhandai-Udi									
1	Bhandai – Udi	1335/1	1367/3-4	PILE	PSC	1	12.6	6.9	ROB
2		1349/2	1377/7-8	PILE	PSC	1	20.93	6.5	ROB
(C) Farrukhabad-Shikohabad & Mainpuri-Etawah									
1		2A	1213/6-7	OPEN	RCC BOX	1	6	6.1	RUB

2		4B	1216/1-3	OPEN	PSC GIRDER	1	19.9	6.1	ROB
3		4-A	1215/3-4	OPEN	RCC BOX	1	6.0	6.1	RUB
4		8-A	1217/11-12	OPEN	RCC BOX	1	6	6.1	RUB
5		10-A	1219/9-10	OPEN	RCC BOX	1	6	6.1	RUB
6		12-A	1222/3-4	OPEN	RCC BOX	1	6	6.1	RUB
7		20-A	1228/2-3	OPEN	RCC BOX	1	6	6.1	RUB
8		27-A	1231/10-11	OPEN	RCC BOX	1	6	6.1	RUB
9		37-A	1235/2-3	OPEN	RCC BOX	1	6.0	6.1	RUB
10		40-A	1236/10-11	OPEN	RCC BOX	1	6.0	6.1	RUB
11		55-A	1242/15-6	OPEN	RCC BOX	1	6.0	6.1	RUB
12		60A	1245/12-13	OPEN	RCC BOX	1	6.0	6.1	RUB
13		68-A	1251/2-3	OPEN	RCC BOX	1	4.0	6.1	RUB
14		74A	1254/1-2	OPEN	RCC BOX	1	6.0	6.1	RUB
15		82A	1257/0-1	OPEN	RCC BOX	1	6.0	6.1	RUB
16		92-A	1263/1-2	OPEN	RCC BOX	1	6.0	6.1	RUB
17	**Farrukhabad-Shikohabad & Mainpuri - Etawah**	95AA	1265/10-11	OPEN	RCC BOX	1	6.0	6.1	RUB
18		95-A	1266/3-4	OPEN	RCC BOX	1	6.0	6.1	RUB
19		97-A	1267/13-14	OPEN	RCC BOX	1	6.0	6.1	RUB
20		100-A	1270/1-2	OPEN	RCC BOX	1	6.0	6.1	RUB
21		103-A	1271/6-7	OPEN	RCC BOX	1	6.0	6.1	RUB
22		103-A	1272/1-2	OPEN	RCC BOX	1	6.0	6.1	RUB
23		110-A	1274/10-11	OPEN	RCC BOX	1	6.0	6.1	RUB
24		111-A	1275/11-12	OPEN	RCC BOX	1	6.0	6.1	RUB
25		118-A	1277/2-3	OPEN	RCC BOX	1	6.0	6.1	RUB
26		123A	1279/7-8	OPEN	RCC BOX	1	4.0	6.1	RUB
27		124A	1279/10-11	OPEN	RCC BOX	1	6.0	6.1	RUB
28		135-B	1284/9.10	OPEN	RCC BOX	1	6.0	6.1	RUB
29		135A	1286/1-2	OPEN	RCC BOX	1	4.0	6.1	RUB
30		137A	1288/13-14	OPEN	RCC BOX	1	6.0	6.1	RUB

31		139A	1290/12-13	OPEN	RCC BOX	1	6.0	6.1	RUB
32		140A	1292/9-10	OPEN	RCC BOX	1	6.0	6.1	RUB
33		151AA	1298/3-4	OPEN	RCC BOX	1	6.0	6.1	RUB
34		151A	1299/8-9	OPEN	RCC BOX	1	6.0	6.1	RUB
35	**Farrukhabad-Shikohabad & Mainpuri - Etawah**	156A	1303/7-8	OPEN	RCC BOX	1	6.0	6.1	RUB
36		158A	1306/4-5	OPEN	RCC BOX	1	6.0	6.1	RUB
37		159A	1307/8-9	OPEN	RCC BOX	1	6.0	6.1	RUB
38		162A	1309/12-13	OPEN	RCC BOX	1	4.0	6.1	RUB
39		168A	1313/9-10	OPEN	RCC BOX	1	6.0	6.1	RUB

4.8 Railway level crossings LEVEL CROSSINGS

The Site includes the following railway level crossings:

SN	Block Section	Chainage	LC No.	TVU / year		L C Classification	Remarks
Birla Nagar-Etawah							
1	BLNR-BBY	1230/3-4	4	24-08-15	23185	C	
2	SAC-RAKL	1243/3-4	15	24-08-15	7463	C	
3	SAC-RAKL	1244/3-4	16	24-08-15	5474	C	
4	RAKL-MLAR	1249/7-8	20	24-08-15	10544	C	
5	NNE-GOA	1259/4-5	28	24-08-15	9771	C	
6	GOA-SCN	1267/9--68/0	33	24-08-15	3552	C	
7	SONI-AXX	1283/5-6	40	04-11-15	22133	C	
8	AXX-AAH	1292/4-5	44	15-08-15	2580	C	
9	AAH-BIX	1296/2-3	45	15-08-15	2450	C	
10	AAH-BIX	1305/9-1306/0	50	15-08-15	54870	C	
11	BIX-UDI	1308/4-5	69	17-09-15	508	C	
12	BIX-UDI	1310/4-5	70	17-09-15	340	C	
13	BIX-UDI	1312/8-9	71	17-09-15	525	C	
14	BIX-UDI	1314/3-4	72A	17-09-15	352	C	
15	BIX-UDI	1319/0-1	75	17-09-15	708	C	
16	BIX-UDI	1320/1-2	77	17-09-15	375	C	
17	BIX-UDI	1322/6-7	82	17-09-15	544	C	
18	UDI-ETW	1331/2-3	88	17-09-15	406	C	
19	UDI-ETW	1337/5-6	91	17-09-15	446	C	

SN	Block Section	Chainage	LC No.	TVUs/Year		L C Classification	Remarks
(B)Bhandai-Udi							
1	BHA-SSDT	1340/2-3	2	NA	NA	C	
2	BHA-SSDT	1344/1-2	4	NA	NA	C	
3	BHA-SSDT	1346/1-2	5	NA	NA	C	

4	SSDT-FAB	1354/1-2	9	NA	NA	C	
5	SSDT-FAB	1356/9-10	11	NA	NA	C	
6	SSDT-FAB	1361/6-7	12	NA	NA	C	
7	SSDT-FAB	1362/6-7	13	NA	NA	C	
8	SSDT-FAB	1364/5-6	14	1088	9/2017	C	
9	FAB-HAB	1373/3-4	17	NA	NA	C	
10	FAB-HAB	1377/3-4	18	NA	NA	C	
11	FAB-HAB	1380/3-4	19	10662	9/2017	C	
12	FAB-HAB	1404/8-9	29	NA	NA	C	
13	FAB-HAB	1406/6-7	31	NA	NA	C	
14	HAB-UDI	1421/9-10	32	NA	NA	C	
15	HAB-UDI	1436/0-1	35	NA	NA	C	
16	HAB-UDI	1437/4-5	36	NA	NA	C	
17	HAB-UDI	1439/9-10	38	NA	NA	C	
18	HAB-UDI	1441/3-4	39	NA	NA	C	
19	HAB-UDI	1443/2-3	40	NA	NA	C	

SN	Block Section	Chainage	LC No	TVUs & year		L C Classification	Remarks
C)Farrukhabad-Shikohabad							
1	SKB-AON	1219/5	7 C	2164	Aug-15	C	
2	AON-TKHA	1224/8	12 C	12613	Oct-15	C	
3	TKHA-KOZ	1235/1	17	2730	Aug-15	C	
4	,,	1238/9	21	23200	Aug-15	C	
5	KOZ-TNUE	1240/1	22	4491	Aug-15	C	
6	,,	1241/8	24	2435	Aug-15	C	
7	,,	1243/0	25	3348	Oct-15	C	
8	,,	1248/0	29	6955	May-15	C	
9	,,	1256/7	35	903	Sep-15	C	
10	,,	1258/3	3B	47864	Oct-15	C	
11	,,	1259/2	38	15324	Sep-15	B	
12	MNQ-BGQ	1260/8	4B	40963	Sep-15	C	
13	,,	1261/1	5B	34191	Oct-15	A	
14	,,	1262/4	41	50329	Oct-15	C	
15	,,	1265/7	44	1845	Sep-15	C	
16	,,	1268/8	6B	129838	Oct-15	A	
17	BGQ-MOQ	1274/2	7SPL	145582	Oct-15	SPL	
18	,,	1277/7	57	172	Sep-15	C	
19	,,	1278/5	58	108	Sep-15	C	
20	,,	1279/8	61	130	Sep-15	C	
21	,,	1282/6	63	4840	Jul-15	C	
22	,,	1288/10	66	178	Sep-15	C	
23	,,	1290/8	68	2782	Oct-15	C	
24	,,	1292/7	70C	211	Oct-15	C	
25	,,	1297/7	7AC	7814	Oct-15	C	
26	NBUE-	1302/1	7BC	6330	Oct-15	C	

	UGP						
27	„	1303/5	74	146	Oct-15	C	
28	„	1306/3	78	313	Oct-15	C	
29	„	1308/7	80	5386	Oct-15	C	
30	„	1311/5	83	195	Oct-15	C	
31	„	1312/7	8A	21682	Oct-15	A	
32	„	1315/5	86	30900	Oct-15	C	

4.9 Railway stations on Railway Project

RAILWAY STATIONS

The Site includes the following railway stations

Birlanagar-Etawah

SN	Station	C.L. km	Nos. Of lines	Nos. Of P.F. & Length	FOB	Remarks
11	Birlanagar	1227.67	4	PF = 3nos. PF1=185.00 PF2& 3=265.00 PF-4=360	1	
2	Bhadroli	1236.46	1	PF = 1no PF1=275.30	Nil	
3	Sanichara	1242.86	4	PF = 2nos. PF1=234.00 PF2=234.00	Nil	
4	Rithaura Kalan	1247.30	1	PF = 1no PF1=260.00	Nil	
5	Malanpur	1250.30	3	PF = 2nos. PF1=260.00 PF2=648.43	Nil	
6	Nonera	1256.231	1	PF = 1 no. PF1=260.00	Nil	
7	Rayatpura	1259.47	1	PF = 1no PF1=260.00	Nil	
8	Gohad Road	1267.25	2	PF = 1no PF1=260.80	Nil	
9	Sondha Road	1275.50	1	PF = 1no PF1=247.60	Nil	
10	Soni	1283.00	4	PF = 1no. PF1=258.00	Nil	
11	Ashokhar	1289.53	1	PF = 1no. PF1=260.00	Nil	
12	Itehar	1295.85	1	PF = 1no. PF1=260.00	Nil	
13	Bhind	1306.76	3	PF = 3nos PF1=475.00 PF2 &3 = 260.00	1	
14	Phuph	1319.742	1	PF = 1nos. PF1=260.00	Nil	
15	Udi	1330.52	4	PF = 2no. PF1=575..00 PF2=575. 00	Nil	
16	Etawah Jn.	1156.755	8	PF = 5no. PF1=605.00 PF2 & 3=605.00, PF4 & 5=420.00	2	

