Standard Engineering, Procurement and Construction (EPC) Agreement with Schedule G-1

for

Survey, Design, Supply, Installation, Testing and commissioning of Trackside KAVACH (Indian Railway Automatic Train Protection System) equipments at stations/LC Gates/IBS locations including OFC works, erection of towers and associated Civil/Track/Electrical works required for KAVACH in ITARSI-MANIKPUR, MAHDEIYA-BINA MALKHERI-MAHADEOKHERI, Entire KATNI COMPLEX, BINA MALKHERI-AGASOD, SATNA-REWA, KAIMA-SAGMA, BANSAPAHAR-OHAN section of Jabalpur Division of West Central Railway.

Ministry of Railways
Government of India

September 2025

Signature Not Verified
Digitally signed by PIYUSH MITTAL
Date: 2025.10.06 18:37:44 IST
Reason: IREPS-CRIS
Location: New Delhi

Contents

	Preamble	i-iv
	PART-I	
	Preliminary	1
Recitals		
1	Definitions and Interpretation	4
1.1	Definitions	4
1.2	Interpretation	4
1.3	Measurements and arithmetic conventions	7
1.4	Priority of agreements and errors/discrepancies	7
1.5	Joint and several liability	7
	PART II	
	Scope of the Project	9
2	**Scope of the Project**	10
2.1	Scope of the Project	10
3	**Obligations of the Contractor**	11
3.1	Obligations of the Contractor	11
3.2	Obligations relating to sub-contracts and any other agreements	12
3.3	Employment of foreign nationals	14
3.4	Contractor's personnel	14
3.5	Advertisement on Railway Project	14
3.6	Contractor's care of the Works	14
3.7	Electricity, water and other services	15
3.8	Unforeseeable difficulties	15
3.9	Training of Authority's personnel	15
3.10	Safety at work site	15
4	**Obligations of the Authority**	16
4.1	Obligations of the Authority	16
4.2	Maintenance and operation of the existing facilities	17
4.3	Environmental and Forest Clearances	17
4.4	Machinery and equipment	17
4.5	Electricity transmission lines	18
4.6	Disconnection for modification of existing signalling and telecommunication works	18
4.7	Provision of Power Blocks and Traffic Blocks	19
5	**Representations and Warranties**	20
5.1	Representations and warranties of the Contractor	20
5.2	Representations and warranties of the Authority	21
5.3	Disclosure	22
6	**Disclaimer**	23
6.1	Disclaimer	23
	PART III	
	Construction	24
7	**Performance Security**	25
7.1	Performance Security	25
7.2	Extension of Performance Security	26
7.3	Appropriation of Performance Security	26
7.4	Release of Performance Security	26
7.5	Retention Money	26
7.6	Maintenance Security	27
8	**Right of Way**	29
8.1	The Site	29
8.2	Handing over of the Project Site	29
8.3	Damages for delay in handing over the Site	30

8.4	Site to be free from Encumbrances	31
8.5	Protection of Site from encroachments	31
8.6	Special/temporary Right of Way	31
8.7	Access to the Authority and the Authority's Engineer	32
8.8	Geological and archaeological finds	32
9	**Utilities and Trees**	33
9.1	Existing utilities and roads	33
9.2	Shifting of obstructing utilities	33
9.3	New utilities	34
9.4	Felling of trees	34
10	**Design and Construction of the Railway Project**	35
10.1	Obligations prior to commencement of Works	35
10.2	Design and Drawings	36
10.3	Construction of the Railway Project	40
10.4	Extension of time for completion	41
10.5	Incomplete Works	43
10.6	Equipment specific Maintenance Manual	43
11	**Quality Assurance, Monitoring and Supervision**	44
11.1	Quality of Materials and workmanship	44
11.2	Quality control system	44
11.3	Methodology	45
11.4	Inspection and technical audit by the Authority	45
11.5	External technical audit	45
11.6	Inspection of construction records	45
11.7	Monthly progress reports	45
11.8	Inspection and Inspection of S&T items	45-46
11.9	Samples	47
11.10	Tests	47
11.11	Examination of work before covering up	47
11.12	Rejection	48
11.13	Remedial work	48
11.14	Delays during construction	49
11.15	Quality control records and Documents	49
11.16	Video recording	49
11.17	Suspension of unsafe Construction Works	49
12	**Completion Certificate**	51
12.1	Tests on completion	51
12.2	Provisional Certificate	51
12.3	Completion of Part-2 Punch List items	52
12.4	Completion Certificate	53
12.5	Rescheduling of Tests	53
12.6	Delayed authorisation	53
13	**Change of Scope**	54
13.1	Change of Scope	54
13.2	Procedure for Change of Scope	55
13.3	Payment for Change of Scope	56
13.4	Restrictions on Change of Scope	57
13.5	Power of the Authority to undertake works	57
14	**Traffic Regulation**	58
14.1	Traffic regulation by the Contractor	58
15	**Defects Liability**	59
15.1	Defects Liability Period	59
15.2	Remedy and rectification of Defects and deficiencies	59
15.3	Cost of remedying Defects	59

15.4	Contractor's failure to rectify Defects	60
15.5	Contractor to search cause	60
15.6	Extension of Defects Liability Period	60
15A	Maintenance	61
15B	Supervision and Monitoring during Maintenance	66
16	**Authority's Engineer**	68
16.1	Appointment of the Authority's Engineer	68
16.2	Duties and functions of the Authority's Engineer	68
16.3	Authorised signatories	69
16.4	Instructions of the Authority's Engineer	69
16.5	Determination by the Authority's Engineer	69
16.6	Remuneration of the Authority's Engineer	69
16.7	Replacement of the Authority's Engineer	70
16.8	Interim arrangement	70
	PART -IV	
	Financial Covenants	71
17	Payments	72
17.1	Contract Price	72
17.2	Advance Payment	72
17.3	Procedure for estimating the payment for the Works	74
17.4	Stage Payment Statement for Works	74
17.5	Stage Payment for Works	74
17.6	Payment of Damages	76
17.7	Time of payment and interest	76
17.8	Price adjustment for the Works	77
17.9	Restrictions on price adjustment	94
17.10	Final Payment Statement	95
17.11	Discharge	96
17.12	Final Payment Certificate	96
17.13	Change in law	97
17.14	Correction of Interim Payment Certificates	97
17.15	Authority's claims	97
17.16	Bonus for early completion	97
18	**Insurance**	98
18.1	Insurance for Works	98
18.2	Notices to the Authority	99
18.3	Evidence of Insurance Cover	99
18.4	Remedy for failure to insure	99
18.5	Waiver of subrogation	99
18.6	Contractor's waiver	100
18.7	Cross liabilities	100
18.8	Accident or injury to workmen	100
18.9	Insurance against accident to workmen	100
18.10	Application of insurance proceeds	101
18.11	Compliance with policy conditions	101
	PART -V	
	Force Majeure and Termination	102
19	**Force Majeure**	103
19.1	Force Majeure	103
19.2	Non-Political Event	103
19.3	Indirect Political Event	104
19.4	Political Event	104
19.5	Duty to report Force Majeure Event	105

19.6	Effect of Force Majeure Event on the Agreement	105
19.7	Termination Notice for Force Majeure Event	106
19.8	Termination Payment for Force Majeure Event	107
19.9	Dispute resolution	107
19.10	Excuse from performance of obligations	107
20	**Suspension of Contractor's Rights**	108
20.1	Suspension upon Contractor Default	108
20.2	Authority to act on behalf of Contractor	108
20.3	Revocation of Suspension	108
20.4	Termination	108
21	**Termination**	110
21.1	Termination for Contractor Default	110
21.2	Termination for Authority Default	112
21.3	Right of Authority to Determine the Contract	113
21.4	Requirements after Termination	113
21.5	Valuation of UnpaidWorks	113
21.6	Termination Payment	114
21.7	Other rights and obligations of the Parties	115
21.8	Survival of rights	115
	PART -VI	
	Other Provisions	116
22	**Assignment and Charges**	117
22.1	Restrictions on assignment and charges	117
22.2	Hypothecation of Materials or Plant	117
23	**Liability and Indemnity**	118
23.1	General indemnity	118
23.2	Indemnity by the Contractor	118
23.3	Notice and contest of claims	118
23.4	Defence of claims	119
23.5	No consequential claims	120
23.6	Survival on Termination	120
24	**Dispute Resolution**	121
24.1	Conciliation of Disputes	121
24.2	Dispute Adjudication Board	121
24.3	Standing Arbitral Tribunal	123
25	**Miscellaneous**	125
25.1	Governing law and jurisdiction	125
25.2	Waiver of immunity	125
25.3	Delayed payments	125
25.4	Waiver	126
25.5	Liability for review of Documents and Drawings	126
25.6	Exclusion of implied warranties etc	126
25.7	Survival	126
25.8	Entire Agreement	127
25.9	Severability	127
25.10	No partnership	127
25.11	Third Parties	127
25.12	Successors and assigns	127
25.13	Notices	127
25.14	Language	128
25.15	Counter parts	128
25.16	Confidentiality	128
25.17	Copyright and Intellectual Property rights	128
25.18	Limitation of Liability	129

26	**Definitions**	130
26.1	Definitions	130
	Schedules	138
Schedule-A	**Site of the Project**	139
1	The Site	139
Annex-I:	Site	140
Annex-II:	Dates for providing Right of Way	150
Annex-III:	Plan and Profile	151
Annex-IV:	Environmental and Forest Clearances	152
Schedule-B	**Development of the Railway Project**	153
Annex-I:	**Description of the Railway Project**	154
Schedule-C	**Project Facilities**	242
1	Project Facilities	242
2	Contractor's Project organization	248
Schedule-D	**Specifications and Standards**	251
1	Construction	251
2	Design Standards	251
3	Latest Version	251
4	Terms used in Manuals	251
5	Absence of specific provisions	251
6	Alternative Specifications and Standards	252
Annex-I:	Specifications and Standards for Construction	253
Annex-II:	List of Drawings and Time Schedule for review of drawings by the Authority	261
Schedule-E	**Applicable Permits**	268
1	Applicable Permits	268
Schedule-F	**Form of Bank Guarantee**	269
Annex-I:	Form of Guarantee for Performance Security	269
Annex-IA:	Form of Insurance Surety Bond	272
Annex-II:	Form of Guarantee for Withdrawal of Retention Money	276
Annex-III:	Form of Guarantee for Advance payment	279
Schedule-G	**Contract Price Weightages**	283
G-1	**Separate BOQ for Itemised Work**	288
Schedule-H	**Drawings**	291
1	Drawings	291
2	Additional drawings	291
Annex-I:	**List of Drawings**	292
Schedule-I	**Project Completion Schedule**	294
1	Project Completion Schedule	294
2	Project Milestone-I	294
3	Project Milestone-II	294
4	Project Milestone-III	295
5	Project Milestone-IV	296
6	Project Milestone-V	297
7	Project Milestone-VI	298
8	Project Milestone-VII	299
9	Scheduled Completion Date	299
10	Extension of time	299
Schedule-J	**Tests on Completion**	300
1	Schedule for Tests	300
2	Tests	300
3	Agency for conducting Tests	301
4	Completion Certificate	301
Schedule-K	**Provisional Certificate/ Completion Certificate**	302

1	Provisional Certificate	302
2	Completion Certificate	303
Schedule-L	**Selection of Authority's Engineer**	304
1	Selection of Authority's Engineer	304
2	Terms of Reference	304
Annex-I:	Duties & Responsibilities of Authority's Engineer	305
1	Scope	305
2	Definitions and interpretation	305
3	General	305
4	Construction Period	306
5	Determination of costs and time	309
6	Payments	309
7	Other duties and functions	309
8	Miscellaneous	309
Schedule-M	**Forms of Payment Statements**	311
1	Stage Payment Statement for Works	311
2	Contractor's Claim for Damages	311
Schedule-N	**Insurance**	312
1	Insurance during Construction Period	312
2	Insurance for Contractor's Defects Liability	312
3	Insurance against injury to persons and damage to property	312
4	Insurance to be in joint names	313
Schedule-O	**Provision of Traffic Blocks and Power Blocks**	314
Schedule-P	**Machinery and equipment**	315
Schedule- Q	**Maintenance Requirement**	316
1	Maintenance Requirement	316
2	Prompt Response Teams	316
3	Tests	316
4	Other Defects and Deficiencies	317
5	Extension of Time Limit for Rectification	317
6	Emergency Repairs/Restoration	317
7	Maintenance record by the Contractor	317
8	Repairs on Account of Natural Calamities	317
9	Epidemic Defect Warranty	317
10	Distribution of Roles and Responsibility for KAVACH equipments	318
Schedule-R	**Payment Reduction for Non- Compliance**	320
Schedule-S	**Test on Completion of Maintenance Period**	321
Schedule-T	**Taking Over Certificate**	322
	The End of Schedules	323
	Appendices	324
I	List of bid specific clauses	325
	A. Clauses with non-numerical foot notes	325
	B. Clauses with curly {} brackets	325
	C.Clauses with blank spaces	326
[II	List of project specific clauses	327
Undertaking From RDSO approved Kavach OEM		328

P R E A M B L E

Need for EPC contracts:

Railways had hitherto been undertaking construction projects through the conventional item rate contracts where the Authority provides the detailed design as well as the estimates of quantities for different items of work (Bill of Quantities). Payments to the contractor are made on the basis of measurements of the work done in respect of each item. Experience in railway projects shows that item rate contracts are prone to excessive time and cost overruns due to delays in design and drawing, variation in items and quantities and inadequate fund provisions as allocation of construction risks are largely to the Authority Considerable time of Project Engineers is consumed in dealing with variations in quantities, introduction of Non-Schedule Items and variation in contract price

The growing requirements of the economy will necessitate faster expansion of the freight network through new capacity creation. Considering that improved and modernised project execution capabilities would be critical for speedy capacity creation, it has been decided to adopt the Engineering, Procurement and Construction (EPC) mode of contracting for construction of railway projects.

On Indian Railways, EPC model has been used earlier in a limited way for constructing some bridges on Jammu-Udhampur rail link. However, in railway sector, EPC model has been extensively and successfully used by Delhi Metro Rail Corporation (DMRC) over the years. Accordingly, the processes for design approval, supervision and monitoring etc have been suitably incorporated in the Model EPC Agreement as per the practices being followed in DMRC.

Based on the Railways' experiences (above 5 years), a 10 member SAG review committee (convener HAG) was constituted by Railway Board to evaluate relevant provisions. Following a detailed assessments, deliberations of committee’s findings and consultation with all stakeholders, revised provisions were proposed and accepted.

In order to address uncertainties in the EPC tendering mode, schedule G-1 (separate Bill of Quantities for itemized work) has been introduced. Inclusion of Schedule G-1 is optional/discretionary and contingent upon the project specific needs of the respective Zonal Railways. However, in case G1 is to be made operational, eligibility criteria of such EPC tender shall be evaluated on the basis of total Tender value which also includes the value of Schedule G-1.