Bhandai-Udi

SN	Station	C.L. km	Nos. Of lines	Nos. Of P.F. & Length	FOB	Remark
1	Bhandai	1332.90	4	PF = 2nos. PF1=278.00	Nil	

				PF2 & 3 =278.00		
2	Karandhan kalan	1340.377	1	PF = 1no. PF1=250.00	Nil	
3	Shamsabad	1350.935	2	PF = 1no. PF1=250.00	Nil	
4	Dhimsiri	1358.227	1	PF = 1no. PF1= 250.00	Nil	
5	Fatehabad	1368.827	2	PF = 1no. PF1=250.00	Nil	
6	Manikpura	1381.677	1	PF = 1no. PF1=250.00	Nil	
7	Bhadrauli	1391.977	1	PF = 1no. PF1=250.00	Nil	
8	Batesar	1400.427	1	PF = 1no. PF1=250.00	Nil	
9	Bah	1408.975	3	PF = 1no. PF1=250.00	Nil	
10	Jaitpur kalan	1418.377	1	PF = 1no. PF1=250.00	Nil	
11	Mansingh ka pura	1426.177	1	PF = 1no. PF1=250.00	Nil	
12	Jaitpura	1439.227	1	PF = 1no. PF1=250.00	Nil	
13	Udi	1330.52	4	PF = 2no. PF1=575..00 PF2=575..00	Nil	

Farukhabad- Shikohabad &Mainpuri-Etawah

SN	Station	C.L. km	Nos. Of lines	Nos. Of P.F. & Length	FOB	Remarks
1	Shikohabad(Excl)	1212.02	6	PF = 4nos. PF=1 & 2 575.00 PF 3 & 4 =470.00	1	
2	Burha bharthana -H	1219.06	1	PF = 1nos. PF1=200.00	Nil	
3	Araon-H	1224.247	1	PF = 1nos. PF1=600.00 ft	Nil	
4	Takha	1232.198	1	PF = 1nos. PF1=453.00 ft	Nil	
5	Kosma	1239.45	2	PF = 2nos. PF1=870.00ft PF2=252.30 ft	Nil	
6	Tindauli-H	1247.55	1	PF = 1nos. PF1=603.00 ft	Nil	
7	Mainpuri	1259.811	3	PF = 3nos. PF1=244.00 PF2=244.00 PF3=244.00	1	
8	Mainpuri Kacheri-H	1262.158	1	PF = 1nos. PF1=593.00ft	Nil	
9	Bhongaon	1273.741	2	PF = 1nos. PF1=178.30	Nil	
10	Takhru Halt	1278.988	1	PF = 1nos.	Nil	

				PF1=262.40		
11	Mota	1283.03	2	PF = 2nos. PF1=112.00 PF2=170.00	Nil	
12	Pakhna	1291.19	1	PF = 1nos. PF1=700ft	Nil	
13	Baba Laxman Das Puri-H	1294.370	1	PF = 1nos. PF1=225.40	Nil	
14	Nib karori	1299.02	2	PF = 2nos. PF1=184.00 PF2=185.00	Nil	
15	Ugarpur	1309.02	1	PF = 1nos. PF1=900.00ft	Nil	
16	Shrimad dwarikapuri-H	1311.650	1	PF = 1nos. PF1=738.00ft	Nil	
17	Farrukhabad Jn.	138/5-6	9	PF = 4nos. PF1=450.00 PF2=585.00 PF2=590.00 PF4=685.00	1	
Mainpuri-Etawah(Excl)						
1	Mainpuri	55.004	3	PF = 2nos. PF1=242.60 PF 2= 244.00	1	
2	Keerathpur Halt	45.510	1	PF = 1nos. PF1=250.00	Nil	
3	Bhujia Halt	38.476	1	PF = 1nos. PF1=350.00	Nil	
4	Karhal	29.050	3	PF = 2nos. PF1=350.00 PF 2= 350.00	Nil	
5	Safai	21.838	1	PF = 1nos. PF1=350.00	Nil	
6	Baidpur	11.500	1	PF = 1nos. PF1=350.00	Nil	
7	Etawah(Jn.)	1156.755	8	PF = 5nos. PF1=605.00 PF 2 & 3 = 605.00, PF 4 & 5 = 420.00	2	

4.10 Railway yards

RAILWAY YARDS

The Site includes the following Railway yards:

(A) Birlanagar-Etawah

SN	Name of Yard	No. of Line	Remarks
1	Birlanagar	4	
2	Bhadroli	1	
3	Sanichara	4	
4	Rithaura Kalan	1	
5	Malanpur	3	
6	Nonera	1	
7	Rayatpura	1	

8	Gohad Road	2	
9	Sondha Road	1	
10	Soni	4	
11	Ashokhar	1	
12	Itehar	1	
13	Bhind	3	
14	Phuph	1	
15	Udi	4	
16	Etawah Jn.	8	

(B) Bhandai-Udi

SECTION

SN	Name of Yard	No. of Line	Remarks
1	Bhandai	4	
2	Karandhan kalan	1	
3	Shamsabad	2	
4	Dhimsiri	1	
5	Fatehabad	2	
6	Manikpura	1	
7	Bhadrauli	1	
8	Batesar	1	
9	Bah	3	
10	Jaitpur kalan	1	
11	Mansingh ka pura	1	
12	Jaitpura	1	
13	Udi	4	

(C) Farukhabad- Shikohabad &Mainpuri-Etawah

SN	Name of Yard	No. of Line	Remarks
1	Shikohabad(Excl)	6	
2	Burha bharthana -H	1	
3	Araon-H	1	
4	Takha	1	
5	Kosma	2	
6	Tindauli-H	1	
7	Mainpuri	2	
8	Mainpuri Kacheri-H	1	
9	Bhongaon	2	
10	Takhru Halt	1	
11	Mota	2	
12	Pakhna	1	
13	Baba Laxman Das Puri-H	1	
14	Nib karori	2	
15	Ugarpur	1	
16	Shrimad dwarikapuri-H	1	
17	Farrukhabad Jn.	9	

	Mainpuri-Etawah		
1	Mainpuri	3	

2	Keerathpur Halt	1	
3	Bhujia Halt	1	
4	Karhal	3	
5	Safai	1	
6	Baidpur	1	
7	Etawah(Jn.)	8	

4.11 Foot over bridges on Railway Project

The Site includes the following foot over bridges:

SN	Station/ Block Section	Km/Chainage	Span (mtr.)/ No. of Track	Remarks
(A)Birlanagar-Etawah section				
1	Birlanagar	1227.684	39.83	
2	Bhind	1306.009	17.56	
3	Etawah	1156.531 1156.703	56.00 36.00	
(B) Bhandai-Udi Section				
Nil				
(c)Farukhabad- Shikohabad& Mainpuri –Etawah Section				
1	Sikohabad	1111.978	41.40	
2	Mainpur	1159.756	24.31	
3	Farrukhabad	138/7-8	83.16	

4.12 Transmission lines crossing the Right of Way

The Site includes the following transmission lines crossing the Right of Way:

(A) Birala Nagar – Etawah Gr-239

SN	Block Section	Chainage	HT/LT (Specify KV)	OH/UG	Height above RL/ Depth below RL in meters
1	ETW - UDIMOR	1331/3-4	800	OH	25.00
2	ETW - UDIMOR	1331/4-5	800	OH	20.00
3	SHANICHARA – RETHORA	1244/9 1245/0	132	OH	17.00
4	SHANICHARA – RETHORA	1245/0 1245/1	33	OH	16.50
5	RETHORA - MALANPUR	1249/7-8	132	OH	16.50
6	NONERA-RAYATPURA	1256/8-9	800	OH	24.00
7	NUNERA-RAYATPURA	1257/2-3	800	OH	25.00
8	NUNERA-GOHAD	1267/9 1268/0	33	OH	17.00
9	SONDHA ROAD-SONI	1281/7-8	132	OH	16.50
10	SONI-ASHOKHAR	1283/6-7	33	OH	17.00
11	SONI-ASHOKHAR	1288/1-2	132	OH	17.00
12	ITEHAR-BHIND	1305/9-10	33	OH	17.00
(B)	**Bhandai-Udi Group 240**				

1	Udi Mor- Etawah	1331/45	132	OH	20.00
2	Udi Mor- Etawah	1331/3-4	800	OH	25.00
3	Jaitpur-Bah	1415/2-3	756	OH	22.00
4	Jaitpur-Bah	1415/0-1	756	OH	22.50
5	Bhadrauli-Bateshar	1395/3-4	765	OH	23.00
6	Bhadrauli-Bateshar	1395/1-2	765	OH	25.00
7	Bhadrauli-Manikpura	1384/1-2	132	OH	24.00
8	Bhadrauli-Manikpura	1384/2-3	132	OH	23.00
9	Manikpura-Fatehabad	1379/7-8	132	OH	18.50
10	Manikpura-Fatehabad	1372/8-9	800	OH	25.00
11	Manikpura-Fatehabad	1371/7-8	400	OH	25.00
12	Manikpura-Fatehabad	1371/5-6	765	OH	23.00
13	Manikpura-Fatehabad	1370/7-9	765	OH	25.0
14	Shamshabad-Dhinsri	1356/0-1	800	OH	24.00
15	Shamshabad-Dhinsri	1354/3-4	800	OH	25.00
16	Shamshabad-Karandhand Kalan	1344/8-9	800	OH	23.00
17	Shamshabad-Karandhand Kalan	1345/5-6	132	OH	24.00
18	Karandhand Kalan-Bhandai	1339/1-2	800	OH	25.00
19	Karandhand Kalan-Bhandai	1337/7-8	800	OH	25.00
20	Karandhand Kalan-Bhandai	1337/7-8	132	OH	18.00
21	Karandhand Kalan-Bhandai	1337/8-9	400	OH	23.00
22	Karandhand Kalan-Bhandai	1335/2-3	400	OH	23.00
23	Karandhand Kalan-Bhandai	1334/8-9	400	OH	25.00
(C) Farukhabad-Shikohabad & Mainpuri-Etawah					
1	Shikohabad-Buda bharthara	1215/7-8	11	OH	8.00
2	Shikohabad-Buda bharthara	1215/7-8	33	OH	8.30
3	Shikohabad-Buda bharthara	1215/7-8	33	OH	8.00
4	Shikohabad-Buda bharthara	1215/7-8	33	OH	9.00
5	Shikohabad-Buda bharthara	1215/7-8	33	OH	9.30
6	Shikohabad-Buda bharthara	1217/9-10	132	OH	17.00
7	Buda bharthara-Araon	1220/3-4	132	OH	17.50
8	Buda bharthara-Araon	1220/1-2	400	OH	22.00
9	Takha-Kosma	1236/1-2	132	OH	16.00
10	Kosma-Tindauli	1243/6-7	400	OH	23.00
11	Kosma-Tindauli	1245/6-7	400	OH	22.00
12	Kosma-Tindauli	1246/3-4	400	OH	New line under construction
13	Tindauli-Mainpuri	1249/3-4	220	OH	18.00
14	Tindauli-Mainpuri	1249/5-6	400	OH	22.00
15	Tindauli-Mainpuri	1249/8-9	765	OH	21.00
16	Tindauli-Mainpuri	1251/3-4	765	OH	22.00
17	Tindauli-Mainpuri	1251/5-6	765	OH	New line under construction
18	Tindauli-Mainpuri	1251/8-9	132	OH	18.00
19	Tindauli-Mainpuri	1253/5-6	400	OH	22.00
20	Tindauli-Mainpuri	1253/7-8	400	OH	24.00
21	Tindauli-Mainpuri	1259/1-2	132	OH	16.00
22	Tindauli-Mainpuri	1259/1-2	132	OH	16.50

23	Tindauli-Mainpuri	1259/3-4	132	OH	18.00
24	Tindauli-Mainpuri	1257/7-8	132	OH	18.50
25	Mainpuri Kacheri-Aron	1267/9-10	765	OH	18.50
26	Mainpuri Kacheri-Aron	1267/1-2	11	OH	8.00
27	Mainpuri Kacheri-Aron	1270/9-10	132	OH	17.00
28	Mainpuri Kacheri-Aron	1271/1-2	132	OH	17.30
29	Mainpuri Kacheri-Aron	1271/2-3	400	OH	21.00
30	Mainpuri Kacheri-Aron	1271/7-8	765	OH	22.00
31	Etawah-Baidpura	16/1-2	132	OH	21.00
32	Etawah-Baidpura	10/9-10	132	OH	18.00
33	Etawah-Baidpura	10/1-2	765	OH	22.00
34	Etawah-Baidpura	8/8-9	400	OH	18.00
35	Etawah-Baidpura	7/9-10	400	OH	21.00
36	Etawah-Baidpura	7/2-3	400	OH	18.00
37	Sefai-Baidpura	17/5-6	400	OH	22.00
38	Bujiya-Karhal	31/1-2	132	OH	17.00
39	Kirathpur-Bujiya	42/1-2	400	OH	22.00
40	Keerathpur-Bujiya	41/7-8	400	OH	21.0
41	Keerathpur-Bujiya	41/6-7	132	OH	23.00
42	Keerathpur-Bujiya	44/8-9	765	OH	23.00
43	Mainpuri-Keerathpur	48/3-4	400	OH	23.00
44	Mainpuri-Keerathpur	49/9-10	132	OH	18.00
45	Mainpuri-Keerathpur	50/3-4	400	OH	19.00
46	Mainpuri-Keerathpur	50/3-4	400	OH	20.00
47	Mainpuri-Keerathpur	48/3-4	400	OH	New Line under construction.
48	Mainpuri-Keerathpur	46/9-10	765	OH	23.00
49	Pakhna-Mota	1277/7-8	400	OH	22.00
50	Nibkarori-Baba lakshman Das	1293/11-12	33	OH	8.50
51	Nibkarori-Baba Lakshman Das	1292/3-4	33	OH	9.00
52	Dwarikapuri-Farrukhabad	1316/3-4	132	OH	17.00

UNDER GROUND POWER CROSSINGS

4.13 Underground power line crossing the Right of Way

The Site includes the following Underground Power Line Crossings

SN	Location	Section	System Voltage in KV	Distance of Structure from centre of Track in meters		Remarks
(A)	**Birlanagar-Etawah**					
(A)	1245/0-1	Sanichara-Rethora	33	35	20	
(B)	1267/9-1268-0	Nonera-Gohad	33	35	20	
(C)	1283/6-7	Soni-Ashokhar	33	30.00	50.00	
(D)	1305/9-10	Itehar-Bhind	33	25	40	
(A) Bhandai- Udi						
------NIL -----						
(B) Farukhabad-Shikohabad & Mainpuri-Etawah						
1	1215/7-8	Shikohabad-Buda bharthara	11	35	20	

2	1215/7-8	Shikohabad-Buda bharthara	33	35	20	
3	1215/7-8	Shikohabad-Buda bharthara	33	35	20	
4	1215/7-8	Shikohabad-Buda bharthara	33	35	20	
5	1215/7-8	Shikohabad-Buda bharthara	33	35	20	
6	1267/1-2	Mainpurikacheri-Aron	11	35	20	
7	1293/11-12	Nibkarori-Baba laksman Das	33	40	35	
8	1292/3-4	Nibkarori-Baba laksman Das	33	40	25	

SIGNALLING INFRA STRUCTURE

4.14 Signalling infrastructure

The Site includes the following signalling infrastructure:

1. Birlanagar (Ex)-Etawah (Ex)- Section (Gr.239)					
SN	Station	Standard of Interlocking	Existing Signalling System (RRI/TBM Rly etc.)	Type of Signals (Single distant/ double distant/colour light etc.	Remarks
1	Birla Nagar	**RE Suit Station**			
2	Sanichara	Std I	MACLS with SM Slide	MACLS, Single distant	
3	Malanpur	Std I	MACLS with SM Slide	MACLS, Single distant	
4	Gohad Road	Std I	MACLS with SM Slide	MACLS, Single distant	
5	Soni	Std I	MACLS with SM Slide	MACLS, Single distant	
6	Bhind	Std I	MACLS with SM Slide	MACLS, Single distant	
7	Udi Road	Std II (R)	PI/MACLS	MACLS, Single distant	
8	Etawah	RE Suit Station			
2. Bhandai (EX)-Udi Road (EX) Section (Gr.240)					
1	Bhandai	**RE Suit Station**			
2	Shamsabad	Std II (R)	SSI/MACLS	MACLS, Single distant	
3	Fatehabad	Std II (R)	SSI/MACLS	MACLS, Single distant	
4	Bah	Std II (R)	SSI/MACLS	MACLS, Single distant	
5	Udi Road	**Taken in Gr.239**			

3. Shikohabad (Ex) - Farrukhabad(Ex) section (Gr.241)

SN	Station	Standard of Interlocking	Existing Signalling	Type of Signal (Single	Remark

			system (RRI/TBM Rly.)	Distant/Double Distant/Colour Light etc.)	
01	Frrukhabad	RE Suit station			
02	Nibkarori	I R	MACLS with lever frame	MACLS, Single Distant	
03	Mota	I R	MACLS with lever frame	MACLS, Single Distant	
04	Bhogaon	I	MACLS with lever frame	MACLS, Single Distant	
05	Manpuri	II R	PI/MACLS	MACLS, Single Distant	
06	Kosma	I R	MACLS with lever frame	MACLS, Single Distant	
07	Karhal	II R	PI/MACLS	MACLS, Single Distant	
08	Shikohabad	RE Suit station			

4.15 Telecom infrastructure

TELECOM INFRASTRUCTURE

The Site includes the following telecom infrastructure:

Birlanagar (Ex)-Etawah (Ex)- Section (Gr.239)					
SN	Station	**Control Phone**	**DOT**	**Any other Communication**	**Availability of OFC**
1	Birla Nagar	Yes (Section Control)	Yes	Yes (VHF Set 25 W	No
2	Sanichara	Yes (Section Control)	Yes	Yes (VHF Set 25 W	No
3	Malanpur	Yes (Section Control)	Yes	Yes (VHF Set 25 W	No
4	Gohad Road	Yes (Section Control)	Yes	Yes (VHF Set 25 W	No
5	Soni	Yes (Section Control)	Yes	Yes (VHF Set 25 W	No
6	Bhind	Yes (Section Control)	Yes	Yes (VHF Set 25 W	No
7	Udi Road	Yes (Section Control)	Yes	Yes (VHF Set 25 W	No
8	Etawah	Yes (Section Control)	Yes	Yes (VHF Set 25 W	No
Bhandai (EX)-Udi Road (EX) Section (Gr.240)					
SN	Station	**Control Phone**	**DOT**	**Any other Communication**	**Availability of OFC**
1	Bhandai	Yes (Section Control)	Yes	Yes (VHF Set 25 W	No
2	Shamsabad	Yes (Section Control)	Yes	Yes (VHF Set 25 W	No
3	Fatehabad	Yes (Section Control)	Yes	Yes (VHF Set 25 W	No
4	Bah	Yes (Section Control)	Yes	Yes (VHF Set 25 W	No
5	Udi Road	Yes (Section Control)	Yes	Yes (VHF Set 25 W	No
Shikohabad (Ex) - Farrukhabad(EX) Section (Gr.241)					
SN	Station	**Control Phone**	**DOT**	**Any other Communication**	**Availability of OFC**
1	Farrukhabad	Yes (Section Control)	Yes	Yes (VHF Set 25 W	No
2	Nibkarori	Yes (Section Control)	Yes	Yes (VHF Set 25 W	No
3	Mota	Yes (Section Control)	Yes	Yes (VHF Set 25 W	No
4	Bhogaon	Yes (Section Control)	Yes	Yes (VHF Set 25 W	No
5	Mainpuri	Yes (Section Control)	Yes	Yes (VHF Set 25 W	No
6	Kosma	Yes (Section Control)	Yes	Yes (VHF Set 25 W	No
7	Karhal	Yes (Section Control)	Yes	Yes (VHF Set 25 W	Yes
8	Shikohabad	Yes (Section Control)	Yes	Yes (VHF Set 25 W	No

Dates for providing Right of way (for signalling work)

1. Birlanagar(Ex)- Etawah (Ex) section (Gr. 239)

SN	Station	From Km. to Km.	Length (Km.)	Width (km.)	Date of providing Right of Way
01	Birlanagar	RE suit Station			
02	Sanichara	-	-	-	Railway Land Available
03	Malanpur	-	-	-	Railway Land Available
04	Nonera Halt	-	-	-	Railway Land Available
05	Gohad Road	-	-	-	Railway Land Available
06	Soni	-	-	-	Railway Land Available
07	Bhind	-	-	-	Railway Land Available
08	Udi Road	-	-	-	Railway Land Available
09	Etawa	RE suit Station			

2. Bhandai (Ex)- UDI(Ex) section (Gr. 240)

SN	Station	From Km. to Km.	Length (Km.)	Width (km.)	Date of providing Right of Way
01	Bhandai	RE suit Station			
02	Shamsabad	-	-	-	Railway Land Available
03	Fatehabad	-	-	-	Railway Land Available
04	Bah	-	-	-	Railway Land Available
05	Udi Road	Taken in Birlanagar- Etawa section			

3. Shikohabad (Ex) - Farrukhabad(Ex) section (Gr.241)

SN	Station	From Km. to Km.	Length (Km.)	Width (km.)	Date of providing Right of Way
01	Frrukhabad	RE Suit station			
02	Nibkarori	-	-	-	Railway Land Avalable
03	Mota	-	-	-	Railway Land Avalable
04	Bhogaon	-	-	-	Railway Land Avalable
05	Manpuri	-	-	-	Railway Land Avalable
IR	Kosma	-	-	-	Railway Land Avalable
IIR	Karhal	-	-	-	Railway Land Avalable
08	Shikohabad	RE Suit station			

Dates for providing Right of Way (For Telecommunication Work)

SN	Station	From km to km		Length (km)	Width (m)	Date of providing Right of Way
(A) Birlanagar-Etawah Gr.239						
2	Birlanagar	1227.67	1236.46	-	-	Railway Land Available
3	Sanichara	1236.46	1250.30	-	-	Railway Land Available
4	Malanpur	1250.30	1275.50	-	-	Railway Land Available