Model EPC Agreement:

The aforesaid drawbacks of item rate contracting can be addressed by adopting the EPC approach that relies on assigning the responsibility for investigations, design and construction to the contractor for a lump sum price determined through competitive bidding. The objective is to ensure speedy implementation of the project to the specified standards and effective

designs, and least time overrun while assigning & balancing various risks judiciously between contractor and authority.

This Standard EPC Agreement provides a contractual framework that balances the allocation of risks and rewards, provides equity of obligations and penalties between Authority and the Contractor, minimises the ambiguities and uncertainties, thus improves the predictability of cost & time. It also follows the global best practices related to force majeure, termination and dispute resolution, apart from transparent and fair procedures

The Contractor also has full freedom to plan the construction schedule for efficient use of its manpower, equipment and other resource while payments are linked to specified stages of construction (payment milestones) vis-à-vis the payment for individual items/units under the item rate contract. Awarding contract for a lump sum price ensures value engineering, balancing of risks and financial discipline, both for the contractor and the Authority. The contract price is subject to adjustment on account of price variation during the contract period as per specified formula

Technical parameters:

The Standard EPC Agreement specifies the required design standards and allows the Contractor to design and construct the project using design engineering and global best practices to achieve quality, speed, efficiency and economy as compared to the item rate contract that relies on a fixed design provided by the Authority.

Only the core requirements of design and construction of the railway project that have a bearing on the quality and safety of assets are to be specified and enough room would be left for the contractor to add value. This would provide the requisite flexibility to the contractor in evolving and adopting the efficient designs without compromising on the quality and safety.

Contract period:

The contract period is determined on a project-specific basis depending on the volume of construction work involved. The Contractor shall be liable to pay Damages at the specified rate for each day of delay beyond the specified date of completion, subject to the total amount of Damages not exceeding 10 per cent of the Contract Price. However, the Contractor shall be entitled to time extension arising out of delays on account of change of scope and force majeure or delays caused by or attributable to the Authority

Selection of contractor:

Selection of the contractor will be based on open competitive bidding. All project parameters such as the contract period, price adjustments and technical parameters are to be clearly stated upfront along with lump sum price for the Railway Project.

Risk allocation:

Projects risks such as soil conditions and weather or commercial and technical risks relating to design and construction have been assigned to the Contractor. The Authority accepts its

liability to pay damages to the Contractor for any delays in handing over the land, approvals from road authorities for road over-bridges/under-bridges at level crossings, environment clearances, shifting of utilities and approvals in respect of engineering scale plan and signalling interlocking plan.

Design and Construction:

It defines the scope of the railway project with precision and predictability to enable the Contractor to determine its costs and obligations. It also lays down a ceiling of 25 per cent of contract price to cater for any changes in the scope of project, the cost of which the Authority will bear.

The Contractor shall carry out survey and investigations and also develop designs and drawings in conformity with the specifications and standards laid down in the Agreement. Authority's engineer shall review the design and drawings to ensure that these conform to the scope of the project, design standards and specifications. The EPC agreement also stipulates provisions for quality control and quality assurance.

Monitoring and Supervision:

Monitoring and supervision of construction are proposed to be undertaken through an engineer to be designated as 'Authority's Engineer', who would be assisted by requisite organizational support for day-to-day interaction between the Authority and the Contractor. Typical organizational structure proposed to be followed for Authority's Engineer shall be in line with the organizational set up being followed by DMRC for monitoring and supervision of their EPC contracts. The Authority's Engineer will act as a single window for coordination with the contractor.

The Agreement provides for the schedule indicating the timeline within which Authority will ensure the clearances of design proposals submitted by the contractor. Any comment by the Authority on the design proposals submitted by the contractor will be communicated in totality once in a time-bound manner as indicated in the schedule. The contractor will be free to proceed with construction after the expiry of specified period in case no remarks/clearances are given by the Authority.

Milestone based payments:

A simple and rational method for estimating interim payments to the Contractor has been provided in the Agreement. It ensures that payments are made for works conforming to the Agreement and commensurate with the stages of completion of works. Works have been broadly divided into three categories, namely, civil and track works, signalling and telecommunication works and electrification works, which could be taken together under a single project or separately under different projects. Each item of work has been further sub-divided into stages and payment will be made for each completed stage of work.

A provision has been made for damages which the Contractor shall pay to Authority for not achieving the prescribed milestones. Authority will pay bonus to the Contractor for completion of the project before the scheduled completion date.

Defects liability period:

Though normally a defects liability period of one year is specified in most contracts, a defects liability period of two years has been specified in the Agreement in order to provide additional comfort to the Authority.

Termination dispute resolution:

In the event the Authority terminates the Agreement on account of any of the specified defaults of the Contractor, the Agreement allows the Authority to forfeit the performance security & retention money of the Contractor. Similarly, defaults by the Authority are proposed to qualify for adequate compensatory payments to the contractor. The Agreement also addresses issues relating to dispute resolution and provides a mechanism for the same

****

Part I

Preliminary

ENGINEERING, PROCUREMENT AND CONSTRUCTION AGREEMENT

THIS AGREEMENT[1] is entered into on this the …….. day of ……, 20…..

BETWEEN

1 [The President of India, represented by General Manager (S&T), West Central Railway, Jabalpur, and having its principal offices at 1st Floor, Annex-Building, Above Platform No.6, West Central Railway, Jabalpur (hereinafter referred to as the "**Authority**" which expression shall, unless repugnant to the context or meaning thereof, include its administrators, successors and assigns) of One Part;

AND

2 {……}[2,] means the selected bidder[3] having its registered office at ……, (hereinafter referred to as the "**Contractor**" which expression shall, unless repugnant to the context or meaning thereof, include its successors and permitted assigns) of the Other Part.

WHEREAS:

(A) The Authority has the responsibility to develop, operate and maintain the Indian Railways in the territorial jurisdiction of the West Central Railway zone[4].

(B) The Authority had resolved to undertake Survey, design, supply, installation, testing and commissioning of trackside KAVACH (Indian Railway Automatic Train Protection System) equipments at stations/LC Gates/IBS locations including OFC works, erection of towers and associated Civil/Track/Electrical works required for KAVACH in ITARSI-MANIKPUR, MAHDEIYA-BINA MALKHERI-MAHADEOKHERI, Entire KATNI COMPLEX, BINA MALKHERI-AGASOD, SATNA-REWA, KAIMA-SAGMA, BANSAPAHAR-OHAN section of Jabalpur Division of West Central Railway, on Engineering, Procurement, Construction ("**EPC**") basis in accordance with the terms and conditions to be set forth in an agreement to be entered into.

(C) The Authority had prescribed the Technical and Financial terms and conditions, and invited Request for Participation (RFP) No. EPC-WCR-JBP-SnT-Proj-04, dated as per NIT from the bidders for undertaking the Project.

---

[1] Deleted.

[2]-Deleted.

[3] Deleted.

[4] Deleted.

(D) After evaluation of the bids received, the Authority had accepted the bid of the selected bidder and issued its Letter of Acceptance No. *** dated *** (hereinafter called the "**LOA**") to the selected bidder for Survey, design, supply, installation, testing and commissioning of trackside KAVACH (Indian Railway Automatic Train Protection System) equipments at stations/LC Gates/IBS locations including OFC works, erection of towers and associated Civil/Track/Electrical works required for KAVACH in ITARSI-MANIKPUR, MAHDEIYA-BINA MALKHERI-MAHADEOKHERI, Entire KATNI COMPLEX, BINA MALKHERI-AGASOD, SATNA-REWA, KAIMA-SAGMA, BANSAPAHAR-OHAN section of Jabalpur Division of West Central Railway, at the Contract Price specified hereinafter, requiring the selected bidder to inter alia:

(i) deliver to the Authority a legal opinion from the legal counsel of the selected bidder with respect to the authority of the selected bidder to enter into this Agreement and the enforceability of the provisions thereof, within 10 (ten) days of the date of issue of LOA; and

(ii) execute this Agreement within 60 (Sixty) days of the date of issue of LOA.

(E) The Contractor has fulfilled the requirements specified in Recital (D) above;

Now, therefore, in consideration of the foregoing and the respective covenants and agreements set forth in this Agreement, the sufficiency and adequacy of which is hereby acknowledged, the Authority hereby covenants to pay the Contractor, in consideration of the obligations specified herein, the Contract Price or such other sum as may become payable under the provisions of the Agreement at the times and in the manner specified by the Agreement and intending to be legally bound hereby, the Parties agree as follows:

ARTICLE 1

DEFINITIONS AND INTERPRETATION

1.1 Definitions

The words and expressions beginning with capital letters and defined in this Agreement (including those in Article 26) shall, unless the context otherwise requires, have the meaning ascribed thereto herein, and the words and expressions defined in the Schedules and used therein shall have the meaning ascribed thereto in the Schedules.

1.2 Interpretation

1.2.1 In this Agreement, unless the context otherwise requires,

(a) references to any legislation or any provision thereof shall include amendment or re-enactment or consolidation of such legislation or any provision thereof so far as such amendment or re-enactment or consolidation applies or is capable of applying to any transaction entered into hereunder;

(b) references to laws of India or Indian law or regulation having the force of law shall include the laws, acts, ordinances, rules, regulations, bye laws or notifications which have the force of law in the territory of India and as from time to time may be amended, modified, supplemented, extended or re-enacted;

(c) references to a "**person**" and words denoting a natural person shall be construed as a reference to any individual, firm, company, corporation, society, trust, government, state or agency of a state or any association or partnership (whether or not having separate legal personality) of two or more of the above and shall include successors and assigns;

(d) the table of contents, headings or sub-headings in this Agreement are for convenience of reference only and shall not be used in, and shall not affect, the construction or interpretation of this Agreement;

(e) the words "**include**" and "**including**" are to be construed without limitation and shall be deemed to be followed by "without limitation" or "but not limited to" whether or not they are followed by such phrases;

(f) references to "**construction**" or "**building**" include, unless the context otherwise requires, survey and investigation, design, developing, engineering, procurement, supply of plant, materials, equipment, labour, delivery, transportation, installation, processing, fabrication, testing, and commissioning of the Railway Project, including maintenance during the Construction Period, removing of defects, if any, and other activities incidental to the construction and "**construct**" or "**build**" shall be construed accordingly;

(g) references to "**development**" include, unless the context otherwise requires, construction, renovation, refurbishing, augmentation, up-gradation and other activities incidental thereto during the Construction Period, and "develop" shall be construed accordingly;

(h) any reference to any period of time shall mean a reference to that according to Indian standard time;

(i) any reference to day shall mean a reference to a calendar day;

(j) reference to a "**business day**" shall be construed as reference to a day (other than a Sunday) on which banks in the State are generally open for business;

(k) any reference to month shall mean a reference to a calendar month as per the Gregorian calendar;

(l) references to any date, period or Project Milestone shall mean and include such date, period or Project Milestone as may be extended pursuant to this Agreement;

(m) any reference to any period commencing "from" a specified day or date and "**till**" or "**until**" a specified day or date shall include both such days or dates; provided that if the last day of any period computed under this Agreement is not a business day, then the period shall run until the end of the next business day;

(n) the words importing singular shall include plural and vice versa;

(o) references to any gender shall include the other and the neutral gender;

(p) "**lakh**" means a hundred thousand (100,000) and "**crore**" means ten million (10,000,000);

(q) "**indebtedness**" shall be construed so as to include any obligation (whether incurred as principal or surety) for the payment or repayment of money, whether present or future, actual or contingent;

(r) references to the "**winding-up**", "**dissolution**", "**insolvency**", or "reorganisation" of a company or corporation shall be construed so as to include any equivalent or analogous proceedings under the law of the jurisdiction in which such company or corporation is incorporated or any jurisdiction in which such company or corporation carries on business including the seeking of liquidation, winding-up, reorganisation, dissolution, arrangement, protection or relief of debtors;

(s) save and except as otherwise provided in this Agreement, any reference, at any time, to any agreement, deed, instrument, licence or document of any description shall be construed as reference to that agreement, deed, instrument, licence or other document as amended, varied, supplemented, modified or suspended at the time of such reference; provided that this Sub-clause(s) shall not operate so as to increase liabilities or obligations of the Authority hereunder or pursuant hereto in any manner whatsoever;

(t) any agreement, consent, approval, authorisation, notice, communication, information or report required under or pursuant to this Agreement from or by any Party or the Authority Engineer shall be valid and effective only if it is in writing under the hand of a duly authorised representative of such Party or the Authority Engineer, as the case may be, in this behalf and not otherwise;

(u) the Schedules and Recitals to this Agreement form an integral part of this Agreement and will be in full force and effect as though they were expressly set out in the body of this Agreement;

(v) references to Recitals, Articles, Clauses, Sub-clauses, Provisos or Schedules in this Agreement shall, except where the context otherwise requires, mean references to Recitals, Articles, Clauses, Sub-clauses, Provisos and Schedules of or to this Agreement; reference to an Annex shall, subject to anything to the contrary specified therein, be construed as a reference to an Annex to the Schedule in which such reference occurs; and reference to a Paragraph shall, subject to anything to the contrary specified therein, be construed as a reference to a Paragraph of the Schedule or Annex, as the case may be, in which such reference appears;

(w) the damages payable by either Party to the other of them, as set forth in this Agreement, whether on per diem basis or otherwise, are mutually agreed genuine pre-estimated loss and damage likely to be suffered and incurred by the Party entitled to receive the same and are not by way of penalty (the "**Damages**"); and

(x) time shall be of the essence in the performance of the Parties' respective obligations. If any time period specified herein is extended for the reasons specified in the Agreement, such extended time shall also be of the essence.

(y) "Maintenance" means the maintenance of the Project KAVACH as set forth in Article 15A for the period specified therein;

(z) "Maintenance Inspection Report" shall have the meaning set forth in Clause 15B.2;

(aa) "Maintenance Manual" shall have the meaning ascribed to it in Clause 10.6;

(bb) "Maintenance Programme" shall have the meaning set forth in Clause 15A.3;

(cc) "Maintenance Period" shall have the meaning set forth in Clause 15A.1;

(dd) "Maintenance Requirements" shall have the meaning set forth in Clause 15A.2

1.2.2 Unless expressly provided otherwise in this Agreement, any Documentation required to be provided or furnished by the Contractor to the Authority shall be provided free of cost and in three copies, and if the Authority is required to return any such Documentation with its comments and/or approval, it shall be entitled to retain two copies thereof.

1.2.3 The rule of construction, if any, that a contract should be interpreted against the parties responsible for the drafting and preparation thereof, shall not apply.

1.2.4 Any word or expression used in this Agreement shall, unless otherwise defined or construed in this Agreement, bear its ordinary English meaning and, for these purposes, the General Clauses Act, 1897 shall not apply.