5	Gohad Road	1275.50	1283.00	-	-	Railway Land Available
6	Soni	1283.00	1306.76	-	-	Railway Land Available
7	Bhind	1306.76	----	-	-	Railway Land Available
8	Phuph	-----		-	-	Railway Land Available
9	Oodi		1343.15	-	-	Railway Land Available
10	Etawah	1343.15	-----	-	-	Railway Land Available
(B)	**Bhandai-Udi Gr.240**					
1	Bhandai	1332.99	1350.72	-	-	Railway Land Available
2	Shamshabad	1350.72	1368.38			
3	Fatehabad	1368.38	1391.97	-	-	Railway Land Available
4	Bhadrauli	1391.97	1408.58	-	-	Railway Land Available
5	Bah	1408.58	1426.17	-	-	Railway Land Available
6	Mansingh Ka Pura	1426.17	1443.50	-	-	Railway Land Available
7	Oodi	1443.50	----	-	-	Railway Land Available
(C)	**Shikohabad- Farrukhabad and Mainpuri-Etawah Gr.241**					
1	Shikohabad	1212.02	1239.45	-	-	Railway Land Available
2	Kosma	1239.45	1259.83			
3	Mainpuri	1259.83	1273.74	-	-	Railway Land Available
4	Bhongaon	1273.74	1283.03	-	-	Railway Land Available
5	Mota	1283.03	1299.19	-	-	Railway Land Available
6	Nibkarori	1299.19	1318.31	-	-	Railway Land Available
7	Farrukhabad	1318.31	----	-	-	Railway Land Available
8	Mainpuri	1259.83	-----	-	-	Railway Land Available
9	karhal	-----	-----	-	-	Railway Land Available
10	Etawa	-------		-	-	Railway Land Available

4.16 Any Other Structures: Not applicable

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TSS LIST

(Schedule-A)
Annex-II
Date for Providing Right of way

Dates for providing Right of Way

The following are complete details of the Right of Way showing the dates on which the Authority shall provide the different sections of the Right of Way to the Contractor:

For Electrification Work

The dates on which the Authority shall provide the Right of Way to the Contractor on different sections of the Site are specified below:

For OHE work

SN	From km to km	Length (km)	Width (m)	Date of Providing Right of way
1	2	3	4	5
(a) Birlanagar-Etawah	1228/0.67 to 1332/0.99	115RKM	As per Pegging plan enclosed	Land available
(b) Bhandai-Udi	1332/0.99 to 1445/726	113RKM		
(c) Farukhabad-Shikohabad & Mainpuri-Etawah	1312/02 (Ex Farukhabad) to 1214/02 & 3/02(Ex Etawah to 49/02	158RKM		

For TSS work (Pls Provide exact Chainage as per approved location plan)

SN	Location	Starting Chainage	Ending Chainage	Length	Width	Date of Providing ROW
1	Bhind	600.00	500.00	100	50	Railway Land available (Also write down that the approved location plan is attached)
2	Malanpur			100	50	
3	Bah	764.00	763.00	100	50	
4	Fatehabad	368.00	268.00	100	50	
5	Bhogaon	311.00	411.00	100	50	
6	Safai	22/240.00	22/340.00	100	50	

SP / SSP LIST

For SP/SSP Works (As per enclosed location plan)

SN	Location	Starting Chainage	Ending Chainage	Length	Width	Date of Providing ROW
Birla Nagar-Etawah Group-239						
1	Bhadrouli-SP	1234/4	1234/5	20.80 M	5.623 M	
2	Sanichara-SSP	1242/6	1242/8	17.80 M	5.623 M	
3	Rithaura Kalan-SSP	1246/8	1246/9	17.80 M	5.623 M	
4	Gohad Road-SSP	1266/7	1266/8	17.80 M	5.623 M	
5	Sondha Road-SSP	1275/1	1275/2	17.80 M	5.623 M	
6	Soni- SP	1284/3	1284/4	20.80 M	5.623 M	
7	Itehar-SSP	1296/4	1296/5	17.80 M	5.623 M	
8	Phuphu-SSP	1319/2	1319/3	17.80 M	5.623 M	
9	Oodi-SSP	1329/8	1329/9	17.80 M	5.623 M	
10	Etawah-SP	1446/8	1446/9	20.80 M	5.623 M	
Bhandai-Udi Group-240						
1	Karandhad Kalan-SP	1339/8	1339/9	20.80 M	5.623 M	
2	Shamsabad-SSP	1350/1	1350/2	20.80 M	5.623 M	Land Available
3	Dhimsiri-SSP	1358/2	1358/3	17.80 M	5.623 M	
4	Manikpura-SSP	1381/9	1381/10	17.80 M	5.623 M	
5	Bhadroli-SP	1390/8	1390/10	20.80 M	5.623 M	
6	Batesar-SSP	1400/4	1400/5	17.80 M	5.623 M	
7	Jaitpur Kalan-SSP	1417/2	1417/3	17.80 M	5.623 M	
8	Man Singh ka Pura-SSP	1425/8	1425/9	17.80M		
9	Jaitpura-SSP	1438/7	1438/8	17.80 M	5.623 M	
10	Oodi-SP	1445/00	1445/1	20.80 M	5.623 M	
Farukhabad - Shikohabad including Manpuri-Etawah						
1	Aron –Halt-SP	1224/8	1224/9	20.80 M	5.623 M	
2	Kosma -SSP	1240/2	1240/3	17.80 M	5.623 M	
3	Mainpuri-SSP	1259/8	1259/10	17.80 M	5.623 M	
4	Mota-SSP	1283/7	1283/8	17.80 M	5.623 M	
5	Baba LaxmanDasPuri Halt-SSP	1293/1	1293/2	17.8 M	5.623 M	
6	Srimad Dwarkapuri Halt-SP	1315/1	1315/2	20.80M	5.623 M	
7	Keerathpur-SP	46/7	46/8	17.8M	5.623 M	
8	Karahal-SSP	29/8	29/9	17.8 M	5.623 M	
9	Baidpura-SSP	12/1	12/2	17.8 M	5.623 M	
10	Etawah-SP	6/4	6/5	20.80 M	5.623 M	

Site for Service Building, Traction sub depot, Tower Wagon Shed and Quarters

SN	Location	From km to km	Length (m)	Width (m)	Date of Providing Right of way
1	2	3	4	5	6
Staff quarters	Bhind	1307.189-1307.309	120	25	Railway land available
	Malanpur	1249.862-1249.762	100	25	Railway land available
	Fatehabad	1368.077-1367.957	120	25	Railway land available
	Bah	1408.727-1408.827	100	25	Railway land available
	Mainpuri	1260.024-1260.174	150	25	Railway Land available
Tower Wagon shed and siding:-	Bhind	1307.4353-1307.465	30.09	6.19	Railway land available
	Malanpur	1249.847-1249.877	30.09	6.19	Railway land available
	Fatehabad	1367.837-1367.807	30.09	6.19	Railway land available
	Bah	1409.240-1409.270	30.09	6.19	Railway land available
	Mainpuri	1260.359-1260.389	30.09	6.19	Railway land available
OHE & PSI depot	Bhind	1307.362-1307.322	40m	35m	Railway land available
	Malanpur	1249.782-1249.822	40m	35m	-do-
	Fatehabad	1367.767-1367.727	40m	35m	-do-
	Bah	1409.183-1409.223	40m	35m	-do-
	Mainpuri	1260.209-1260.249	40m	35m	-do-
DEE/AEE Office-	Mainpuri	1260.174-1260.194	20m	15m	-do-
SSE(Sig) Office and Store-	Mainpuri	1260.194-1260.209	15m	25m	Railway land available
	Bhind	1307.304-1307.289	15m	25m	-do-
SSE(Tele) Office and store-	Mainpuri	1260.209-1260.224	15m	25m	Railway land available
	Bhind	1307.319-1307.304	15m	25m	-do-
TSS	Bhind	1307.362-1307.262	100M	50M	Railway land available
	Malanpur	1249.782-1249.732	50M	100M	-do-
	Bah	1409.223-1409.323	100M	50M	-do-
	Fatehabad	1369.112-1369.212	100M	50M	-do-
	Bhogaon	1273.430-1273.330	100M	50M	-do-
	Safai	22.240-22.340	100M	50M	-do-
Project facility Subordinate rest house	Bhind	-	20 m	15 m	Railway land available
	Bah	-	20 m	15 m	Railway land available
	Mainpuri	-	20 m	15 m	Railway land available
Camp office for Railway staff	Bhind	-	20 m	15 m	Railway land available
	Bah	-	20 m	15 m	Railway land available
	Mainpuri	-	20 m	15 m	Railway land available

Dates for providing Right of way (for signalling work

4. Birlanagar(Ex)- Etawah (Ex) section (Gr. 239)

SN	Station	From Km. to Km.	Length (Km.)	Width (km.)	Date of providing Right of Way
01	Birlanagar				RE suit Station
02	Sanichara	-	-	-	Railway Land Available
03	Malanpur	-	-	-	Railway Land Available
04	Nonera Halt	-	-	-	Railway Land Available
05	Gohad Road	-	-	-	Railway Land Available
06	Soni	-	-	-	Railway Land Available
07	Bhind	-	-	-	Railway Land Available
08	Udi Road	-	-	-	Railway Land Available
09	Etawa		RE suit Station		

5. Bhandai (Ex)- UDI(Ex) section (Gr. 240)

SN	Station	From Km. to Km.	Length (Km.)	Width (km.)	Date of providing Right of Way
01	Bhandai			RE suit Station	
02	Shamsabad	-	-	-	Railway Land Available

6. Farrukhabad (Ex)- Shikohabad(Ex) section (Gr.241)

SN	Station	From Km. to Km.	Length (Km.)	Width (km.)	Date of providing Right of Way
01	Frrukhabad	RE Suit station			
02	Nibkarori	-	-	-	Railway Land Available
03	Mota	-	-	-	Railway Land Available
04	Bhogaon	-	-	-	Railway Land Available
05	Manpuri	-	-	-	Railway Land Available
IR	Kosma	-	-	-	Railway Land Available
IIR	Karhal	-	-	-	Railway Land Available

08	Shikohabad	RE Suit station

1. SIGNAL BOQ SHALLBE PROVIDED BY CONTRACTOR TO BHEL.
2. BHEL WILL PROCURE THE CABLE AS FREE ISSUE AND SUPPLIED TO BHEL STORES IN THE RESPECTIVE GROUPs.

Requirement of signalling cable

1. **Birlanagar (Ex)- Etawah (Ex) section (Gr. 239)**

Item No.	DESCRIPTION OF Cable	Unit	Qty
1	Cable Signalling 12C	Km	125
2	Cable Signalling 2x25 Sqmm	Km	22
3	Cable Signalling 2C x 2.5mmSq	Km	0.5
4	Underground Railway Jelly filled 6 Quad Cable, 0.9 mm dia.	KM	0

2. **Bhandai (Ex)- UDI(Ex) section (Gr. 240)**

Item No.	DESCRIPTION OF Cable	Unit	Qty
1	Cable Signalling 12C	Km	40
2	Cable Signalling 2x25 Sqmm	Km	01
3	Cable Signalling 2C x 2.5mmSq	Km	0.5
4	Underground Railway Jelly filled 6 Quad Cable, 0.9 mm dia.	KM	32

3. **Farrukhabad (Ex)- Shikohabad(Ex) section (Gr.241)**

Item No.	DESCRIPTION OF Cable	Unit	Qty
1	Cable Signalling 12C	Km	100
2	Cable Signalling 2x25 Sqmm	Km	03
3	Cable Signalling 2C x 2.5mmSq	Km	0
	Underground Railway Jelly filled 6 Quad Cable, 0.9 mm dia.	KM	06

REQUIRMENT OF TELECOM CABLE

1. **GROUP 239 (BLNR-ETW)**

ITEM.NO	Description of cable	UNIT	Quantity
1	OFC CABLE	Km	125
2	6 QUAD CABLE	km	50
3	PIJF DERIVATION CABLE 10	km	20

	PAIR 0.63 mm		
4	PIJF DERIVATION CABLE 20 PAIR 0.63 mm	km	01
5	TWO CORE POWER CABLE	km	01

2. GROUP 240 (BHA-UDI)

ITEM NO	Description of cable	UNIT	Quantity
1	OFC CABLE	Km	140
2	6 Quad cable	km	55
3	PIJF DERIVATION CABLE 10 PAIR 0.63 mm	km	10
4	PIJF DERIVATION CABLE 20 PAIR 0.63 mm	km	05
5	Two core power cable	km	01

3. GROUP 241 (SKB-FBD –MNQ-ETW)

SR.NO	Description of cable	UNIT	Quantity
1	OFC CABLE	Km	155
2	6 QUAD CABLE	km	50
3	PIJF DERIVATION CABLE 10 PAIR 0.63 mm	km	25
4	PIJF DERIVATION CABLE 20 PAIR 0.63 mm	km	04
5	TWO CORE POWER CABLE	km	01

Dates for providing Right of Way (For Telecommunication Work)

SN	Station	From km to km		Length (km)	Width (m)	Date of providing Right of Way
(B) Birlanagar-Etawah Gr.239						
2	Birlanagar	1227.67	1236.46	-	-	Railway Land Available
3	Sanichara	1236.46	1250.30	-	-	Railway Land Available
4	Malanpur	1250.30	1275.50	-	-	Railway Land Available
5	Gohad Road	1275.50	1283.00	-	-	Railway Land Available
6	Soni	1283.00	1306.76	-	-	Railway Land Available
7	Bhind	1306.76	----	-	-	Railway Land Available
8	Oodi	-----		-	-	Railway Land Available
9	Phuph		1343.15	-	-	Railway Land Available
10	Etawah	1343.15	-----	-	-	Railway Land Available
(B)	**Bhandai-Udi Gr.240**					
1	Bhandai	1332.99	1350.72	-	-	Railway Land Available
2	Shamshabad	1350.72	1368.38			
3	Fatehabad	1368.38	1391.97	-	-	Railway Land Available
4	Bhadrauli	1391.97	1408.58	-	-	Railway Land Available
5	Bah	1408.58	1426.17	-	-	Railway Land Available
6	Mansingh Ka Pura	1426.17	1443.50	-	-	Railway Land Available
7	Oodi	1443.50	----	-	-	Railway Land Available
(C)	**Farrukhabad-Shikohabad and Mainpuri-Etawah Gr.241**					

1	Shikohabad	1212.02	1239.45	-	-	Railway Land Available
2	Kosma	1239.45	1259.83			
3	Mainpuri	1259.83	1273.74	-	-	Railway Land Available
4	Bhongaon	1273.74	1283.03	-	-	Railway Land Available
5	Mota	1283.03	1299.19	-	-	Railway Land Available
6	Nibkarori	1299.19	1318.31	-	-	Railway Land Available
7	Farrukhabad	1318.31	----	-	-	Railway Land Available
8	Mainpuri	1259.83	-----	-	-	Railway Land Available
9	karhal	-----	-----	-	-	Railway Land Available
10	Etawa	-------		-	-	Railway Land Available

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Chapter XI-Bridges Information

The Site includes the following Important Bridges:

SN	Bridge No. and location (km)		Type of Structure			No. of Spans with span length (m)		Width (m)
			Foundation	Sub-structure	Superstructure			
Birla Nagar-Etawah Gr.239								
1	1313/1	1313.949	OWF	cc	OW GIRDER	8	45.70	1.6
2	1326/1	1326.56	OWF	cc	OW GIRDER	9	76.20	1.6
3	1333/2	1333.752	OWF	cc	OW GIRDER	10	61.00	1.6
Bhandai-Udi Gr.240								
NIL								
Farrukhabad-Shikohabad and Mainpuri-Etawah Gr.241								
NIL								

4.3 Major Bridges

The Site includes the following Major Bridges:

SN	Bridge No. and location (km)		Type of Structure			No. of spans with span length (m)		Width (m)
(A)	Birla Nagar-Etawah Gr 239		Foundation	Sub-structure	Superstructure			
	Bridge No.	Location						
1	1250/1	1250/8-9	Open	cc	RCC SLAB	1	6.100	6.1
2	1264/1	1264/4-5	Open	cc	PLATE GIRDER	1	18.30	6.1
3	1273/2	1273/7-8	Open	cc	PLATE GIRDER	2	18.30	6.1
4	1285/1	1285/2-3	Open	cc	PLATE GIRDER	1	18.30	6.1
5	1304/2	1304/7-8	Open	cc	PLATE GIRDER	1	18.30	6.1
(B)	Bhandai-Udi Group -240							
1	1367/1	N/A	Open	cc	PSC GIRDER	1	15	6.1
2	1377/1	N/A	Open	cc	PSC GIRDER	12	18.3	6.1
3	1395/1	N/A	Open	cc	PSC GIRDER	2	15	6.1
4	1413/2	N/A	Open	cc	PSC GIRDER	2	15	6.1
(C)	Farrukhabad-Shikohabad & Mainpuri-Etawah Group-241							
1	2	1213/364	WELL	CC	RIVT PG	3	12.18	
2	3	1213/980	OPEN	CC	RIVT PG	2	12.18	
3	24	1230/800	WELL	CC	RCC SLAB	7	12.19	
4	25	1231/0-1	WELL	CC	RCC SLAB	1	12.18	
5	35	1234/7-8	OPEN	CC	RIVT PG	3	6.1	
6	37	1235/2-3	WELL	CC	RIVT PG	1	12.18	
7	52	1241/720	WELL	CC	RIVT PG	3	12.18	
8	60	1245/3-4	WELL	CC	RIVT PG	3	12.18	
9	71	1251/10-1	WELL	CC	RIVT PG	4	18.29	
10	74	1253/3-4	WELL	CC	RIVT PG	2	6.09	

11	94	1264/6-7	WELL	CC	RIVT PG	3	18.29	
12	104	1272/10-1	OPEN	CC	RCC SLAB	3	6.1	
13	126	1279/11-1	WELL	CC	RIVT PG	1	12.2	
14	136	1286/10-1	WELL	CC	RIVT PG	10	18.29	
15	169	1314/6-7	WELL	CC	RIVT PG	4	12.2	

4.4 Minor Bridges/culverts

The Site includes the following Minor Bridges and culverts:

SN	Bridge No.	location (km)	Type of Structure			No. of spans with span length (m)		Width (m)
			Foundation	Sub-structure	Superstructure	No	Span	
(A)	Birla Nagar-Etawah Gr-239							
1	1229/1	1229/1	Open	cc	RCC SLAB	1	3.962	6.1
2	1229/2	1229/9-1230/0	Open	cc	RCC SLAB	3	3.350	6.1
3	1230/1	1230/3	Open	cc	RCC BOX	1	1.200	6.1
4	1231/1	1231/2-3	Open	cc	RCC SLAB	1	2.000	6.1
5	1231/1A	1231/2-3	Open	cc	RCC BOX	1	5.000	6.1
6	1231/2	1231/9-1232/0	Open	cc	RCC SLAB	1	3.500	6.1
7	1232/1	1232/2-3	Open	cc	RCC SLAB	1	3.500	6.1
8	1232/1A	1232/6-7	Open	cc	RCC BOX	1	5.000	6.1
9	1232/2	1232/7-8	Open	cc	RCC BOX	1	1.200	6.1
10	1232/3	1232/9-1233/0	Open	cc	RCC SLAB	1	3.000	6.1
11	1233/1	1233/7-8	Open	cc	RCC BOX	1	1.200	6.1
12	1233/2	1233/8-9	Open	cc	PIPE	1	1.200	6.1
13	1234/1	1234/4-5	Open	cc	RCC SLAB	1	3.500	6.1
14	1234/ 1A	1234/8-9	Open	cc	RCC BOX	1	5.000	6.1
15	1235/1	1235/2-3	Open	cc	RCC SLAB	1	2.500	6.1
16	1235/2	1235/7-8	Open	cc	RCC SLAB	1	3.500	6.1
17	1236/1	1236/0-1	Open	cc	RCC BOX	1	5.000	6.1
18	1237/1	1237/2-3	Open	cc	RCC BOX	1	5.000	6.1
19	1238/1	1238/1-2	Open	cc	PIPE	2	1.200	6.1
20	1238/2	1238/5	Open	cc	RCC SLAB	2	3.500	6.1
21	1239/1A	1239/1-2	Open	cc	RCC BOX	1	5.000	6.1
22	1239/1	1239/4-5	Open	cc	PIPE	2	1.200	6.1
23	1240/1	1240/4-5	Open	cc	RCC SLAB	2	3.500	6.1
24	1240/2	1240/7-8	Open	cc	RCC SLAB	1	2.000	6.1
25	1240/ 2A	1240/8-9	Open	cc	RCC BOX	1	5.000	6.1
26	1240/3	1240/9-1241/0	Open	cc	RCC SLAB	1	2.000	6.1
27	1241/1	1241/1-2	Open	cc	PIPE	1	1.200	6.1
28	1241/2	1241/3-4	Open	cc	PIPE	1	1.200	6.1
29	1242/1	1242/1-2	Open	cc	RCC SLAB	1	3.500	6.1
30	1243/1	1243/6-7	Open	cc	RCC SLAB	1	2.440	6.1
31	1244/1	1244/2-3	Open	cc	RCC SLAB	1	2.440	6.1
32	1246/1	1246/4-5	Open	cc	RCC SLAB	2	1.830	6.1
33	1246/2	1246/6-7	Open	cc	RCC BOX	1	5.000	6.1
34	1247/1	1247/0-1	Open	cc	RCC SLAB	2	6.100	6.1