1.3 Measurements and arithmetic conventions

All measurements and calculations shall be in the metric system and calculations done to 2 (two) decimal places, with the third digit of 5 (five) or above being rounded up and below 5 (five) being rounded down.

1.4 Priority of agreements and errors/discrepancies

1.4.1 This Agreement, and all other agreements and documents forming part of or referred to in this Agreement are to be taken as mutually explanatory and, unless otherwise expressly provided elsewhere in this Agreement, the priority of this Agreement and other documents and agreements forming part hereof or referred to herein shall, in the event of any conflict between them, be in the following order:

(a) this EPC Agreement; and

(b) all other agreements and documents forming part hereof or referred to herein, i.e. this Agreement at (a) above shall prevail over the agreements and documents at (b).

1.4.2 Subject to the provisions of Clause 1.4.1, in case of ambiguities or discrepancies within this Agreement, the following shall apply:

(a) between two or more Clauses of this Agreement, the provisions of a specific Clause relevant to the issue under consideration shall prevail over those in other Clauses;

(b) between the Clauses of this Agreement and the Schedules, the Clauses shall prevail and between Schedules and Annexes, the Schedules shall prevail;

(c) between any two Schedules, the Schedule relevant to the issue shall prevail;

(d) between the written description on the Drawings and the Specifications and Standards, the latter shall prevail;

(e) between the dimension scaled from the Drawing and its specific written dimension, the latter shall prevail; and

(f) between any value written in numerals and that in words, the latter shall prevail.

{1.5 Joint and several liability

1.5.1 If the Contractor has formed a Consortium/Joint Venture of two or more persons for implementing the Project:

(a) these persons shall, without prejudice to the provisions of this Agreement, be deemed to be jointly and severally liable to the Authority for the performance of the Agreement; and

(b) the Contractor shall ensure that no change in the composition of the Consortium/Joint Venture is effected without the prior consent of the Authority.

1.5.2 Without prejudice to the joint and several liability of all the members of the Consortium/Joint Venture, the Lead Member shall represent all the members of the Consortium/Joint Venture and shall at all times be liable and responsible for discharging the functions and obligations of the Contractor. The Contractor shall ensure that each member of the Consortium/Joint Venture shall be bound by any decision, communication, notice, action or inaction of the Lead Member on any matter related to this Agreement and the Authority shall be entitled to rely upon any such action, decision or communication of the Lead Member. The Authority shall have the right to release payments solely to the Lead Member and shall not in any manner be responsible or liable for the *inter se* allocation of payments among members of the {Consortium/Joint Venture}}.

Part II

Scope of the Project

ARTICLE 2

SCOPE OF THE PROJECT

2.1 Scope of the Project

Under this Agreement, the scope of the Project (the "**Scope of the Project**") shall mean and include:

(a) Construction of the Railway Project on the Site set forth in Schedule-A and as specified in Schedule-B together with provision of Project Facilities as specified in Schedule-C, and in conformity with the Specifications and Standards set forth in Schedule-D, with Contractor's own Material Supplies including Stationary KAVACH, Loco KAVACH, Tower material & accessories, OFC Works, Building construction material, Various licences/clearances, all Signalling, Telecom and OHE/PSI/ Electrification/ Lighting materials as per laid down specifications.

(b) Deleted.

(c) Performance and fulfilment of all other obligations of the Contractor in accordance with the provisions of this Agreement and matters incidental thereto or necessary for the performance of any or all of the obligations of the Contractor under this Agreement.

(d) Maintenance of the Project in accordance with the provisions of this Agreement and in conformity with the requirements set forth in Schedule-Q;

ARTICLE 3

OBLIGATIONS OF THE CONTRACTOR

3.1 Obligations of the Contractor

3.1.1 Subject to and on the terms and conditions of this Agreement, the Contractor shall undertake the survey, investigation, design, engineering, procurement, and construction of the Railway Project and observe, fulfil, comply with and perform all its obligations set out in this Agreement or arising hereunder.

3.1.2 The Contractor shall comply with all Applicable Laws and Applicable Permits (including renewals as required) in the performance of its obligations under this Agreement.

3.1.3 Save and except as otherwise provided in this Agreement or Applicable Laws, as the case may be, the Contractor shall, in discharge of all its obligations under this Agreement, conform with and adhere to Good Industry Practice at all times.

3.1.4 The Contractor shall remedy any and all loss or damage to the Railway Project, occurring on or after the Appointed Date and until the date of Provisional Certificate, with respect to the Works completed prior to the issuance of the Provisional Certificate and/or Completion Certificate, with respect to the Works referred to in the Punch List, at its own cost, save and except to the extent that any such loss or damage shall have arisen from any default of the Authority or on account of a Force Majeure Event in which case the provisions of Article 19 shall apply.

3.1.5 The Contractor shall remedy any and all loss or damage to the Railway Project during the Defects Liability Period at its own cost, to the extent that such loss or damage shall have arisen out of the reasons specified in Clause 15.3.

3.1.6 The Contractor shall, at its own cost and expense, in addition to and not in derogation of its obligations elsewhere set out in this Agreement:

(a) make, or cause to be made, necessary applications to the relevant Government Instrumentalities with such particulars and details as may be required for obtaining Applicable Permits set forth in Schedule-E and obtain and keep in force and effect such Applicable Permits in conformity with Applicable Laws;

(b) procure, as required, the appropriate proprietary rights, licences, agreements and permissions for Materials, methods, processes, know-how and systems used or incorporated into the Railway Project;

(c) make reasonable efforts to maintain harmony and good industrial relations among the personnel employed by it or its Sub-contractors in connection with the performance of its obligations under this Agreement;

(d) ensure that its Sub-contractors comply with all Applicable Permits and Applicable Laws in the performance by them of any of the Contractor's obligations under this Agreement;

(e) always act in a manner consistent with the provisions of this Agreement and not cause or fail to do any act, deed or thing, whether intentionally or otherwise, which may in any manner be in violation of any of the provisions of this Agreement;

(f) support, cooperate with and facilitate the Authority in the implementation and operation of the Project in accordance with the provisions of this Agreement;

(g) ensure that the Contractor and its Sub-contractors comply with the safety and welfare measures for labour in accordance with Applicable Laws and Good Industry Practice;

(h) keep, on the Site, a copy of this Agreement, publications named in this Agreement, the Drawings, Documents relating to the Project, Change of Scope Orders and other communications sent under this Agreement, and provide access to all these documents at all reasonable times to the Authority Engineer and its authorised personnel;

(i) cooperate with other contractors employed by the Authority and with personnel of any other public authority; and

(j) not interfere unnecessarily or improperly with the convenience of the public, or the access to and use and occupation of all the existing facilities within the Right of Way, irrespective of whether they are public or in the possession of the Authority or of others.

(k) to provide reasoned comments on any information relating to the contractor's activities under or pursuant to the agreement, which the Authority may publish.

3.1.7 The Contractor shall undertake all necessary superintendence to plan, arrange, direct, manage, inspect and test the Works.

3.2 Obligations relating to sub-contracts and any other agreements

3.2.1 The Contractor shall not sub-contract the Works comprising more than 70% (seventy per cent) of the Contract Price and shall carry out Works for at least 30% (thirty per cent) of the total Contract Price directly under its own supervision and through its own personnel. The Parties expressly agree that for the purposes of computing the value of sub-contracts under this Clause 3.2.1, the Contract Price shall exclude any sub-contract for the procurement of goods and equipment. The Parties agree that all obligations and liabilities under this Agreement for the entire Railway Project shall at all time remain with the Contractor. {The Parties agree that the obligations of the Contractor to carry out Works equal to at least 30% (thirty per cent) of the Contract Price shall be discharged solely by the Lead Member.}[$]

[$] May be deleted if the Contractor is not a Consortium/Joint Venture.

3.2.2 In the event any sub-contract for Works, or the aggregate of such sub-contracts with any Sub-contractor, exceeds 5% (five percent) of the Contract Price, the Contractor shall communicate the name and particulars, including the relevant experience of the sub-contractor, to the Authority prior to entering into any such sub-contract. Provided, however, that in any event the Contractor shall communicate the name and particulars to the Authority for any sub-contract including the relevant experience prior to entering into any such sub-contract. The Authority shall examine the particulars of the sub-contractor from the national security and public interest perspective and may require the Contractor, no later than 15 (fifteen) business days from the date of receiving the communication from the Contractor, not to proceed with the sub-contract, and the Contractor shall comply therewith and shall have no claim whatsoever on this account.

3.2.3 Without prejudice to the provisions of Clause 3.2.2, in the event any sub-contract referred to in Clause 3.2.2 relates to a sub-contractor who has, over the preceding 3 (three) financial years and the current financial year , not undertaken at least one work of a similar nature with a contract value exceeding 40% (forty per cent) of the value of the sub-contract to be awarded hereunder and received payments in respect thereof for an amount equal to at least 80% (eighty per cent) of such contract, the Authority may, no later than 15 (fifteen) business days from the date of receiving the communication from the Contractor, require the Contractor not to proceed with such sub-contract, and the Contractor shall comply therewith.

3.2.4 It is expressly agreed that the Contractor shall, at all times, be responsible and liable for all its obligations under this Agreement notwithstanding anything contained in the agreements with its Sub-contractors or any other agreement that may be entered into by the Contractor, and no default under any such agreement shall excuse the Contractor from its obligations or liability hereunder.

3.2.5 Notwithstanding anything to the contrary contained in this Concession Agreement, the Concessionaire agrees and acknowledges that it will not assign any work to any contractor/sub- contractor from a country which shares a land border with India unless such contractor/sub-contractor is registered with the competent Authority. Concessionaire will ensure that such Contractor/sub-contractor fulfils all requirements in this regard and is eligible to be considered (evidence of valid registration by the competent authority is enclosed). The Competent Authority for registration will be the Registration Committee constituted by the Department for Promotion of Industry and Internal Trade (DPIIT), India.

3.2.6 Contractor shall be liable for the regular payment to the sub-Contractor.

3.2.7 Contractor in each Interim payment certificate (IPC) reflect the amount of payment to be paid to the Sub-Contractor. The invoices raised by Sub-Contractor for his bill shall be submitted along with IPC, duly attested by the Sub-Contractor.

3.2.8 In the subsequent Interim Payment Certificate (IPC), the Contractor shall submit a certificate of Sub-Contractor that they have received the bill amount of previous stage payment statement.

3.2.9 In case of dispute over sum of amount to be paid to the sub-Contractor or non-payment to Sub-Contractor, Authority Engineer may raise the issue to the Contractor. After,

issue has been raised, Contractor shall resolve the issue within 10 days. In case issue is not resolved, *Authority Engineer shall* pay *payment due as decided by authority*, to the Sub-Contractor from the forthcoming IPC of Contractor.

3.3 Employment of foreign nationals

The Contractor acknowledges, agrees and undertakes that employment of foreign personnel by the Contractor and/or its Sub-contractors and their sub-contractors shall be subject to grant of requisite regulatory permits and approvals including employment/residential visas and work permits, if any required, and the obligation to apply for and obtain the same shall and will always be of the Contractor. Notwithstanding anything to the contrary contained in this Agreement, refusal of or inability to obtain any such permits and approvals by the Contractor or any of its Sub-contractors or their sub-contractors shall not constitute Force Majeure Event, and shall not in any manner excuse the Contractor from the performance and discharge of its obligations and liabilities under this Agreement.

3.4 Contractor's personnel

3.4.1 The Contractor shall ensure and procure that the personnel engaged by it or by its Sub-contractors for performance of its obligations under this Agreement are at all times appropriately qualified, skilled and experienced in their respective functions including in conformity with Applicable Laws including the Indian Railway General and Subsidiary Rules, [Indian Railway Signal Engineering Manual, Indian Railway Telecom Manual, Indian Railways Permanent Way Manual, Latest IRS / RDSO specifications, latest Technical Advisory Notes issued by RDSO, Indian Railway Schedule of Dimensions, various safety and policy circulars issued by WCR and the Indian Electricity Rules], and Good Industry Practice.

3.4.2 The Authority Engineer may, for reasons to be specified in writing, direct the Contractor to remove any member of the Contractor's or Sub-contractor's personnel from the Railway Project. Provided, any such direction issued by the Authority Engineer shall specify the reasons for the removal of such person.

3.4.3 The Contractor shall, on receiving a direction from the Authority Engineer under the provisions of Clause 3.4.2, ensure and procure the removal of such person or persons from the Railway Project with immediate effect. The Contractor shall further ensure that such persons have no further connection with the Railway Project.

3.4.4 The Contractor shall be responsible for the Security of the Work Site and for keeping the unauthorized persons off the Site.

3.5 Advertisement on Railway Project

The Contractor shall not use the Railway Project or any part thereof in any manner for branding or advertising purposes including for advertising any commercial product or services or companies.

3.6 Contractor's care of the Works

The Contractor shall bear full risk in and take full responsibility for the care of Works, and of Materials, goods and equipment for incorporation therein, on and from

the Appointed Date and until the date of Provisional Certificate, with respect to the Works completed prior to the issuance of the Provisional Certificate and/or Completion Certificate, with respect to the Works referred to in the Punch List, save and except to the extent that any such loss or damage shall have arisen from any default or neglect of the Authority.

3.7 Electricity, water and other services

The Contractor shall be responsible for procuring of all power, water and other services that it may require for the Railway Project.

3.8 Unforeseeable difficulties

Except as otherwise specified in the Agreement:

(a) the Contractor accepts complete responsibility for having foreseen all difficulties and costs of successfully completing the Works;

(b) the Contract Price shall not be adjusted to take account of any unforeseen difficulties or costs; and

(c) the Scheduled Completion Date shall not be adjusted to take account of any unforeseen difficulties or costs.

For the purposes of this Clause, unforeseeable difficulties include natural physical conditions including sub-surface and hydrological conditions which the Contractor encounters at the Site during execution of the Works.

3.9 Training of Authority's personnel

3.9.1 The Contractor shall provide and complete the training to the personnel of the Authority in diagnostic, trouble shooting, repairing, operation and maintenance of the signalling and telecommunication equipment. Training shall be provided only by certified personnel of the company with approved modules of KAVACH by IRISET Secunderabad.The number of persons to be trained shall not exceed 200 mandays. The training shall be completed before the issuance of the Provisional Certificate/ Completion Certificate. Before the issue of any handing-over certificate, the final O& M Manuals, wherever required, shall be submitted by the contractor to the Authority Engineer.

3.9.2 Deleted.

3.10 Safety at work site

The Contractor and its sub-contractors shall follow the safety instructions and take all safety measures for workmen and vehicles plying in the work area in accordance with Applicable Laws, Good Industry Practice and the provisions of this Agreement.

ARTICLE 4

OBLIGATIONS OF THE AUTHORITY

4.1 Obligations of the Authority

4.1.1 The Authority shall, at its own cost and expense, undertake, comply with and perform all its obligations set out in this Agreement or arising hereunder.