35	1247/2	1247/7-8	Open	cc	RCC SLAB	2	6.100	6.1
36	1247/2A	1247/7-8	Open	cc	RCC BOX	1	5.000	6.1
37	1248/1	1248/4-5	Open	cc	RCC SLAB	1	1.220	6.1
38	1248/2	1248/8-9	Open	cc	RCC SLAB	2	4.570	6.1
39	1249/1	1249/0-1	Open	cc	RCC SLAB	2	6.100	6.1
40	1249/2	1249/7-8	Open	cc	RCC BOX	1	5.500	6.1
41	1250/2	1250/9-1251/0	Open	cc	RCC SLAB	3	6.100	6.1
42	1250/3	1250/9-1251/0	Open	cc	RCC SLAB	1	3.05	6.1
43	1251/1	1251/4-5	Open	cc	RCC SLAB	1	1.220	6.1
44	1251/2	1251/8-9	Open	cc	RCC SLAB	2	1.220	6.1
45	1252/1B	1252/0-1	Open	cc	RCC BOX	1	5.000	6.1
46	1252/1	1252/4-5	Open	cc	RCC SLAB	2	6.100	6.1
47	1252/1A	1252/6-7	Open	cc	RCC BOX	1	5.000	6.1
48	1252/2	1252/7-8	Open	cc	RCC SLAB	2	3.05	6.1
49	1253/1	1253/2-3	Open	cc	RCC SLAB	2	3.660	6.1
50	1253/ 2	1253/3-4	Open	cc	RCC BOX	1	5.000	6.1
51	1254/1	1254/8-9	Open	cc	RCC SLAB	1	1.220	6.1
52	1255/1A	1255/1-2	Open	cc	RCC BOX	1	5.000	6.1
53	1255/1	1255/4-5	Open	cc	RCC SLAB	1	2.440	6.1
54	1255/2	1255/6-7	Open	cc	RCC SLAB	1	3.660	6.1
55	1255/3	1255/6-7	Open	cc	RCC BOX	1	5.000	6.1
56	1256/1	1256/6-7	Open	cc	RCC BOX	4	1.200	6.1
57	1257/ 1A	1257/0-1	Open	cc	RCC BOX	1	5.000	6.1
58	1257/1	1257/3-4	Open	cc	RCC BOX	1	1.200	6.1
59	1257/2	1257/5-6	Open	cc	RCC BOX	4	1.200	6.1
60	1258/1	1258/3-4	Open	cc	RCC BOX	1	1.200	6.1
61	1258/2	1258/8-9	Open	cc	RCC BOX	4	1.800	6.1
62	1260/1	1260/0-1	Open	cc	RCC BOX	1	1.200	6.1
63	1260/2	1260/1-2	Open	cc	RCC BOX	1	1.000	6.1
64	1261/1A	1261/5-6	Open	cc	RCC BOX	1	5.000	6.1
65	1261/1	1261/6-7	Open	cc	RCC BOX	1	1.200	6.1
66	1262/1	1262/5-6	Open	cc	RCC BOX	2	1.200	6.1
67	1263/1A	1263/5-6	Open	cc	RCC BOX	1	5.000	6.1
68	1263/1	1263/6-7	Open	cc	RCC BOX	2	1.200	6.1
69	1264/2	1264/7-8	Open	cc	RCC BOX	1	5.00	6.1
70	1265/1A	1265/4-5	Open	cc	RCC BOX	1	5.000	6.1
71	1265/1	1265/5-6	Open	cc	RCC BOX	3	1.000	6.1
72	1266/1	1266/0-1	Open	cc	RCC BOX	3	1.200	6.1
73	1266/2	1266/4-5	Open	cc	RCC BOX	2	1.200	6.1
74	1267/1	1267/9-1268/0	Open	cc	RCC BOX	2	1.500	6.1
75	1268/1	1268/6-7	Open	cc	RCC BOX	2	1.200	6.1
76	1268/2	1268/8-9	Open	cc	RCC BOX	1	1.200	6.1
77	1269/1	1269/3-4	Open	cc	RCC BOX	4	1.200	6.1
78	1270/ 1	1270/6-7	Open	cc	RCC BOX	1	5.000	6.1
79	1271/1	1271/4-5	Open	cc	RCC BOX	4	1.200	6.1
80	1272/1	1272/4-5	Open	cc	RCC BOX	2	1.200	6.1
81	1273/1	1273/5-6	Open	cc	RCC BOX	1	1.200	6.1
82	1273/3	1273/7-8	Open	cc	RCC BOX	1	5.000	6.1
83	1275/1	1275/8-9	Open	cc	RCC BOX	1	5.000	6.1
84	1276/1	1276/0-1	Open	cc	RCC BOX	2	1.200	6.1
85	1277/1A	1277/5-6	Open	cc	RCC BOX	1	5.000	6.1
86	1277/1	1277/6-7	Open	cc	RCC BOX	3	1.800	6.1

87	1279/1	1279/3-4	Open	cc	RCC BOX	4	1.200	6.1
88	1280/1	1280/7-8	Open	cc	RCC BOX	1	1.200	6.1
89	1280/1A	1280/8-9	Open	cc	RCC BOX	1	5.000	6.1
90	1281/1	1281/6-7	Open	cc	RCC BOX	2	1.000	6.1
91	1281/1A	1281/6-7	Open	cc	RCC BOX	1	5.000	6.1
92	1282/1	1282/9-1283/0	Open	cc	RCC BOX	2	1.200	6.1
93	1283/1	1283/5-6	Open	cc	RCC BOX	2	1.200	6.1
94	1283/2	1283/6-7	Open	cc	RCC BOX	2	1.200	6.1
95	1284/1	1284/9-1285/0	Open	cc	RCC BOX	3	1.200	6.1
96	1285/1A	1285/2-3	Open	cc	RCC BOX	1	5.000	6.1
97	1286/1	1286/4-5	Open	cc	RCC BOX	1	5.00	6.1
98	1287/1	1287/0-1	Open	cc	RCC BOX	1	1.000	6.1
99	1287/2	1287/9	Open	cc	RCC BOX	1	1.000	6.1
100	1288/1	1288/3-4	Open	cc	RCC BOX	2	1.200	6.1
101	1289/1	1289/1-2	Open	cc	RCC BOX	1	1.000	6.1
102	1289/1A	1289/4-5	Open	cc	RCC BOX	1	5.000	6.1
103	1289/2	1289/8-9	Open	cc	RCC BOX	1	1.000	6.1
104	1290/1	1290/4-5	Open	cc	RCC BOX	1	1.000	6.1
105	1291/1	1291/2-3	Open	cc	RCC BOX	1	1.200	6.1
106	1291/2	1291/9-1292/0	Open	cc	RCC BOX	1	1.200	6.1
107	1292/1	1292/4-5	Open	cc	RCC BOX	1	5.000	6.1
108	1292/1A	1292/5-6	Open	cc	RCC BOX	3	1.000	6.1
109	1294/1	1294/8-9	Open	cc	RCC BOX	3	1.200	6.1
110	1295/1	1295/7-8	Open	cc	RCC BOX	2	1.200	6.1
111	1296/1	1296/1-2	Open	cc	RCC BOX	3	1.200	6.1
112	1296/2	1296/5-6	Open	cc	RCC BOX	3	1.200	6.1
113	1297/1A	1297/2-3	Open	cc	RCC BOX	1	5.000	6.1
114	1297/1	1297/9-1298/0	Open	cc	RCC BOX	1	1.000	6.1
115	1298/1	1298/2-3	Open	cc	RCC BOX	1	1.000	6.1
116	1298/1A	1298/2-3	Open	cc	RCC BOX	1	5.000	6.1
117	1300/1	1300/3-4	Open	cc	RCC BOX	1	1.200	6.1
118	1300/2	1300/9-1301/1	Open	cc	RCC BOX	1	1.200	6.1
119	1301 / 1	1301/4-5	Open	cc	RCC BOX	1	5.000	6.1
120	1302/1	1302/1-2	Open	cc	RCC BOX	1	1.200	6.1
121	1302/2	1302/6-7	Open	cc	RCC BOX	1	2.000	6.1
122	1303 / 1	1303/7-8	Open	cc	RCC BOX	1	5.000	6.1
123	1304/1	1304/6-7	Open	cc	RCC SLAB	1	6.10	6.1
124	1307/1	1307.964	Open	cc	RCC BOX	1	3.00	6.1
125	1308/1A	1308/4-5	Open	cc	RCC BOX	1	5.000	6.1
126	1308/1	1308.979	Open	cc	RCC Box	1	1.20	6.1
127	1309/1	1309.947	Open	cc	RCC Box	1	1.20	6.1
128	1310/1	1310/4-5	Open	cc	RCC BOX	1	5.000	6.1
129	1311/1	1311.968	Open	cc	RCC Box	1	4.00	6.1
130	1312/1	1312.467	Open	cc	RCC Box	1	1.50	6.1
131	1312/2	1312/8-9	Open	cc	RCC BOX	1	5.000	6.1
132	1314/21 A	1314/3-4	Open	cc	RCC BOX	1	5.000	6.1
133	1314/1	1314.613	Open	cc	RCC Box	2	4.00	6.1
134	1316/1	1316.037	Open	cc	RCC Box	2	5.00	6.1
135	1316/2	1316.952	Open	cc	RCC Box	1	4.00	6.1

136	1317/1	1317.327	Open	cc	RCC Box	2	3.00	6.1
137	1318/1	1318.018	Open	cc	RCC Box	1	4.00	6.1
138	1318/2	1318.394	Open	cc	RCC Box	3	3.00	6.1
139	1318/3	1318.598	Open	cc	RCC Box	2	4.00	6.1
140	1319/1	1319/0-1	Open	cc	RCC BOX	1	6.000	6.1
141	1320/1	1320.119	Open	cc	RCC Box	1	3.00	6.1
142	1320/1A	1320/1-2	Open	cc	RCC BOX	1	5.000	6.1
143	1320/2	1320.629	Open	cc	HP Culvert	1	1.20	6.1
144	1321/1	1321.753	Open	cc	RCC Box	1	2.00	6.1
145	1322/1	1322.675	Open	cc	HP Culvert	1	1.20	6.1
146	1322/2	1322.695	Open	cc	RCC Box	1	2.00	6.1
147	1322/2A	1322/6-7	Open	cc	RCC BOX	1	5.000	6.1
148	1325/1	1325.635	Open	cc	RCC Box	3	3.00	6.1
149	1327/1	1327.183	Open	cc	RCC Box	2	3.00	6.1
150	1327/2	1327.472	Open	cc	RCC Box	1	4.00	6.1
151	1327/3	1327.739	Open	cc	RCC Box	1	3.00	6.1
152	1328/1	1328.139	Open	cc	RCC Box	1	3.00	6.1
153	1328/2	1328.367	Open	cc	RCC Box	1	3.00	6.1
154	1328/3	1328.649	Open	cc	RCC Box	1	3.00	6.1
155	1328/4	1328.884	Open	cc	RCC Box	1	3.00	6.1
156	1330/1	1330.199	Open	cc	RCC Box	3	2.00	6.1
157	1331/ 1	1331/2-3	Open	cc	RCC BOX	1	5.000	6.1
158	1332/1	1332.958	Open	cc	RCC Box	2	4.50	6.1
159	1333/1	1333.105	Open	cc	RCC Box	1	4.00	6.1
160	1334/1	1334.277	Open	cc	RCC Box	1	1.50	6.1
161	1334/2	1334.352	Open	cc	RCC Box	1	2.00	6.1
162	1334/3	1334.813	Open	cc	RCC Box	1	4.00	6.1
163	1334/4	1334.84	Open	cc	RCC Box	1	4.50	6.1
164	1335/1	1335.172	Open	cc	RCC Box	1	1.50	6.1
165	1336/1	1336.37	Open	cc	RCC Box	1	3.00	6.1
166	1336/2	1336.82	Open	cc	RCC Box	1	2.00	6.1
167	1337/1	1337/5-6	Open	cc	RCC BOX	1	5.000	6.1
168	1338/1	1338.414	Open	cc	RCC Box	1	2.00	6.1
169	1338/2	1338.43	Open	cc	RCC Box	2	4.00	6.1
170	1338/3	1338.701	Open	cc	RCC Box	2	6.00	6.1
171	1339/2	1339.408	Open	cc	RCC Box	1	4.00	6.1
172	1237/1A	1237/7-8	Open	cc	PSC G.B			6.1
173	1307/1A		Open	cc	GIRDER	1	2.44	6.1
174	1325/1A	1325.078	Open	cc	RCC-T-Beam+RCC Solid slab	1	12.40	6.1
175	1329/1	1329.493	Open	cc	RCC-T-Beam slab	1	15.33	6.1

Bhandai-Udi Gr-240								
1	1333/01	1333/9-34/0	Open	cc	RCC/BOX	2	2	6.1
2	1334/1	1334/3-4	Open	cc	RCC/BOX	1	3	6.1
3	1334/2	1334/6-7	Open	cc	RCC/BOX	2	3	6.1
4	1337/1	1337/1-2	Open	cc	RCC/BOX	1	3	6.1
5	1337/2	1337/8-9	Open	cc	RCC/BOX	2	3	6.1
6	1340/1	1340/7-8	Open	cc	RCC/BOX	3	4	6.1
7	1342/1	1342/0-1	Open	cc	RCC/BOX	1	6	6.1
8	1342/2	1342/3-4	Open	cc	RCC/BOX	1	2.5	6.1
9	1345/1	1345/7-8	Open	cc	RCC/BOX	1	3	6.1

10	1349/1	1349/3-4	Open	cc	RCC/BOX	1	3	6.1
11	1352/1	1352/3-4	Open	cc	RCC/BOX	1	2.5	6.1
12	1354/1	1354/2-3	Open	cc	RCC/BOX	1	2.5	6.1
13	1357/1	1357/5-6	Open	cc	RCC/BOX	2	3	6.1
14	1357/2	1357/8-9	Open	cc	RCC/BOX	2	5.5	6.1
15	1357/3	1357/9-58/0	Open	cc	RCC/BOX	1	3	6.1
16	1359/1	1359/0-1	Open	cc	RCC/BOX	1	6	6.1
17	1359/2	1359/8-9	Open	cc	RCC/BOX	1	2.5	6.1
18	1364/1	1364/0-1	Open	cc	RCC/BOX	1	3	6.1
19	1364/2	1364/7-8	Open	cc	RCC/BOX	1	1.5	6.1
20	1366/1	1366/0-1	Open	cc	RCC/BOX	1	2.5	6.1
21	1366/2	1366/8-9	Open	cc	RCC/BOX	1	3	6.1
22	1367/2	1367/6-7	Open	cc	RCC/BOX	1	3	6.1
23	1368/2	1368/0-1	Open	cc	RCC/BOX	1	3	6.1
24	1368/2	1368/9-1369/0	Open	cc	RCC/BOX	1	3	6.1
25	1369/1	1369/7-8	Open	cc	RCC/BOX	1	2	6.1
26	1371/1	1371/3-4	Open	cc	RCC/BOX	1	2.5	6.1
27	1374/1	1374/2-3	Open	cc	RCC/BOX	1	4	6.1
28	1374/2	1374/3-4	Open	cc	RCC/BOX	1	5	6.1
29	1374/3	1374/8-9	Open	cc	RCC/BOX	1	3	6.1
30	1375/1	1375/7-8	Open	cc	RCC/BOX	1	3	6.1
31	1379/1	1379/6-7	Open	cc	RCC/BOX	1	3	6.1
32	1383/1	1383/4-5	Open	cc	RCC/BOX	1	3	6.1
33	1384/1	1384/0-1	Open	cc	RCC/BOX	1	1.5	6.1
34	1387/1	1387/3-4	Open	cc	RCC/BOX	1	2.5	6.1
35	1387/2	1387/6-7	Open	cc	RCC/BOX	1	4	6.1
36	1388/1	1388/3-4	Open	cc	RCC/BOX	2	6	6.1
37	1391/1	1391/1-2	Open	cc	RCC/BOX	1	3	6.1
38	1393/1	1393/0-1	Open	cc	RCC/BOX	1	3	6.1
39	1393/2	1393/7-8	Open	cc	RCC/BOX	2	6	6.1
40	1394/1	1394/1-2	Open	cc	RCC/BOX	1	5	6.1
41	1396/1	1396/5-6	Open	cc	RCC/BOX	2	4.5	6.1
42	1397/1	1397/1-2	Open	cc	RCC/BOX	1	4	6.1
43	1397/2	1397/5-6	Open	cc	RCC/BOX	2	4	6.1
44	1398/1	1398/0-1	Open	cc	RCC/BOX	1	3	6.1
45	1398/2	1398/6-7	Open	cc	RCC/BOX	1	4	6.1
46	1399/1	1399/4-5	Open	cc	RCC/BOX	1	3	6.1
47	1399/2	1399/9-1400/0	Open	cc	RCC/BOX	2	6	6.1
48	1401/1	1401/5-6	Open	cc	RCC/BOX	1	6	6.1
50	1402/1	1402/0-1	Open	cc	RCC/BOX	1	3	6.1
51	1405/1	1405/1-2	Open	cc	RCC/BOX	1	3	6.1
52	1407/1	1407/5-6	Open	cc	RCC/BOX	1	3	6.1
53	1407/2	1407/7-8	Open	cc	RCC/BOX	1	3	6.1
54	1408/1	1408/2-3	Open	cc	RCC/BOX	1	5	6.1
55	1409/1	1409/7-8	Open	cc	RCC/BOX	1	3	6.1
56	1410/1	1410/7-8	Open	cc	RCC/BOX	1	3	6.1
57	1411/1	141/7-8	Open	cc	RCC/BOX	1	3	6.1

58	1412/1	1412/2-3	Open	cc	RCC/BOX	1	5	6.1
59	1412/2	1412/7-8	Open	cc	RCC/BOX	1	3	6.1
60	1413/1	1413/1-2	Open	cc	RCC/BOX	1	5	6.1
61	1414/1	1414/4-5	Open	cc	RCC/BOX	1	4	6.1
62	1415/1	1415/9-1416/0	Open	cc	RCC/BOX	1	3	6.1
63	1417/1	1417/4-5	Open	cc	RCC/BOX	1	6	6.1
64	1418/1	1418/2-3	Open	cc	RCC/BOX	1	3	6.1
65	1419/1	1419/7-8	Open	cc	RCC/BOX	1	4	6.1
66	1419/2	1419/8-9	Open	cc	RCC/BOX	1	3	6.1
67	1420/1	1420/2-3	Open	cc	RCC/BOX	1	1.5	6.1
68	1420/2	1420/3-4	Open	cc	RCC/BOX	1	3	6.1
39	1423/1	1423/7-8	Open	cc	RCC/BOX	1	4	6.1
70	1425/1	1425/5-6	Open	cc	RCC/BOX	1	3	6.1
71	1425/2	1425/6-7	Open	cc	RCC/BOX	1	3.5	6.1
72	1425/3	1425/7-8	Open	cc	RCC/BOX	1	1.5	6.1
73	1426/1	1426/1-2	Open	cc	RCC/BOX	1	2.5	6.1
74	1427/1	1427/0-1	Open	cc	RCC/BOX	1	4	6.1
75	1427/2	1427/5-6	Open	cc	RCC/BOX	1	4	6.1
76	1427/3	1427/8-9	Open	cc	RCC/BOX	1	5	6.1
77	1428/1	1428/5-6	Open	cc	RCC/BOX	1	4	6.1
78	1428/2	1428/7-8	Open	cc	RCC/BOX	1	4	6.1
79	1429/1	1429/5-6	Open	cc	RCC/BOX	1	3	6.1
80	1430/1	1430/1-2	Open	cc	RCC/BOX	1	4	6.1
81	1431/1	1431/0-1	Open	cc	RCC/BOX	1	4	6.1
82	1431/2	1431/6-7	Open	cc	RCC/BOX	1	3	6.1
83	1432/1	1432/2-3	Open	cc	RCC/BOX	1	2.5	6.1
84	1433/1	1433/0-1	Open	cc	RCC/BOX	1	3	6.1
85	1433/2	1423/3-4	Open	cc	RCC/BOX	1	4	6.1
86	1434/1	1434/0-1	Open	cc	RCC/BOX	1	4	6.1
87	1434/2	1434/6-7	Open	cc	RCC/BOX	2	2.5	6.1
88	1434/3	1434/8-9	Open	cc	RCC/BOX	1	2.5	6.1
89	1435/1	1435/6-7	Open	cc	RCC/BOX	1	3	6.1
89	1438/1	1438/2-3	Open	cc	RCC/BOX	2	2	6.1

(C)Farrukhabad- Shikohabad & Mainpuri-Etawah Gr-241								
1	1	1213/3-4	OPEN	CC	ARCH	1	0.61	6.1
2	4	1214/8-9	OPEN	CC	ARCH	1	0.91	6.1
3	7	1216/7-8	OPEN	CC	RCC SLAB	2	0.61	6.1
4	8	1217/11-12	OPEN	CC	ARCH	1	0.91	6.1
5	9	1219/1-2	OPEN	CC	RCC SLAB	1	0.61	6.1
6	10	1219/8-9	OPEN	CC	RCC SLAB	2	0.61	6.1
7	11	1221/2-3	OPEN	CC	ARCH	2	1.52	6.1
8	12	1221/4-5	OPEN	CC	RCC slab	1.	3.66	6.1
9	13	1222/9-10	OPEN	CC	ARCH	2.	1.52	6.1
10	13A	1222/5-6	OPEN	CC	pipe	1	.4.5	6.1
11	14	1223/3-4	OPEN	CC	RCC BOX	2	0.91	6.1
12	15	1223/9-10	OPEN	CC	RCC BOX	1	1.83	6.1