4.1.2 The Authority shall be responsible for the correctness of the Scope of the Project, Project Facilities, Specifications and Standards and the criteria for Testing of the completed Works.

4.1.3 The Authority shall, upon receiving the Performance Security under Clause 7.1.1, provide to the Contractor:

(a) the Right of Way in accordance with the provisions of Clauses 8.2 and 8.3 on no less than 95% (ninety five per cent)of core land length and 90% (ninety percent) of non-core land length of the total length of the Railway Project before appointed date;

(b) Deleted.

(c) Deleted.

4.1.4 In the event that (i) the Authority does not procure fulfilment of any or all of the obligations set forth in Clause 4.1.3 within the period specified in respect thereof, and (ii) the delay has not occurred as a result of breach of this Agreement by the Contractor or due to Force Majeure, the Authority shall pay to the Contractor Damages in a sum calculated in accordance with the provisions of Clause 8.3 of this Agreement and grant Time Extension in accordance with the provisions of Clause 10.4.

4.1.5 Notwithstanding anything to the contrary contained in this Agreement, the Parties expressly agree that the aggregate Damages payable by the Authority under Clauses 4.1.4,4.4.3, 8.3 and 9.2 shall not exceed 5% (five per cent) of the Contract Price. For the avoidance of doubt, the Damages payable by the Authority under the aforesaid Clauses shall not be additive if they arise concurrently from more than one cause but relate to the same part of the Railway Project.

4.1.6 The Authority agrees to provide support to the Contractor and undertakes to observe, comply with and perform, subject to and in accordance with the provisions of this Agreement and Applicable Laws, the following:

(a) upon written request from the Contractor, and subject to the Contractor complying with Applicable Laws, provide reasonable support to the Contractor in procuring Applicable Permits required from any Government Instrumentality for implementation of the Project;

(b) upon written request from the Contractor, provide reasonable assistance to the Contractor in obtaining access to all necessary infrastructure facilities and utilities, including water and electricity at rates and on terms no less

favourable than those generally available to commercial customers receiving substantially equivalent services;

(c) procure that no barriers that would have a material adverse effect on Works are erected or placed on or about the Railway Project by any Government Instrumentality or persons claiming through or under it, except for reasons of Emergency, national security or law and order;

(d) not do or omit to do any act, deed or thing which may in any manner is in violation of any of the provisions of this Agreement;

(e) support, cooperate with and facilitate the Contractor in the implementation of the Project in accordance with the provisions of this Agreement; and

(f) upon written request from the Contractor and subject to the provisions of Clause 3.3, provide reasonable assistance to the Contractor and any expatriate personnel of the Contractor or its Sub-contractors to obtain applicable visas and work permits for the purposes of discharge by the Contractor or its Sub-contractors of their obligations under this Agreement and the agreements with the Sub-contractors.

4.2 Maintenance and operation of the existing facilities

The Authority shall undertake the maintenance of the facilities existing prior to the Appointed Dateincluding railway lines, bridges, structures, electrical, signaling and communications works within the Right of Way.

4.3 Environmental and Forest Clearances

The Authority represents and warrants that the environmental and forest clearances of Land mentioned in clause 4.1.3 (a) will be obtained by the contractor. In the event of any delay, the Contractor shall be entitled to Time Extension for the period of such delay in accordance with the provisions of Clause 10.4 of this Agreement. For the avoidance of doubt, the present status of environmental and forest clearances is specified in Schedule-A.[5]

4.4 Machinery and equipment:

4.4.1 The Authority shall upon receiving a request from the Contractor, provide the machinery and equipment specified in Schedule P on payment of hire charges at the monthly rates specified therein. The Parties agree that the monthly rate for each machine or equipment shall be inclusive of fuel and all other operating charges, which shall be converted into daily rates taking a month comprising 25 (twenty five) working days. The Parties further agree that for each machinery or equipment:

[5] Deleted

(a) The charges shall be payable for a day even if a machine or equipment is used for less than 8 (eight) hours, so long as it has been placed at the disposal of the Contractor and has not been withdrawn;

(b) the daily rates shall be computed for a shift of 8 (eight) hours taken as one day. By way of illustration, if the machinery or equipment is used for 16 (sixteen) hours on any day, the charges payable shall be equal to twice the daily rate; and

[(c) for any machinery or equipment which can be used only during the period of a Power Block or Traffic Block, no payment shall be due or payable for the day on which such block is not provided to the Contractor.]

4.4.2 The Contractor shall by notice of at least three weeks convey to the Authority the particulars of the machinery and equipment required for each day of the following one month.

4.4.3 In the event that the Authority does not provide any machinery and equipment at the designated time in pursuance of the provisions of Clause 4.4.1, the Contractor shall be entitled to Damages in an amount equal twice the rates specified in Schedule-P. Provided further that the Contractor shall be entitled to Time Extension in accordance with the provisions of Clause 10.4 if the number of days for which the machinery has not been provided continuously exceeds 7 (seven) and/ or the total number of days of not providing the machinery exceed 15 (fifteen) days in a period of 03 months.[6]

[**4.5 Electricity transmission lines-**

~~The Authority shall procure the Applicable Permits and right of way for the erection, installation, and energisation of the transmission lines required for operating the Railway Project.~~]~~[7]~~

4.6 Disconnection for modification of existing signalling and telecommunication works

The Contractor shall on requirement of disconnection of a particular subsystem for modification in the existing signalling and telecommunication system at railway stations, level crossing gates and interlocked sections, inform the Authority Engineer by notice of at least one week of its readiness for commissioning and the Authority Engineer shall obtain the requisite approvals from the Authority for the required disconnections. All such work requiring disconnection of existing signalling systems shall be executed under supervision of Authority Engineer or his representative. The Parties expressly agree that in the event of any default in providing such disconnection, the Authority shall pay to the Contractor Damages at the rate of Rs.1,000 (Rupees one thousand) per day. The Contractor shall ensure that there is no interruption/ disturbance to operational circuits in such cases of modification of signalling and telecom systems.

---

[6] Delete.

[7] Delete.

[4.7 Provision of Power Blocks and Traffic Blocks

4.7.1 The Authority shall provide Power Block or Traffic Block or both to enable the Contractor to undertake the construction of overhead equipment, or such other work as may be determined by the Authority Engineer.

4.7.2 The Contractor shall, in consultation with the Authority Engineer, submit a weekly programme of Blocks, commencing from Monday, with a notice of at least 1 (one) week and the Authority Engineer shall convey the approved weekly programme to the Contractor no less than 3 (three) days prior to the start of such week.

4.7.3 The minimum period for which a Power Block or Traffic Block shall be provided to the Contractor shall not be less than two hours, period being counted from the time the track is placed at the disposal of the Contractor and until it is cleared by the Contractor. Provided, however, that a Power Block or Traffic Block, as the case may be, of shorter duration may be provided with mutual consent of the Parties.

4.7.4 The aggregate period of Power Block and Traffic Block to be provided to the Contractor during the Construction Period is specified in Schedule-O. The Contractor shall organise its work so as to complete all Construction Works within such aggregate period. However, this aggregate period may be increased by the Authority Engineer on Contractor's request, if the same is considered justified and reasonable under the prevailing circumstances.

4.7.5 In the event of any change in the schedule of Power Block or Traffic Block or both, as the case may be, the Authority shall inform the Contractor by a notice of not less than 24 (twenty four) hours. Provided, however, that no such notice shall be required in case of a breakdown, accident, law and order disturbance, natural calamity or any other unusual occurrence or Emergency.

4.7.6 In the event a Power Block or Traffic Block, as the case may be, is not provided for any day in accordance with the confirmed programme, the Contractor shall be compensated by providing an additional Power Block or Traffic Block of equal time during the same week or the following week. The Parties expressly agree that in the event of any default in providing such additional blocks for compensating the Contractor, the Authority shall pay to the Contractor Damages at the rate of Rs.1,000 (Rupees one thousand) per day for each hour which has not been provided as required hereunder and until such hour is provided during any of the 6 (six) following weeks.

4.7.7 The Contractor shall be entitled to undertake the Construction Works within the aggregate period specified in Schedule-O. Provided, however, that in the event the aggregate period utilised by the Contractor exceeds the period specified in Schedule-O and the extra time granted thereto under clause 4.7.4 if any, the Contractor shall pay to the Authority hourly charges at the rate specified therein.]

ARTICLE 5

REPRESENTATIONS AND WARRANTIES

5.1 Representations and warranties of the Contractor

The Contractor represents and warrants to the Authority that:

(a) it is duly organised and validly existing under the laws of India, and has full power and authority to execute and perform its obligations under this Agreement and to carry out the transactions contemplated hereby;

(b) it has taken all necessary corporate and other actions under Applicable Laws to authorise the execution and delivery of this Agreement and to validly exercise its rights and perform its obligations under this Agreement;

(c) this Agreement constitutes its legal, valid and binding obligation, enforceable against it in accordance with the terms hereof, and its obligations under this Agreement will be legally valid, binding and enforceable obligations against it in accordance with the terms hereof;

(d) it is subject to the laws of India, and hereby expressly and irrevocably waives any immunity in any jurisdiction in respect of this Agreement or matters arising there under including any obligation, liability or responsibility hereunder;

(e) the information furnished in the Bid and as updated on or before the date of this Agreement is true and accurate in all respects as on the date of this Agreement;

(f) the execution, delivery and performance of this Agreement will not conflict with, result in the breach of, constitute a default under, or accelerate performance required by any of the terms of its memorandum and articles of association or any Applicable Laws or any covenant, contract, agreement, arrangement, understanding, decree or order to which it is a party or by which it or any of its properties or assets is bound or affected;

(g) there are no actions, suits, proceedings, or investigations pending or, to its knowledge, threatened against it at law or in equity before any court or before any other judicial, quasi-judicial or other authority, the outcome of which may result in the breach of this Agreement or which individually or in the aggregate may result in any material impairment of its ability to perform any of its obligations under this Agreement;

(h) it has no knowledge of any violation or default with respect to any order, writ, injunction or decree of any court or any legally binding order of any Government Instrumentality which may result in any material adverse effect on its ability to perform its obligations under this Agreement and no fact or circumstance exists which may give rise to such proceedings that would adversely affect the performance of its obligations under this Agreement;

(i) it has complied with Applicable Laws in all material respects and has not been subject to any fines, penalties, injunctive relief or any other civil or criminal liabilities which in the aggregate have or may have a material adverse effect on its ability to perform its obligations under this Agreement;

(j) no representation or warranty by it contained herein or in any other document furnished by it to the Authority or to any Government Instrumentality in relation to Applicable Permits contains or will contain any untrue or misleading statement of material fact or omits or will omit to state a material fact necessary to make such representation or warranty not misleading;

(k) no sums, in cash or kind, have been paid or will be paid, by it or on its behalf, to any person by way of fees, commission or otherwise for securing the contract or entering into this Agreement or for influencing or attempting to influence any officer or employee of the Authority in connection therewith;

(l) all information provided by the {selected bidder/ members of the Consortium/Joint Venture} in response to the RFP or otherwise, is to the best of its knowledge and belief, true and accurate in all material respects; and

(m) nothing contained in this Agreement shall create any contractual relationship or obligation between the Authority and any Sub-contractors, designers, consultants or agents of the Contractor.

5.2 Representations and warranties of the Authority

The Authority represents and warrants to the Contractor that:

(a) it has full power and authority to execute, deliver and perform its obligations under this Agreement and to carry out the transactions contemplated herein and that it has taken all actions necessary to execute this Agreement, exercise its rights and perform its obligations, under this Agreement;

(b) it has taken all necessary actions under Applicable Laws to authorise the execution, delivery and performance of this Agreement;

(c) it has the financial standing and capacity to perform its obligations under this Agreement;

(d) this Agreement constitutes a legal, valid and binding obligation enforceable against it in accordance with the terms hereof;

(e) it has no knowledge of any violation or default with respect to any order, writ, injunction or any decree of any court or any legally binding order of any Government Instrumentality which may result in any material adverse effect on the Authority's ability to perform its obligations under this Agreement;

(f) it has complied with Applicable Laws in all material respects;

(g) it has good and valid right to the Site and has the power and authority to grant the Right of Way in respect thereof to the Contractor; and

(h) it shall have procured, as on the Appointed Date, Right of Way and environment clearances such that the Contractor can commence construction forthwith on 95% (ninety five percent) of the core land length and 90% of non-core land length of the Railway Project.

5.3 Disclosure

In the event that any occurrence or circumstance comes to the attention of either Party that renders any of its aforesaid representations or warranties untrue or incorrect, such Party shall immediately notify the other Party of the same. Such notification shall not have the effect of remedying any breach of the representation or warranty that has been found to be untrue or incorrect nor shall it adversely affect or waive any obligation of either Party under this Agreement.

ARTICLE 6

DISCLAIMER

6.1 Disclaimer

6.1.1 The Contractor acknowledges that prior to the execution of this Agreement, the Contractor has, after a complete and careful examination, made an independent evaluation of the Request for Proposal (RFP), Scope of the Project, Specifications and Standards, Site, local conditions, physical qualities of ground, subsoil and geology, traffic volumes, suitability and availability of access routes to the Site and all information provided by the Authority or obtained, procured or gathered otherwise, and has determined to its satisfaction the accuracy or otherwise thereof and the nature and extent of difficulties, risks and hazards as are likely to arise or may be faced by it in the course of performance of its obligations hereunder. Save as provided in Clause 4.1.2 and Clause 5.2, the Authority makes no representation whatsoever, express, implicit or otherwise, regarding the accuracy, adequacy, correctness, reliability and/or completeness of any assessment, assumptions, statement or information provided by it and the Contractor confirms that it shall have no claim whatsoever against the Authority in this regard.

6.1.2 The Contractor acknowledges and hereby accepts to have satisfied itself as to the correctness and sufficiency of the Contract Price.

6.1.3 The Contractor acknowledges and hereby accepts the risk of inadequacy, mistake or error in or relating to any of the matters set forth in Clause 6.1.1 above and hereby acknowledges and agrees that the Authority shall not be liable for the same in any manner whatsoever to the Contractor, or any person claiming through or under any of them, and shall not lead to any adjustment of Contract Price or Scheduled Completion Date.

6.1.4 The Parties agree that any mistake or error in or relating to any of the matters set forth in Clause 6.1.1 above shall not vitiate this Agreement, or render it voidable.

6.1.5 In the event that either Party becomes aware of any mistake or error relating to any of the matters set forth in Clause 6.1.1 above, that Party shall immediately notify the other Party, specifying the mistake or error.

6.1.6 Except as otherwise provided in this Agreement, all risks relating to the Project shall be borne by the Contractor; and the Authority shall not be liable in any manner for such risks or the consequences thereof.