13	16	1223/13-14	OPEN	CC	RCC SLAB	2	0.91	6.1
14	17	1224/9-10	OPEN	CC	ARCH	4	1.83	6.1
15	18	1224/12-13	OPEN	CC	RCC SLAB	2	1.83	6.1
16	19	1226/9-10	OPEN	CC	RCC SLAB	2	1.83	6.1
17	20	1227/2-3	OPEN	CC	RCC SLAB	2	1.83	6.1
18	21	1228/6-7	OPEN	CC	RCC SLAB	1	1.83	6.1
19	22	1229/10-11	OPEN	CC	RCC SLAB	1	1.83	6.1
20	23	1230/8-9	OPEN	CC	RCC SLAB	1	3.66	6.1
21	26	1231/7-8	OPEN	CC	PIPE	1	0.61	6.1
22	27	1231/11-12	OPEN	CC	PIPE	1	0.61	6.1
23	28	1232/2-3	OPEN	CC	PIPE	1	0.61	6.1
24	29	1232/5-6	OPEN	CC	RCC SLAB	1	0.61	6.1
25	30	1232/8-9	OPEN	CC	PIPE	1	0.46	6.1
26	31	1233/1-2	OPEN	CC	PIPE	1	0.61	6.1
27	32	1233/5-6	OPEN	CC	RCC SLAB	1	3.66	6.1
28	33	1233/12-13	OPEN	CC	PIPE	1	0.31	6.1
29	34	1234/1-3	OPEN	CC	ARCH	1	0.61	6.1
30	36	1234/14-15	OPEN	CC	RCC SLAB	1	0.61	6.1
31	38	1235/10-11	OPEN	CC	ARCH	1	0.61	6.1
32	39	1235/12-13	OPEN	CC	RCC SLAB	1	1.83	6.1
33	40	1236/1-2	OPEN	CC	ARCH	1	1.83	6.1
34	41	1236/13-14	OPEN	CC	ARCH	1	1.83	6.1
35	42	1237/3-4	OPEN	CC	ARCH	1	1.83	6.1
36	43	1237/14-15	OPEN	CC	ARCH	1	1.83	6.1
37	44	1238/9-10	OPEN	CC	ARCH	2	0.61	6.1
38	45	1238/15-16	OPEN	CC	ARCH	1	0.61	6.1
39	46	1239/0-1	OPEN	CC	RCC SLAB	1	3.66	6.1
40	47	1239/1-2	OPEN	CC	RCC SLAB	1	3.66	6.1
41	48	1239/2-3	OPEN	CC	RCC SLAB	1	1.83	6.1
42	49	1240/2-3	OPEN	CC	RCC SLAB	2	1.83	6.1
42	50	1241/0-1	OPEN	CC	ARCH	1	0.91	6.1
43	51	1241/6-7	OPEN	CC	ARCH	1	1.83	6.1
44	53	1241/8-9	OPEN	CC	ARCH	1	2.44	6.1
45	54	1241/9-10	OPEN	CC	ARCH	1	0.91	6.1
46	55	1242/6-7	OPEN	CC	RCC SLAB	1	1.83	6.1
47	56	1243/0-1	OPEN	CC	ARCH	1	0.91	6.1
48	57	1243/3-4	OPEN	CC	RCC SLAB	1	1.83	6.1
49	58	1243/6-7	OPEN	CC	ARCH	1	0.61	6.1
50	59	1243/14-15	OPEN	CC	RCC SLAB	1	1.83	6.1
51	61	1246/1-2	OPEN	CC	ARCH	1	1.83	6.1
52	62	1246/5-6	OPEN	CC	ARCH	1	1.83	6.1
53	63	1249/4-5	OPEN	CC	ARCH	2	1.52	6.1
54	64	1249/6-7	OPEN	CC	ARCH	1	1.83	6.1
55	65	1249/12-13	OPEN	CC	ARCH	1	0.61	6.1
56	66	1250/2-3	OPEN	CC	ARCH	1	0.61	6.1
57	67	1250/5	OPEN	CC	ARCH	1	0.61	6.1
58	68	1250/14-15	OPEN	CC	ARCH	1	3.66	6.1

59	69	1251/7-8	OPEN	CC	ARCH	1	0.91	6.1
60	70	1251/9-10	OPEN	CC	ARCH	1	1.83	6.1
61	72	1251/11-1	OPEN	CC	ARCH	1	1.83	6.1
62	73	1252/6-7	OPEN	CC	ARCH	1	1.83	6.1
63	75	1254/5-6	OPEN	CC	RCC SLAB	1	1.83	6.1
64	76	1254/8-9	OPEN	CC	RCC SLAB	1	1.83	6.1
65	77	1255/2-3	OPEN	CC	ARCH	1	0.61	6.1
66	78	1255/4-5	OPEN	CC	RCC SLAB	3	1.83	6.1
67	79	1255/8-9	OPEN	CC	RCC SLAB	1	3.66	6.1
68	80	1256/2	OPEN	CC	ARCH	1	0.61	6.1
69	81	1256/7-8	OPEN	CC	PIPE	1	0.61	6.1
70	82	1256/15	OPEN	CC	RCC SLAB	1	6.09	6.1
71	83	1257/2-3	OPEN	CC	ARCH	1	0.61	6.1
72	84	1259/0-1	OPEN	CC	RCC BOX	1	0.61	6.1
73	85	1260/5	OPEN	CC	RCC SLAB	1	1.83	6.1
74	86	1260/9	OPEN	CC	RIVT PG	2	8.61	6.1
75	87	1260/12-13	OPEN	CC	RCC SLAB	2	0.61	6.1
76	88	1261/2-3	OPEN	CC	RCC SLAB	2	0.61	6.1
77	89	1261/3-4	OPEN	CC	RCC SLAB	1	0.61	6.1
78	90	1261/6-7	OPEN	CC	RCC SLAB	1	0.61	6.1
79	91	1261/11-1	OPEN	CC	RCC SLAB	1	0.61	6.1
80	92	1262/3-4	OPEN	CC	PIPE	1	0.31	6.1
81	93	1263/11	OPEN	CC	ARCH	1	0.61	6.1
82	95	1265/12-1	OPEN	CC	RCC SLAB	1	1.83	6.1
83	96	1267/0-1	OPEN	CC	RCC SLAB	1	0.61	6.1
84	97	1267/8-9	OPEN	CC	RCC SLAB	2	0.61	6.1
85	98	1268/9-10	OPEN	CC	PIPE	3	0.61	6.1
86	99	1269/5-6	OPEN	CC	PIPE	1	0.31	6.1
87	100	1270/0-1	OPEN	CC	RCC SLAB	1	0.61	6.1
88	101	1270/6-7	OPEN	CC	PIPE	1	0.61	6.1
89	102	1270/9-10	OPEN	CC	ARCH	2	1.83	6.1
90	103	1270/12-1	OPEN	CC	ARCH	2	1.83	6.1
91	105	1273/2-3	OPEN	CC	RCC SLAB	1	0.61	6.1
92	106	1273/3-4	OPEN	CC	RCC SLAB	1	3.66	6.1
93	107	1273/5-6	OPEN	CC	RCC SLAB	1	0.61	6.1
94	108	1274/1-2	OPEN	CC	RCC SLAB	1	0.61	6.1
95	109	1274/2-3	OPEN	CC	RCC SLAB	1	0.61	6.1
96	110	1274/4-5	OPEN	CC	RCC SLAB	1	0.61	6.1
97	111	1274/11-1	OPEN	CC	RCC SLAB	2	0.61	6.1
98	112	1275/12-1	OPEN	CC	RCC SLAB	1	0.61	6.1
99	113	1275/14-1	OPEN	CC	RCC SLAB	1	1.83	6.1
100	114	1275/15-1	OPEN	CC	RCC SLAB	1	0.61	6.1
101	115	1276/6-7	OPEN	CC	RCC SLAB	3	1.52	6.1
102	116	1276/7-8	OPEN	CC	ARCH	1	0.61	6.1
103	117	1276/12-1	OPEN	CC	RCC SLAB	3	1.52	6.1
104	118	1276/13-1	OPEN	CC	ARCH	1	0.61	6.1

105	119	1277/5-6	OPEN	CC	PIPE	1	0.31	6.1
106	120	1278/1-2	OPEN	CC	ARCH	1	0.61	6.1
107	121	1278/3-4	OPEN	CC	RCC SLAB	1	0.61	6.1
108	122	1278/7-8	OPEN	CC	RCC SLAB	1	0.61	6.1
109	123	1279/5-6	OPEN	CC	ARCH	1	0.61	6.1
110	124	1279/8-9	OPEN	CC	ARCH	1	0.61	6.1
111	125	1279/10-1	OPEN	CC	RCC BOX	1	3.66	6.1
112	127	1279/13-1	OPEN	CC	ARCH	1	0.61	6.1
113	128	1280/6-7	OPEN	CC	RCC SLAB	1	0.61	6.1
114	129	1280/10-11	OPEN	CC	RCC SLAB	1	0.61	6.1
115	130	1280/10-12	OPEN	CC	RCC SLAB	1	0.3	6.1
116	131	1281/11-12	OPEN	CC	ARCH	1	0.91	6.1
117	132	1282/4-5	OPEN	CC	PIPE	1	0.91	6.1
118	133	1282/8-9	OPEN	CC	RCC SLAB	1	0.61	6.1
119	134	1283/9-10	OPEN	CC	RCC SLAB	1	3.66	6.1
120	135	1284/6-7	OPEN	CC	ARCH	1	1.83	6.1
121	137	1287/14-1	OPEN	CC	ARCH	1	3.65	6.1
122	138	1290/5-6	OPEN	CC	RCC SLAB	1	0.61	6.1
123	139	1290/12-1	OPEN	CC	PIPE	2	0.61	6.1
124	140	1292/2-3	OPEN	CC	RCC SLAB	1	1.83	6.1
125	141	1293/1-2	OPEN	CC	ARCH	1	0.61	6.1
126	142	1293/6-7	OPEN	CC	RCC SLAB	2	3.65	6.1
127	143	1293/11-1	OPEN	CC	RCC SLAB	2	3.65	6.1
128	144	1294/1-2	OPEN	CC	ARCH	1	0.61	6.1
129	145	1294/5-6	OPEN	CC	PIPE	1	0.61	6.1
130	146	1294/11-1	OPEN	CC	RCC SLAB	2	3.66	6.1
131	147	1295/1-2	OPEN	CC	ARCH	1	0.61	6.1
132	148	1295/14-1	OPEN	CC	ARCH	1	0.61	6.1
133	149	1296/8-9	OPEN	CC	RIVT PG	1	9.15	6.1
134	150	1297/8-9	OPEN	CC	ARCH	1	0.61	6.1
135	151	1298/2-3	OPEN	CC	RCC SLAB	1	0.61	6.1
136	152	1298/11-1	OPEN	CC	RCC SLAB	2	1.83	6.1
137	153	1300/5-6	OPEN	CC	RCC SLAB	2	1.83	6.1
138	154	1300/12-1	OPEN	CC	ARCH	1	0.61	6.1
139	155	1301/12-1	OPEN	CC	RCC SLAB	1	1.83	6.1
140	156	1302/9-10	OPEN	CC	RCC SLAB	2	3.66	6.1
141	157	1305/7-8	OPEN	CC	RCC SLAB	1	1.83	6.1
142	158	1305/14-1	OPEN	CC	RCC SLAB	1	0.61	6.1
143	159	1307/4-5	OPEN	CC	RCC SLAB	2	1.8	6.1
144	160	1307/12-1	OPEN	CC	RCC SLAB	1	0.61	6.1
145	160 A	1308/10-1	OPEN	CC	RCC SLAB	1	0.46	6.1
146	161	1309/9-10	OPEN	CC	RCC SLAB	1	0.61	6.1
147	162	1309/12-1	OPEN	CC	ARCH	1	0.61	6.1
148	163	1309/13-1	OPEN	CC	ARCH	1	0.91	6.1
149	164	1310/2-3	OPEN	CC	RCC SLAB	1	1.83	6.1