Part III

Construction

ARTICLE 7

PERFORMANCE SECURITY

7.1 Performance Security[8]

7.1.1 Contractor shall, for the performance of its obligations hereunder, provide to the Authority, within 30(Thirty) days of issue of LOA, Performance security in the form of [Insurance Surety Bond*/ account payee demand draft/ fixed deposit receipt from a commercial bank/ online payment in an acceptable form/ an irrevocable and unconditional Bank Guarantee (the "**Performance Security**")], for an amount equal to 5% (five percent) of the Contract Price from a Bank in the form set forth in Annex-I/IA of Schedule-F

The Performance Security shall be valid until 60 (sixty) days of the expiry of the Defects Liability Period specified in Clause 15.1.1. Until such time the Performance Security is provided by the Contractor pursuant hereto and the same comes into effect, the 'Bid Security' shall remain in force and effect, and upon such provision of the Performance Security, the Authority shall release the Bid Security to the Contractor. For the avoidance of doubt, the Parties expressly agree that the Contractor shall provide, no later than 30 (thirty) days prior to the expiry of the Performance Security for the Defects Liability Period specified in Clause 15.1.1, a Performance Security in respect of the extended Defects Liability Period, as specified in Clause 15.1.2, for an amount equal to 5% Five percent of the estimated cost of the Structures, Important Bridges, if any, comprising a new technology not currently in use in the Railways and the interlocking and telecom switching equipment as specified in Schedule B.

***Note (In case PG in for of Insurance Surety Bond):**
In case of extension of Date of Completion, selected bidder needs to submit extended Insurance Surety Bond/Fresh Insurance Surety Bond/fresh Performance Security, in any form as given above, before expiry of existing Insurance Surety Bond.

7.1.2 Notwithstanding anything to the contrary contained in this Agreement, the Parties agree that in the event of failure of the Contractor to provide the Performance Security in accordance with the provisions of Clause 7.1.1 and within the time specified therein or such extended period as may be provided by the Authority, in accordance with the provisions of Clause 7.1.3, the Authority shall encash the Bid Security and appropriate the proceeds thereof as part-Damages, and thereupon all rights, privileges, claims and entitlements of the Contractor under or arising out of this Agreement shall be deemed to have been waived by, and to have ceased with the concurrence of the Contractor, and this Agreement shall be deemed to have been terminated by mutual agreement of the Parties along with further levy of the Liquidated Damages equivalent to the stipulated 'Performance Security', which shall be recoverable from contractor's pending/future dues with IR in any of the ongoing/future contracts.

7.1.3 In the event the Contractor fails to provide the Performance Security within 30 (Thirty) days of the issue of LOA as provided in Clause 7.1.1 above, the contractor

---

[8] Deleted

may seek extension of time for a period not exceeding a further 30(thirty) days on payment of damages for such extended period equivalent to a sum calculated at the rate of 0.01% (zero point zero one percent) of the Contract Price for each day until the Performance Security is provided.(i.e. from 31st day to 60th day).

7.2 Extension of Performance Security

The Contractor may initially provide the Performance Security for a period of [2 (two) years]; provided that it shall procure the extension of the validity of the Performance Security, as necessary, at least 2 (two) months prior to the date of expiry thereof. Upon the Contractor providing an extended Performance Security, the previous Performance Security shall be deemed to be released and the Authority shall return the same to the Contractor within a period of 7 (seven) business days from the date of submission of the extended Performance Security.

7.3 Appropriation of Performance Security

7.3.1 Upon occurrence of a Contractor Default, the Authority shall, without prejudice to its other rights and remedies hereunder or in law, be entitled to encash and appropriate from the Performance Security the amounts due to it as Damages for the Contractor Default.

7.3.2 Upon such encashment and appropriation from the Performance Security, the Contractor shall, within 30 (thirty) days thereof, replenish, in case of partial appropriation, to its original level the Performance Security, and in case of appropriation of the entire Performance Security provide a fresh Performance Security, as the case may be, and the Contractor shall, within the time so granted, replenish or furnish fresh Performance Security as aforesaid failing which the Authority shall be entitled to terminate the Agreement in accordance with Article 21. Upon such replenishment or furnishing of a fresh Performance Security, as the case may be, the Contractor shall be entitled to an additional Cure Period of 30 (thirty) days for remedying the Contractor Default, and in the event of the Contractor not curing its default within such Cure Period, the Authority shall be entitled to encash and appropriate such Performance Security as Damages, and to terminate this Agreement in accordance with Article 21.

7.4 Release of Performance Security

The Authority shall release the Performance Security within 60 (sixty) days of the expiry of the Defects Liability Period or the extended Defects Liability Period, as the case may be, under this Agreement. Notwithstanding the aforesaid, the Parties agree that the Authority shall not be obliged to release the Performance Security until all Defects identified during the Defects Liability Period or the extended Defects Liability Period, as the case may be, have been rectified.

7.5 Retention Money[9]

7.5.1 From every payment for Works due to the Contractor in accordance with the provisions of Clause 17.5, the Authority shall deduct 6% (six per cent) thereof as guarantee money for performance of the obligations of the Contractor during the Construction Period (the "**Retention Money**") subject to the condition that the

[9] Deleted

maximum amount of Retention Money shall not exceed 5% (five per cent) of the Contract Price.

7.5.2 Upon occurrence of a Contractor's Default, the Authority shall, without prejudice to its other rights and remedies hereunder or in law, be entitled to appropriate the relevant amounts from the Retention Money as Damages for such Contractor's Default.

7.5.3 The Contractor may, upon furnishing an irrevocable and unconditional bank guarantee substantially in the form provided at Annex-II of Schedule-For FDR/Insurance surety bonds, require the Authority to refund the Retention Money deducted by the Authority under the provisions of Clause 7.5.1. Provided that the refund hereunder shall be made in tranches of not less than 0.5% (zero point five percent) of the Contract Price. Further, the Retention money may be deposited as Bank Guarantee, issued by Scheduled commercial Bank or FDR/Insurance surety bonds after signing of Contract Agreement, but before payment of first payment bill. Provided further that validity of Bank Guarantee shall be extended from time to time depending upon extension of Contract granted.

7.5.4 Within 15 (fifteen) days of the date of issue of the Completion Certificate, the Authority shall discharge the bank guarantees, if any, furnished by the Contractor under the provisions of Clause 7.5.3 and refund the balance of Retention Money remaining with the Authority after adjusting the amounts appropriated under the provisions of Clause 7.5.2 and the amounts refunded under the provisions of Clause 7.5.3.

7.5.5 The Parties agree that in the event of Termination of this Agreement, the Retention Money and the bank guarantees specified in this Clause 7.5 shall be treated as if they are Performance Security and shall be reckoned as such for the purposes of Termination Payment under Clause 21.6.

7.6 **Maintenance Security**

7.6.1 Maintenance Security

7.6.1.1 The Contractor shall, for the performance of its obligations hereunder between the date of completion of Defects Liability Period and the Completion of Maintenance Period, provide to the Authority, no later than 30 (thirty) days prior to the completion of Defects Liability Period, an irrevocable and unconditional guarantee from a Bank for a sum equivalent to 5% of Capital cost of KAVACH equipments substantially in the form set forth in Schedule-F, Annex-I (the "Maintenance Security"), to be modified, mutatis mutandis, for this purpose. Until such time the Maintenance Security is provided by the Contractor pursuant hereto and the same comes into effect, the Performance Security shall remain in force and effect, and upon such provision of the Maintenance Security pursuant hereto, the Authority shall release the Performance Security to the Contractor.

7.6.1.2 Notwithstanding anything to the contrary contained in this Agreement, in the event Maintenance Security is not provided by the Contractor within the period specified in Clause 7.6.1.1, such failure shall be deemed to be a Contractor's Default and the

Authority shall be entitled to encash the Performance Security and appropriate the proceeds thereof as Damages, in accordance with the provisions of Clause 7.4.

7.6.2 Appropriation of Maintenance Security

Upon occurrence of a Contractor Default, the Authority shall, without prejudice to its other rights and remedies hereunder or in law, be entitled to encash and appropriate the Maintenance Security as Damages for such Contractor Default and to terminate this Agreement in accordance with Article 21.

7.6.3 Release of Maintenance Security

Subject to the Contractor not being in default under this Agreement, the Authority shall, no later than 30 (thirty) days from the Date of Completion of Maintenance Period, release the Maintenance Security.

7.6.4 The Parties expressly agree that the Contractor may furnish Maintenance Security valid for 2 (two) years at a time; provided that the Contractor shall, 2 (two) months prior to the expiry of such Maintenance Security, submit a new Maintenance Security valid for a further period of 2 (two) years and repeat the process hereunder until expiry of the Maintenance Period

ARTICLE 8

RIGHT OF WAY

8.1 The Site

The site of the Railway Project (the "**Site**") shall comprise the site described in Schedule-A in respect of which the Right of Way shall be provided by the Authority to the Contractor. The Authority shall be responsible for:

(a) acquiring and providing Right of Way on the Site in accordance with the [alignment plan, Longitudinal section, Yard Plans/ESP/SIP and electrification sectioning diagram] finalised by the Authority and attached with this document, free from all encroachments and encumbrances, and free access thereto for the execution of this Agreement;

[This Right of Way will not include completely free access to locations where working may affect safety of train traffic (i.e. relay room, locations boxes etc). In such cases, right of work will be arranged by the Authority Engineer on written request made by contractor at least 7 days in advance, if such request is reasonable.]

(b) Deleted.

8.2 Handing over of the Project Site

8.2.1 The Authority Representative and the Contractor shall, within 15 (fifteen) days of providing the Performance Security by the Contractor in accordance with the provisions of Clause 7.1, jointly inspect the Site and prepare a joint memorandum containing an inventory of the Site including the vacant and unencumbered land, buildings, structures, road/ railway works, trees and any other immovable property on or attached to the Site. Subject to the provisions of Clause 8.2.3, such memorandum shall have appended thereto an Appendix (the "**Appendix**") specifying in reasonable detail those parts of the Site to which vacant access and Right of Way has not been given to the Contractor. Signing of the memorandum, in 2 (two) counterparts (each of which shall constitute an original), by the authorised representatives of the Parties shall be deemed to constitute a valid evidence of handing over of the Right of Way to the Contractor for discharging its obligations under and in accordance with the provisions of this Agreement and for no other purpose whatsoever.

For the avoidance of doubt, the Parties agree that subject to the provisions of Clauses 8.2.2 and 8.2.3, whenever the Authority is ready to provide Right of Way for any part or parts of the Site included in the **"Appendix",** it shall by notice inform the Contractor, of the proposed date and time when the Authority Representative and the Contractor shall inspect the specified parts of the Site, and prepare a memorandum which shall be deemed to constitute a valid evidence of handing over of such Right of Way to the Contractor in accordance with the provisions of this Clause 8.2.1.

8.2.2 Notwithstanding anything to the contrary contained in this Clause 8.2, the Authority shall specify the parts of the Site, if any, for which Right of Way shall be provided to the Contractor on the dates specified in Schedule-A. Such parts shall also be included in the Appendix prepared in pursuance of Clause 8.2.1. For the avoidance of doubt, the Parties expressly agree that the Appendix shall in no event contain Sections of the

Railway Project the cumulative length of which exceeds 5% (Five per cent) of the core land length and 10 % (Ten percent) of the non-core land length of the Railway Project.

8.2.3 The Authority shall provide the Right of Way to the Contractor, in respect of the land included in the Appendix, by the date specified in Schedule-A for each part of the Site referred to therein, but in no case later than 180 (one hundred and eighty) days of the Appointed Date, and in the event of delay for any reason other than Force Majeure or breach of this Agreement by the Contractor, it shall pay to the Contractor, Damages in a sum calculated in accordance with Clause 8.3.

8.3 Damages for delay in handing over the Site

8.3.1 In the event the Right of Way to any part of the Site is not provided by the Authority on or before the date(s) specified in Clause 8.2 for any reason other than Force Majeure or breach of this Agreement by the Contractor, the Authority shall grant a suitable extension to time and no damages will be paid to the contractor.

In the event that any Damages are due and payable to the Contractor under the provisions of this Clause 8.3.1 for delay in providing the Right of Way, the Contractor shall, subject to the provisions of Clause 10.4, be entitled to Time Extension equal to the period for which the Damages have become due and payable under this Clause 8.3.1, save and except that:

(a) if any delays involve time overlaps, the overlaps shall not be additive; and

(b) such Time Extension shall be restricted only to the Works which are affected by the delay in providing the Right of Way.

For the avoidance of doubt, the Parties expressly agree that the Damages specified hereunder and the Time Extension specified in Clause 10.4 shall be restricted only to failure of the Authority to provide the Right of Way for and in respect of the width of the Site required for Works in accordance with the Good Industry Practice.

8.3.2 Notwithstanding anything to the contrary contained in this Agreement, the Contractor expressly agrees that Works on all parts of the Site for which Right of Way is granted within 180 (one hundred and eighty) days of the Appointed Date, or with respect to the parts of the Site provided in Schedule-A, no later than the date(s) specified therein, as the case may be, shall be completed before the Scheduled Completion Date and shall not qualify for any Time Extension under the provisions of Clause 8.3.1.

8.3.3 Notwithstanding anything to the contrary contained in this Agreement, the Authority may at any time withdraw any part of the Right of Way and the Works forming part of this Agreement, subject to such Works not exceeding an aggregate value, such value to be determined in accordance with Schedule-G, equal to 5% (five per cent) of the Contract Price.

Provided that if Right of Way has not been provided within 240 (two hundred and forty) days of the Appointed Date, for commencing construction on any part of the Site included in the Appendix, the affected Works shall be deemed to be withdrawn under the provisions of this Clause 8.3.3 unless the Parties agree to the contrary, and such Works shall not be computed for the purposes of the aforesaid ceiling of 5% (five per cent) of the Contract Price hereunder. For the avoidance of doubt, the

Parties agree that such deemed withdrawal of Works hereunder shall be without prejudice to the Contractor's entitlement to Damages under Clauses 4.1.4, 8.3 and 9.2.

8.3.4 In the event of withdrawal of Works under Clause 8.3.3, including deemed withdrawal of Works, the Contract Price shall be reduced by an amount equal to 95% (ninety five per cent) of the value of the Works withdrawn and the Contractor shall not be entitled to any other compensation or Damages for the withdrawal of Works, including their deemed withdrawal, save and except for Damages as provided under Clause 4.3.

Provided that if any Works are withdrawn after commencement of the Construction of such Works, the Authority shall pay to the Contractor 100% (one hundred) of the fair value of the work done, as assessed by the Authority Engineer:

8.4 Site to be free from Encumbrances

Subject to the provisions of Clause 8.2, the Site shall be made available by the Authority to the Contractor pursuant hereto free from all Encumbrances and occupations and without the Contractor being required to make any payment to the Authority on account of any costs, compensation, expenses and charges for the acquisition and use of such Site for the duration of the Project Completion Schedule. For the avoidance of doubt, it is agreed that the existing rights of way, easements, privileges, liberties and appurtenances to the Site shall not be deemed to be Encumbrances. It is further agreed that, unless otherwise specified in this Agreement, the Contractor accepts and undertakes to bear any and all risks arising out of the inadequacy or physical condition of the Site.

8.5 Protection of Site from encroachments

On and after signing the memorandum and/or subsequent memorandum referred to in Clause 8.2.1, and until the issue of the Provisional Certificate, the Contractor shall maintain a round-the-clock vigil over the Site and shall ensure and procure that no encroachment thereon takes place. During the Construction Period, the Contractor shall protect the Site from any and all occupations, encroachments or Encumbrances, and shall not place or create nor permit any Sub-contractor or other person claiming through or under the Agreement to place or create any Encumbrance or security interest over all or any part of the Site or the Project Assets, or on any rights of the Contractor therein or under this Agreement, save and except as otherwise expressly set forth in this Agreement. In the event of any encroachment or occupation on any part of the Site, the Contractor shall report such encroachment or occupation forthwith to the Authority and undertake its removal at its own cost and expenses.

8.6 Special/temporary Right of Way

The Contractor shall bear all costs and charges for any special or temporary right of way required by it in connection with access to the Site. The Contractor shall obtain at its cost such facilities on or outside the Site as may be required by it for the purposes of the Railway Project and the performance of its obligations under this Agreement.

8.7 Access to the Authority and the Authority Engineer

8.7.1 The Right of Way given to the Contractor hereunder shall always be subject to the right of access of the Authority and the Authority Engineer and their employees and agents for inspection, viewing and exercise of their rights and performance of their obligations under this Agreement.

8.7.2 The Contractor shall ensure, subject to all relevant safety procedures, that the Authority has unrestricted access to the Site during any Emergency.

8.8 Geological and archaeological finds

It is expressly agreed that mining, geological or archaeological rights do not form part of this Agreement with the Contractor for the Works, and the Contractor hereby acknowledges that it shall not have any mining rights or interest in the underlying minerals, fossils, antiquities, structures or other remnants or things either of particular geological or archaeological interest and that such rights, interest and property on or under the Site shall vest in and belong to the Authority or the concerned Government Instrumentality. The Contractor shall take all reasonable precautions to prevent its workmen or any other person from removing or damaging such interest or property and shall inform the Authority forthwith of the discovery thereof and comply with such instructions as the Authority or the concerned Government Instrumentality may reasonably give for the removal of such property. For the avoidance of doubt, it is agreed that any reasonable expenses incurred by the Contractor hereunder shall be reimbursed by the Authority. It is also agreed that the Authority shall procure that the instructions hereunder are issued by the concerned Government Instrumentality within a reasonable period.

ARTICLE 9

UTILITIES AND TREES

9.1 Existing utilities and roads

Notwithstanding anything to the contrary contained herein, the Contractor shall ensure that the respective entities owning the existing roads, right of way, level crossings, structures, or utilities on, under or above the Site are enabled by it to keep them in continuous satisfactory use, if necessary, by providing suitable temporary diversions with the authority of the controlling body of that road, right of way or utility.

9.1.1 The works of shifting of utility (ies) owned by Railways and already communicated to Contractor as part of Tender document shall be part of schedule-G. The contractor shall have to conduct the inspection/investigation of the utilities before execution of the work independently.

9.1.2 Diversion of utility(ies) not owned by Railways or not communicated to Contractor as part of Tender document shall be payable under BOQ items of relevant Schedule-G1

9.1.3 The contractor shall have to conduct the inspection/investigation of the utilities before execution of the work independently.

9.2 Shifting of obstructing utilities

9.2.1 The Contractor shall, in accordance with Applicable Laws and with the proactive support & assistance of the Authority, cause shifting of utility (ies) as per 9.1.2 (including electric lines, water pipes and telephone cables) to an appropriate location or alignment, if such utility or obstruction adversely affects/ infringes the execution of Works in accordance with this Agreement. The utilities are to be diverted with proper liaison and approval of the utility owning agencies. NOC & Approval of schemes of Diversion of Utilities from the concerned regulatory /statutory / Local Authority is the responsibility of the Contractor. Cost of such utility shifting unless otherwise specified will be paid separately under relevant item of BOQ (Schedule G1B). No claim on account of delay in execution of utility diversion will be entertained.

9.2.2 For the existing utilities owned by Railways, where the shifting thereof can take place only after certain works for enabling its shifting have been completed by the Contractor, the Authority shall, undertake and complete its shifting within 180 (one hundred and eighty) days after the Contractor has notified the Authority of the completion of the enabling works. In the event of delay in shifting the utility, beyond the aforesaid period of 180 (one hundred and eighty) days, the Contractor shall be entitled to Damages for the period of delay in accordance with the provisions of this Clause 9.2.1.

9.2.3 The utilities which are not to be diverted, proper supporting shall be done to prevent any damage. No payment shall however be made for supporting and protecting the utilities during execution of the work. All temporary diversion of any utilities done to facilitate the construction activity shall be the part of the schedule G.

9.3 New utilities

9.3.1 The Contractor shall allow, subject to such conditions as the Authority may specify, access to, and use of the Site for laying telephone lines, water pipes, electric cables or other public utilities. Where such access or use causes any financial loss to the Contractor, it may require the user of the Site to pay compensation or damages as per Applicable Laws. For the avoidance of doubt, it is agreed that use of the Site under this Clause 9.3 shall not in any manner relieve the Contractor of its obligation to construct and maintain the Railway Project in accordance with this Agreement and any damage caused by such use shall be restored forthwith at the cost of the Authority.

9.3.2 In the event the construction of any Works is affected by a new utility or works undertaken in accordance with this Clause 9.3, the Contractor shall be entitled to a reasonable Time Extension in accordance with Clause 10.4 for and in respect of the part(s) of the Works affected by such delay; provided that if the delays involve any time overlaps, the overlaps shall not be additive.

9.4 Felling of trees

The Authority shall obtain the Applicable Permits for felling of trees to be identified by the Authority for this purpose if and only if such trees cause a Material Adverse Effect on the construction of the Railway Project. The cost of such felling and of the compensatory plantation of trees, if any, shall be borne by the Authority. In the event of any delay in felling thereof for reasons beyond the control of the Contractor; it shall be excused for failure to perform any part of its obligations hereunder if such failure is a direct consequence of delay in the felling of trees. The Parties hereto agree that the felled trees shall be deemed to be owned by the Authority and shall be disposed in such manner and subject to such conditions as the Authority may in its sole discretion deem appropriate. For the avoidance of doubt, the Parties agree that if any felling of trees hereunder is in a forest area, the Applicable Permit thereof shall be procured by the Authority within the time specified in the Agreement; and for any period of delay in providing the Applicable Permits, the Contractor shall be entitled to Damages and Time Extension as provided under Clause 9.2.1.

ARTICLE 10

DESIGN AND CONSTRUCTION OF THE RAILWAY PROJECT

10.1 Obligations prior to commencement of Works

10.1.1 Within 20 (twenty) days of the Appointed Date, the Contractor shall:

(a) appoint its representative, duly authorised to deal with the Authority in respect of all matters under or arising out of or relating to this Agreement;

(b) appoint a design director (the "**Design Director**") who will head the Contractor's design unit and shall be responsible for surveys, investigations, collection of data, and preparation of preliminary and detailed designs;

(c) undertake and perform all such acts, deeds and things as may be necessary or required before commencement of Works under and in accordance with this Agreement, Applicable Laws and Applicable Permits; and

(d) make its own arrangements for quarrying and procurement of materials needed for the Railway Project under and in accordance with Applicable Laws and Applicable Permits.

10.1.2 The Authority shall, within 15 (fifteen) days of the date of this Agreement, appoint an engineer (the "**Authority Engineer**") to discharge the functions and duties specified in this Agreement, and shall notify to the Contractor the name, address and the date of appointment of the Authority Engineer forthwith.

10.1.3 Within 30 (thirty) days of the Appointed Date, the Contractor shall submit to the Authority and the Authority Engineer a programme/CPM Charts & Bar Charts (the "**a Resource loaded Programme**"**)** for construction of Works, developed using networking techniques and giving the following details:

Part I Contractor's organisation for the Project, the project execution plan indicating arrangements for design and construction i.e. engagement of design consultants, project phasing and sub-contracting etc., environmental management plan, Quality Assurance Plan including design quality plan, traffic management and safety plan covering safety of users and workers during construction, Contractor's key personnel, and equipment.

In case of non- submission of documents beyond 30 days from appointed dat e the damages shall be imposed as under –

a) QAP which includes design quality plan, MTP, ITP etc. @ Rs. 25,00 0/- per day
b) Environmental management plan @ Rs. 10,000/- per day
c) Method Statement @ Rs. 10000/- per method statement per day.

Part II Programme for completion of all stages of construction given in Schedule-G and Project Milestones of the Works as specified in Project Completion Schedule set forth in Schedule-I. The Programme shall include:

(a) the order in which the Contractor intends to carry out the Works, including the anticipated timing of design and stages of Works;

(b) the periods for reviews under Clause 10.2; and

(c) the sequence and timing of inspections and tests specified in this Agreement.

The Contractor shall submit a revised programme whenever the previous programme is inconsistent with the actual progress or with the Contractor's obligations.

Part III Monthly cash flow forecast for the Project

Provided, however, that the Authority may, within a period of 21 (twenty-one) days of receipt of the Programme, convey its comments to the Contractor stating the modifications, if any, required for compliance with the provisions of this Agreement, and the Contractor shall carry out such modifications, to the extent required for conforming with the provisions of this Agreement.

Part IV Monthly account of resources (Men and Machinery) proposed to be deployed to complete the milestone/contract in specified time. Failure to deploy the resources will make contractor liable for penalty as decided by authority. The penalties so recovered can be refunded if the contractor make good the resources and achieve next milestone.

The Contractor shall submit a revised resource loaded programme whenever the previous programme is inconsistent with the actual progress or with the Contractor's obligation.

10.1.4 The Contractor shall plan the project work by keeping Schedule-G and G1 into consideration in order to maximise the cash flow and progress. However, the Authority Engineer may modify/break up any of the stage payment schedule (payment milestones) during execution if the same is considered essential to speed up the progress or if the contractor is not able to achieve a particular payment milestone due to the reasons/delays attributable to the Authority or due to the factors beyond the control of Contractor or to any unforeseen circumstances.

10.1.5 Procurement of items should be planned by the Contractor in consultation with the Authority Engineer. Procurement plan should be prepared in such a manner that those materials which have limited shelf life may be procured in a staggered manner so that materials are utilised/consumed well before its expiry. If the material/product does not remain of required specifications at the time of its actual use, the same will be replaced by the Contractor with materials confirming to Specifications at his own cost.

10.2 Design and Drawings

10.2.1 Design and Drawings shall be developed in conformity with the Specifications and Standards set forth in Schedule-D. In the event, the Contractor requires any relaxation in design standards due to restricted Right of Way in any section or unforeseen issues, the alternative design criteria for such section shall be provided for review/approval of the Authority Engineer.

10.2.1A In case Contractor is not having in house design team then - The Contractor shall appoint a "Design Consultant" at its cost after proposing to the Authority a panel of 3 (three) names of qualified, reputed and experienced firms and Authority will select one Design Consultant from the above panel, provided, however, that if none of the name proposed in the panel is acceptable to the Authority and the reasons for the same are furnished to the Contractor, the Contactor shall propose to the Authority a revised panel of 3 (three) more names for obtaining the consent of the Authority. The Contractor shall also obtain the consent of the Authority for two key personnel of the Design Consultant who shall have adequate experience and qualifications with respect to the main components of the Railway Project. The Authority shall, within 30 (thirty) days of receiving a panel from the Contractor, either convey its decision with reasons, to the Contractor, and if no such decision is conveyed within the said period, the Contractor may proceed with engaging of the Design Consultant of its own choice. For the avoidance of doubt, the Parties agree that no firm or person having any conflict of interest shall be engaged for this purpose. The Parties further agree that any assignments completed at least three years prior to the appointment hereunder shall not be reckoned for the purposes of conflict of interest.

10.2.2 The Contractor shall appoint a proof checking consultant at its cost (the "**Proof Consultant**"). Contractor shall submit the panel of 3 names within 30 days of Appointed date to the Authority Engineer. After proposing to the Authority a panel of 3 (three) names of qualified, reputed and experienced firms, the Authority will select one Proof Consultant from the above panel, provided, however, that if none of the name proposed in the panel is acceptable to the Authority and the reasons for the same are furnished to the Contractor, the Contactor shall propose to the Authority a revised panel of 3 (three)more names for obtaining the consent of the Authority. The Contractor shall also obtain the consent of the Authority for two key personnel of the Proof Consultant who shall have adequate experience and qualifications with respect to the main components of the Railway Project. The Authority shall, within 30(thirty) days of receiving a panel from the Contractor, either convey its decision with reasons, to the Contractor, and if no such decision is conveyed within the said period, the Contractor may proceed with engaging of the Proof Consultant of its own choice. For the avoidance of doubt, the Parties agree that no firm or person having any conflict of interest shall be engaged for this purpose. The Parties further agree that any assignments completed at least three years prior to the appointment hereunder shall not be reckoned for the purposes of conflict of interest.

10.2.3 The Proof Consultant shall:

(a) evolve a systems approach with the Design Director so as to minimise the time required for approval of final designs and construction drawings; and

(b) examine the designs expeditiously and wherever necessary raise observations/ seek clarifications etc. as deemed appropriate and refer back the drawings within 15 days for rectifications/clarifications, and finally proof check and endorse/counter-sign the detailed calculations, drawings and designs, which have been approved by the Design Director.

10.2.4 In respect of the route control chart, the following shall apply:

(a) Route control chart

(i) The Contractor shall prepare and submit to the Authority Engineer all route control charts conforming to the ESP/SIPs, within a period of 3 (three) months from the Appointed Date;

(ii) The Authority Engineer shall review the route control chart within two weeks and submit it with its comments to the Authority for its approval; and

(iii) The Authority shall communicate the route control chart as approved by it within a period not exceeding 2(two) months from the date of submission of the route control chart by the Contractor. Such period of two months shall exclude any time that is taken by the Contractor in providing clarifications or modifications in response to any communication from the Authority.

10.2.5 In the event of delay by the Contractor in submitting the signalling interlocking plan or route control chart, as the case may be, within the period specified in Clause 10.2.4 for any reason other than Force Majeure or breach of this agreement by the Authority, the Contractor shall pay Damages to the Authority in a sum equal to 0.01% (zero point zero one percent) of the Contract Price for each day of delay.

10.2.6 In the event of delay by the Authority in providing to the Contractor the approved signalling interlocking plan or route control chart as the case may be, within the period specified in Clause 10.2.4 for any reason other than Force Majeure or breach of this Agreement by the Contractor, the Authority shall pay Damages to the Contractor in a sum equal to 0.01% (zero point zero one percent) of the Contract Price for each day of delay, and shall also grant Time Extension in accordance with the provisions of Clause 10.4.

10.2.7 In regard to Contractor's obligations with respect to the design and Drawings of the Railway Project as set forth in Schedule-H, the following shall apply:

(a) The Contractor shall prepare and submit, with reasonable promptness and in such sequence as is consistent with the Project Completion Schedule, 3 (three) copies each of the design and necessary Drawings, duly approved/signed by the Design Director and certified/signed by the Proof Consultant, to the Authority Engineer for review. Provided, however, that in respect of Important Bridges, Major Bridges, Structures, railway stations and yards, the Authority Engineer may require additional drawings for its review in accordance with Good Industry Practice;

(b) by submitting the Drawings for review to the Authority Engineer, the Contractor shall be deemed to have represented that it has determined and verified that the design and Drawings are in conformity with stipulated Specifications and Standards, the Applicable Laws, statutory stipulations and Good Industry Practice;

(c) within 21 (twenty one) days of the receipt of the Drawings, the Authority Engineer shall review the same and convey its observations to the Contractor with particular reference to their conformity or otherwise with the Scope of the Project and the Specifications and Standards. Beyond the said period of 21 (twenty one) days, the Contractor shall not be obliged to await the observations of the Authority Engineer on the Drawings submitted pursuant

hereto and may begin or continue Works at its own discretion and risk; Provided, however, that in case of Important Bridges, Major Bridges, Structures, interlocking and telecom switching equipment and any other specified item the aforesaid period of 21 (twenty one) days may be extended as per the time limit as indicated in Annexure-II of Schedule-D;

(d) if the aforesaid observations of the Authority Engineer indicate that the Drawings are not in conformity with the Scope of the Project or the Specifications and Standards, such Drawings shall be revised by the Contractor in conformity with the provisions of this Agreement and resubmitted to the Authority Engineer for review. The Authority Engineer shall give its observations, if any, within 10 (ten) days of receipt of the revised Drawings. In the event the Contractor fails to revise and resubmit such Drawings to the Authority Engineer for review as aforesaid, the Authority Engineer may cause the payment for the affected works to be withheld under and in accordance with the provisions of Clause 17.5.4. If the Contractor disputes any decision, direction or determination of the Authority Engineer hereunder, the Dispute shall be resolved in accordance with the Dispute Resolution Procedure;

(e) no review and/or observation of the Authority Engineer and/or its failure to review and/or convey its observations on any Drawings shall relieve the Contractor of its obligations and liabilities under this Agreement in any manner nor shall the Authority Engineer or the Authority be liable for the same in any manner; and if errors, omissions, ambiguities, inconsistencies, inadequacies or other Defects are found in the Drawings, they shall, along with the affected Works, be corrected at the Contractor's cost, notwithstanding any review under this Article 10;

(f) the Contractor shall be responsible for delays in submitting the Drawings, as set forth in Schedule-H, caused by reason of delays in surveys and field investigations, and shall not be entitled to seek any relief in respect thereof from the Authority; and

(g) the Contractor warrants that its designers, including any third parties engaged by it, shall have the required experience and capability in accordance with Good Industry Practice and it shall indemnify the Authority against any damage, expense, liability, loss or claim, which the Authority might incur, sustain or be subject to arising from any breach of the Contractor's design responsibility and/or warranty as set out in this Clause.

10.2.8 Any cost or delay in construction arising from the review by the Authority Engineer shall be borne by the Contractor.

10.2.9 Works shall be executed in accordance with the Drawings provided by the Contractor in accordance with the provisions of this Clause 10.2 and the observations of the Authority Engineer thereon as communicated pursuant to the provisions of Clause 10.2.7. Such Drawings shall not be amended or altered without prior written notice to the Authority Engineer. If a Party becomes aware of an error or defect of a technical nature in the design or Drawings, that Party shall promptly give notice to the other Party of such error or defect.

10.2.10 Within 90 (ninety) days of the Project Completion Date, the Contractor shall furnish to the Authority and the Authority Engineer a complete set of as-built Drawings, in 2

(two) hard copies and in its editable digital format or in such other medium or manner as may be acceptable to the Authority, including an as-built survey illustrating the layout of the Railway Project and setback lines, if any, of the buildings and structures forming part of Project Facilities, and shall hand them over to the Authority against receipt thereof.

10.2.11 The Contractor shall also appoint a safety consultant (the "**Safety Consultant**"), at its own cost, contractor shall submit the panel within 30 days of Appointed date to the Authority Engineer, after proposing to the Authority a panel of 3 (three) names of qualified and experienced consultants having minimum 10 years experience in ensuring safety at work site from whom the Authority may choose 1 (one) to be the Safety Consultant. Provided, however, that if the panel is not acceptable to the Authority and the reasons for the same are furnished to the Contractor, the Contractor shall propose to the Authority a revised panel of 3 (three) names for obtaining the consent of the Authority. The Contractor shall also obtain the consent of the Authority for additional two key personnel of the Safety Consultant who shall have at least 5 years experience in ensuring safety at work site. The Authority shall, within 15 (fifteen) days of receiving a proposal from the Contractor hereunder, convey its decision, with reasons, to the Contractor, and if no such decision is conveyed within the said period, the Contractor may proceed with engaging of the Safety Consultant. The Safety Consultant shall:

(a) evolve a system approach for undertaking a safety audit of the Railway Project during construction phase ; and

(b) proof check the detailed safety plan covering all aspects of including safety of Users, workers and equipment.

10.3 Construction of the Railway Project

10.3.1 The Contractor shall construct the Railway Project as specified in Schedule-B and Schedule-C, and in conformity with the Specifications and Standards set forth in Schedule-D. The Contractor shall be responsible for the correct positioning of all parts of the Works, and shall rectify any error in the positions, levels, dimensions or alignment of the Works. For works involving existing yards, the non-interlocking programme for each yard shall be drawn by the Authority Engineer and provided to the Contractor. The Contractor and the Authority Engineer, within a period of 30 days, will discuss the same and issue a jointly agreed NI programme. The execution of work during the non-interlocking period will be the responsibility of the Contractor. The work during non-interlocking period in yards will be executed directly under the supervision of Railways, however, the timely completion of NI working will be the responsibility of the Contractor. The 960th (nine hundred sixteeth) day from the Appointed Date shall be the scheduled completion date (the "**Scheduled Completion Date**") and the Contractor agrees and undertakes that the construction shall be completed on or before the Scheduled Completion Date, including any extension thereof, in which case the Scheduled Completion Date will be the extended date as per the time extension granted.

10.3.2 The Contractor shall construct the Railway Project in accordance with the Project Completion Schedule set forth in Schedule-I. In the event that the Contractor fails to achieve any Project Milestone or the Scheduled Completion Date within a period of 30 (thirty) days from the date set forth in Schedule-I, unless such failure has occurred due to Force Majeure or for reasons attributable to the Authority, it shall pay

Damages to the Authority in a sum calculated at the rate of 0.05% (zero point zero five per cent)of the Contract Price for delay of each day reckoned from the date specified in Schedule - I and until such Project Milestone is achieved or the Works are completed; provided that if the period for any or all Project Milestones or the Scheduled Completion Date is extended in accordance with the provisions of this Agreement, the dates set forth in Schedule-I shall be deemed to be modified accordingly and the provisions of this Agreement shall apply as if Schedule-I has been amended as above; provided further that in the event the Works are completed within or before the Scheduled Completion Date including any Time Extension, the Damages paid under this Clause 10.3.2 shall be refunded by the Authority to the Contractor, but without any interest thereon. For the avoidance of doubt, it is agreed that recovery of Damages under this Clause 10.3.2 shall be without prejudice to the rights of the Authority under this Agreement including the right of Termination thereof. The Parties further agree that Time Extension hereunder shall only be reckoned for and in respect of the affected Works as specified in Clause 10.4.2.

However, Authority may consider the request of contractor to defer the recovery of these damages if the same is considered essential to maintain the progress of work. The contractor shall submit a resource loaded plan to make good the delay and achieve next Milestone.

10.3.3 The Authority shall notify the Contractor of its decision to impose Damages in pursuance of the provisions of this Clause 10.3. Provided, however, that no deduction on account of Damages shall be effected by the Authority without taking into consideration the representation, if any, made by the Contractor within 20 (twenty) days of such notice. The Parties expressly agree that the total amount of Damages under Clause 10.3.2 shall not exceed 10% (ten percent) of the Contract Price.

10.3.4 Certain works, which are executed in the vicinity of running track, may require prior sanction of Commissioner of Railway Safety (CRS)/GM/ PCSTE and Electrical Inspector to the Government (EIG)/ Railway Authority(as required) before execution of such works are taken up by the Contractor. Authority Engineer will advise such works to the Contractor. The Contractor shall be responsible to prepare and submit applications to Authority Engineer for obtaining sanction of CRS)/GM/ PCSTE and Electrical Inspector to the Government (EIG)/ Railway Authority(as required) at least 60 (sixty) days in advance of commencing a work that requires prior sanction of CRS)/GM/ PCSTE and Electrical Inspector to the Government (EIG)/ Railway Authority(as required).

10.4 Extension of time for completion

10.4.1 Without prejudice to any other provision of this Agreement for and in respect of extension of time, the Contractor shall be entitled to extension of time in the Project Completion Schedule (the "**Time Extension**") to the extent that completion of any Project Milestone is or will be delayed by any of the following, namely:

(a) delay in providing the Right of Way, approval of GAD by Railway Authorities or signalling interlocking plan and route control chart in accordance with the provisions of this Agreement;

(b) Change of Scope, unless an adjustment to the Scheduled Completion Date has been agreed under Article 13;

(c) occurrence of a Force Majeure Event;

(d) any delay, impediment or prevention caused by or attributable to the Authority, the Authority's personnel or the Authority's other contractors on the Site; and

(e) any other cause or delay which entitles the Contractor to Time Extension in accordance with the provisions of this Agreement.

10.4.2 The Contractor shall, no later than 30 (thirty) business days from the occurrence of an event or circumstance specified in Clause 10.4.1, inform the Authority Engineer by notice in writing, with a copy to the Authority, stating in reasonable detail with supporting particulars, the event or circumstances giving rise to the claim for Time Extension in accordance with the provisions of this Agreement. Provided that the period of 15 (fifteen) business days shall be calculated from the date on which the Contractor became aware, or should have become aware, of the occurrence of such an event or circumstance.

Provided further that notwithstanding anything to the contrary contained in this Agreement, Time Extension shall be due and applicable only for the Works which are affected by the aforesaid events or circumstances and shall not in any manner affect the Project Completion Schedule for and in respect of the Works which are not affected thereby.

10.4.3 In the event of the failure of the Contractor to issue to the Authority Engineer a notice in accordance with the provisions of Clause 10.4.2 within the time specified therein, the Contractor shall not be entitled to any Time Extension and shall forfeit its right for any such claims in future. For the avoidance of doubt, in the event of failure of the Contractor to issue notice as specified in this Clause 10.4.3, the Authority shall be discharged from all liability in connection with the claim.

10.4.4 The Authority Engineer shall, on receipt of a claim in accordance with the provisions of Clause 10.4.2, examine the claim expeditiously within the time frame specified herein. In the event the Authority Engineer requires any clarifications to examine the claim, the Authority Engineer shall seek the same within 15 (fifteen) days from the date of receiving the claim. The Contractor shall, on the receipt of the communication of the Authority Engineer requesting for clarification, furnish the same to the Authority Engineer within 10 (ten) days thereof. The Authority Engineer shall, within a period of 30 (thirty) days from the date of receipt of such clarifications, forward in writing to the Contractor its determination of Time Extension. For the avoidance of doubt, the Parties agree that the Authority Engineer shall, in accordance with the provisions of this Agreement, notify the Contractor of the aforesaid Time Extension no later than 30 (thirty) days from the date of receipt of the Contractor's claim for Time Extension or the date of receipt of the clarification from the Contractor, as the case may be.

Provided that when determining each extension of time under this Clause 10.4, the Authority Engineer shall review previous determinations and may increase, but shall not decrease, the total Time Extension.

10.4.5 If the event or circumstance giving rise to the notice has a continuing effect:

(a) the detailed claim shall be considered as interim;

(b) the Contractor shall, no later than 10 (ten) days after the close of each month, send further interim claims specifying the accumulated delay, the extension of

time claimed, and such further particulars as the Authority Engineer may reasonably require; and

(c) the Contractor shall send a final claim within 30 (thirty) days after the effect of the event or the circumstance ceases.

Upon receipt of the claim hereunder, the Authority Engineer shall examine and determine the same in accordance with the provisions of Clause 10.4.4 within a period of 30 (thirty) days of the receipt thereof.

10.5 Incomplete Works

In the event the Contractor fails to complete the Works in accordance with the Project Completion Schedule, including any Time Extension granted under this Agreement, the Contractor shall endeavour to complete the balance work expeditiously and shall pay Damages to the Authority in accordance with the provisions of Clause 10.3.2 for delay of each day until the Works are completed in accordance with the provisions of this Agreement. Recovery of Damages under this Clause shall be without prejudice to the rights of the Authority under this Agreement including the right to termination under Clause 21.1.

10.6 Equipment specific Maintenance Manual

No later than 90 (ninety) days prior to the Project Completion Date, the Contractor shall, in consultation with the Authority Engineer, evolve an equipment specific maintenance manual for equipment based on a new technology not currently in use in the Railways (the "**Maintenance Manual**") for the regular operation and maintenance of such equipment in conformity with safety requirements, Good Industry Practice and manufacturer's manuals and instructions and shall provide 10 (ten) hard copies and 2 (two) compact discs thereof to the Authority Engineer.

ARTICLE 11

QUALITY ASSURANCE, MONITORING 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, Quality Assurance Plan (the "**Quality Assurance Plan**" or "**QAP**"), Material Testing Plan (the "**Material Testing Plan**" or "**MTP**") and Method Statements for execution of works (the "**Method Statements** " or "**MS**") in consultation of Authority Engineer.

11.2.2 The Contractor shall, within 30 (thirty) days of the Appointed Date, submit to the Authority Engineer its Quality Control Mechanism, QAP, MTP and MS which shall include the following:

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

(b) quality control mechanism including sampling and testing of Materials, tests required during the execution of works and frequencies by Contractor and Authority Engineer, 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. The Contractor shall carry out internal audits of the Quality management System regulary, and at least once every 6 months. The Contractor shall submit to the Engineer a report listing the results of each internal audit within 7 days of completion. Each report shall include, where appropriate, the proposed measures to improve and/or rectify the Quality Management System and/or its implementation.

The Authority 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.

11.2.3 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 Project Assets, Materials and workmanship in accordance with the Quality Assurance Plan.

11.2.4 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 any construction activity, submit to the Authority Engineer for review the Method Statement proposed to be adopted for executing the Work, giving details of inspection checklist, quality parameters, equipment to be deployed, traffic management and measures for ensuring safety. The Authority 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 method statement from the Contractor. The Contractor shall revise the method statements by incorporating these comments or else will advise the Authority Engineer reasons for not/partially including the same.

11.4 Inspection and technical audit 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 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 and maintenance period, 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 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. Notwithstanding anything contained in this Clause 11.5, the external technical audit shall not affect any obligations of the Contractor or the Authority Engineer under this Agreement.

11.6 Inspection of construction records

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

11.7 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 Engineer a monthly report on the progress of Works and shall promptly give such other relevant information as may be required by the Authority Engineer along with all resources deployed and all problems faced during work.

11.8 Inspection

11.8.1 The Authority 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.

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

11.8.3 The Authority 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 Engineer shall not relieve or absolve the Contractor of its obligations and liabilities under this Agreement in any manner whatsoever.

11.8.4 **Inspection conditions for S&T items:**

(a) All items having RDSO/IRS Specifications and RDSO approved Vendors, must be procured from RDSO approved vendors after RDSO inspection only.

(b) All items having RDSO/IRS Specifications and RDSO approved Developmental Vendors only, must be procured from RDSO approved Developmental vendors after RDSO inspection only.

(c) Critical items will be inspected by RDSO as mentioned in RDSO's letter No. 99/RS (IC)/165/SRC Pt 1. Dated 06.03.2012.

(d) Items not covered under a, b & c above shall be inspected by Third Party Inspection (TPI) Agencies

(e) Instructions regarding TPI agencies as given vide RB's letter No. 2022/RS(G)/779/8 dated:04.01.2023 shall be applied on Third Party Inspections.

(f) Inspection Charges of RDSO inspection and Third Party Agency Inspection shall be borne by Railways.

(g) Inspecting agencies can be changed only in special circumstances with the approval of Tender Accepting Authority (TAA).

(h) Necessary materials, tools, labour, and assistance for any test/examination in connection with the inspection shall be provided by the Vendor at their own cost.

(i) If facilities for the tests are inadequate/not available within the Vendor/OEM premise, then the Authorized Inspector may have the relevant tests done at a suitable laboratory outside the Vendor/OEM premise. In such cases, the cost of testing of the laboratory shall be borne by the Vendor/OEM by direct payment to the laboratory. The cost of transport of samples and any other incidental cost shall also be borne by the Vendor/OEM.

11.9 Samples

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

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

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

11.10 Tests

11.10.1 For determining that the Works conform to the Specifications and Standards, the Authority 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 submit the schedule for performing such tests to the Authority Engineer well in advance and not less than 7 days prior to conducting such tests. The Contractor shall, with due diligence, carry out all the tests in accordance with the Agreement and furnish the results thereof to the Authority 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 Engineer or his authorised representative may witness or participate in such tests conducted or cause to be conducted by the Contractor. Documentation of test records to be maintained by Contractor and Authority Engineer or his authorised representative shall scrutinize 100% Testing records of all tests conducted as per existing guidelines of Indian Railways and Indian Road Congress. A copy of such tests records shall be provided to the Authority Engineer.

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 and furnish a report to the Authority Engineer in this behalf. The Authority 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. For the avoidance of doubt, the cost of such tests and the remedial measures in pursuance thereof shall be solely borne by the Contractor.

11.11 Examination of work before covering up

In respect of the work which the Authority 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 Engineer whenever any such work is ready and before it is covered up. The Authority Engineer shall then either carry out the examination, inspection or testing without unreasonable delay, or promptly give notice to the Contractor that the Authority 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 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 Engineer within a period of 3

(three) business days from the date on which the Contractor's notice hereunder is delivered to the Authority Engineer, the Contractor shall be entitled to assume that the Authority 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 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 Engineer requires the 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 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 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 or otherwise; provided that in case of any work which is required on account of a Force Majeure Event, the provisions of Clause 19.6 shall apply.

11.13.2 If the Contractor fails to comply with the instructions issued by the Authority Engineer under Clause 11.13.1, within the time specified in the Authority Engineer's notice or as mutually agreed, the Authority 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.

11.14 Delays during construction

Without prejudice to the provisions of Clause 10.3.2, in the event the Contractor does not achieve any of the Project Milestones within the time period stipulated in Schedule - I or the Authority Engineer shall have reasonably determined that the rate of progress of Works is such that Completion of the Railway Project is not likely to be achieved by the end of the Scheduled Completion Date, it may notify the same to the Contractor, and the Contractor shall, within 15 (fifteen) days of such notice, by a communication inform the Authority Engineer in reasonable detail about the steps it proposes to take to expedite progress and the period within which it shall achieve the Project Completion Date.

11.15 Quality control records and Documents

The Contractor shall hand over to the Authority Engineer a copy of all its quality control records and documents before the Completion Certificate is issued pursuant to Clause 12.2.

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 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 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 including pedestrians. The Contractor may by notice require the Authority 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 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 in the reasonable opinion of the Authority, and the procedure set forth in this Clause 11.17 shall be repeated until the suspension hereunder is revoked.

11.17.3 Subject to the provisions of Clause 19.6, all reasonable costs incurred for maintaining and protecting the Works or part thereof during the period of suspension (the "**Preservation Costs**"), shall be borne by the Contractor; provided that if the suspension has occurred as a result of any breach of this Agreement by the Authority, the Preservation Costs shall be borne by the Authority.

11.17.4 If suspension of Works is for reasons not attributable to the Contractor, the Authority Engineer shall determine any Time Extension to which the Contractor is reasonably entitled.

ARTICLE 12

COMPLETION CERTIFICATE

12.1 Tests on completion

12.1.1 No later than 30 (thirty) days prior to the likely completion of the Railway Project or a part thereof, the Contractor shall prepare and submit to the Authority Engineer the documents required for seeking approval of the Commissioner of Railway Safety/GM/PCSTE/ Electrical Inspector to the Government (EIG)/ Railway Authority (as required), in accordance with the provisions of the Railways Opening for Public Carriage of Passenger Rules, the Indian Railway Permanent Way Manual, the Indian Railways Manual of A.C. Traction, Indian Railways Signal Engineering Manual, Indian Railways Telecom Manual as the case may be, and notify the Authority Engineer of its intent to subject the Railway Project to Tests. After ensuring and procuring that the documents required to be submitted to the Commissioner for Railway Safety/GM/PCSTE/ Electrical Inspector to the Government (EIG)/ Railway Authority (as required), meet the requirements of Applicable Laws, the Authority Engineer shall, in consultation with the Contractor, determine the date and time of each of the Tests, and inform the Authority who may designate its representative to witness the Tests. The Contractor shall provide such assistance as the Authority Engineer may reasonably require for conducting the Tests. For avoidance of doubts, the parties agree that in the event of the Contractor and the Authority Engineer failing to mutually agree on the dates for conducting the Tests, the Contractor shall fix the dates by giving not less than 10 (ten) days' notice to the Authority Engineer. Authority will carry out tests on completion within 30 days of receiving request from contractor. And if Authority Engineer fails to carry out test within 30 days, the Authority will pay damage to Contractor @ 0.02% of the payment pending for want of test per day.

12.1.2 All Tests shall be conducted in accordance with Schedule-J at the cost and expense of the Contractor; provided, however, that the trial running on railway track shall be undertaken at the cost and expense of the Authority. The Authority Engineer shall observe, monitor and review the results of the Tests to determine compliance of the Railway Project with Specifications and Standards and if it is reasonably anticipated or determined by the Authority Engineer during the course of any Test that the performance of the Railway Project or Section or any part thereof, does not meet the Specifications and Standards, it shall have the right to suspend or delay such Test and require the Contractor to remedy and rectify any Defect or deficiency. Upon completion of each Test, the Authority Engineer shall provide to the Contractor and the Authority copies of all Test data including detailed Test results. For the avoidance of doubt, the Parties expressly agree that the Authority Engineer may require the Contractor to carry out or cause to be carried out additional Tests, in accordance with Good Industry Practice, for determining the compliance of the Railway Project thereof with the Specifications and Standards.

12.2 Provisional Certificate

12.2.1 Upon completion of Tests, the Authority Engineer shall satisfy itself that the Tests have been successful and the Railway Project is fit for opening to traffic. A list of outstanding items signed jointly by the Authority Engineer and the Contractor (called the "**Punch List**") shall be prepared in two parts. The part-1 showing the critical/safety items and the part-2 showing non-critical/non-safety items. The

Authority Engineer may issue a Provisional Certificate to the Contractor and the Authority in the form set forth in Schedule-K (the "**Provisional Certificate**"), provided the items figuring in the Punch List of critical/safety items (part-1) have been fully completed/attended to. The items figuring in the Punch List(part-2) of non-critical/non-safety should be completed by contractor in a time frame as stipulated in Clause12.3.

12.2.2 Upon issuance of the "Provisional Certificate", the Authority Engineer shall forward to the Authority (i) copies of all Test data including Test results, and (ii) the documents submitted by the Contractor for seeking approval of the Commissioner of Railway Safety/GM/PCSTE/ Electrical Inspector to the Government (EIG)/ Railway Authority (as required), in accordance with the provisions of the Railways Opening for Public Carriage of Passenger Rules, the Indian Railway Permanent Way Manual/ or the Indian Railways Manual of A.C. Traction, Indian Railways Signal Engineering Manual, Indian Railways Telecom Manual as the case may be, for obtaining authorisation from the Commissioner for Railway Safety/GM/PCSTE/ Electrical Inspector to the Government (EIG)/ Railway Authority (as required).

12.2.3 The Contractor shall assist the Authority during inspection and tests to be conducted by the Commissioner of Railway Safety/GM/PCSTE/ Electrical Inspector to the Government (EIG)/ Railway Authority (as required), for determining compliance of the Railway Project with Applicable Laws and the provisions of this Agreement.

12.2.4 The Defects Liability Period for the Railway Project shall commence from the date of issue of the Provisional Certificates.

12.2.5 The Parties hereto expressly agree that the Authority Engineer may also issue a "Part Provisional Certificate" for part of the Railway Project ready for commissioning/opening subject to the provisions of Clauses 12.1 and 12.2 applying mutatis mutandis. The issuance of the part-provisional certificate will however not absolve the contractor in any manner of its obligations to complete the remaining part of Railway Project.

12.2.6 The risk of loss or damage to any Materials, Plant or Works in the Railway Project or part thereof, as the case may be, and the care and custody thereof shall pass from the Contractor to the Authority upon issuance of Provisional Certificate for the Railway Project or part thereof.

12.3 Completion of Part-2 Punch List items

All items figuring in the Punch List shall be completed by the Contractor within 90 (ninety) days of the date of issuance of the Provisional Certificate and for any delay thereafter, other than for reasons solely attributable to the Authority or due to Force Majeure, the Authority shall be entitled to recover Damages from the Contractor to be calculated and paid for each day of delay until all items are completed, at the lower of (a) 0.005% (zero point zero zero five per cent) of the contract price and (b) 0.2% (zero point two percent) of the cost of completing such items as estimated by the Authority Engineer. Subject to payment of such Damages, the Contractor shall be entitled to a further period not exceeding 120 (one hundred and twenty) days for completion of the Punch List items. For the avoidance of doubt, it is agreed that if completion of any item in the Punch List is delayed for reasons attributable to the Authority or due to Force Majeure, the completion date thereof shall be determined by the Authority Engineer in

accordance with Good Industry Practice, and such completion date shall be deemed to be the date of issue of the Provisional Certificate for the purposes of Damages, if any, payable for such item under this Clause 12.3.

12.4 Completion Certificate

12.4.1 Upon completion of all items in the Punch List (part-1 as well as part-2) and issuance of authorisation by the Commissioner of Railway Safety/GM/PCSTE/ Electrical Inspector to the Government (EIG)/ Railway Authority (as required), and compliance of all CRS/GM/PCSTE/ Electrical Inspector to the Government (EIG)/ Railway Authority (as required), observations pertaining to Contractor if any, the Authority Engineer shall issue forthwith to the Contractor and the Authority; a completion certificate substantially in the form set forth in Schedule-K (the "**Completion Certificate**") separately in respect of each Provisional Certificate issued. For Avoidance of doubt, Completion Certificate may also be issued for part-commissioning of Project.

12.4.2 Upon receiving the Completion Certificate, the Contractor shall remove its equipment, materials, debris and temporary works from the Site, which are not required any more for the Project, within a period of 15 (fifteen) days thereof, failing which the Authority may remove or cause to be removed, such equipment, materials, debris and temporary works and recover from the Contractor an amount equal to 120% (one hundred and twenty per cent) of the actual cost of removal incurred by the Authority.

12.5 Rescheduling of Tests

If the Authority Engineer certifies to the Authority and the Contractor that it is unable to issue the Completion Certificate or Provisional Certificate, as the case may be, because of events or circumstances on account of which the Tests could not be held or had to be suspended, the Contractor shall be entitled to re-schedule the Tests and hold the same as soon as reasonably practicable.

12.6 Delayed authorisation

In the event of delay in issuance of authorisation by the Commissioner of Railway Safety beyond a period of 60 (sixty) days from the date of completion of all safety/critical items of punch list, the Contractor shall be entitled to interest for the period of delay at a rate equal to 3% (three percent) above the Bank Rate on the payment due for integrated testing and commissioning as specified in Schedule-G.

ARTICLE 13

CHANGE OF SCOPE

13.1 Change of Scope

13.1.1 The Authority may, notwithstanding anything to the contrary contained in this Agreement, require the Contractor to make modifications or alterations to the Works ("**Change of Scope**") before the issue of the Completion Certificate either by giving an instruction or by requesting the Contractor to submit a proposal for Change of Scope involving additional cost or reduction in cost. Any such Change of Scope shall be made and valued in accordance with the provisions of this Article 13.

13.1.2 Change of Scope shall mean:

(a) change in specifications of any item of Works;

(b) omission of any work from the Scope of the Project except under Clause 8.3.3; provided that, subject to Clause 13.5, the Authority shall not omit any work under this Clause in order to get it executed by any other entity; or

(c) any additional work, Plant, Materials or services which are not included in the Scope of the Project, including any associated Tests on completion of construction. However any unsanctioned work which is independent work per se shall not be considered as Change of scope;

(d) Variation in the quantities of certain items (positive or negative) necessitated due to any change(s) in the L-Section/Alignment/ESPs/SIPs of the Project with respect to those attached with this document, except on account of existing ground conditions/ground levels mentioned in L-Section/Alignment/ESPs. For avoidance of doubt, it is clarified that the existing ground conditions/ground levels are to be validated by bidders before bid and hence no change on this account is payable, except for works under schedule G1.

(e) any change in quantities under Schedule G1;

13.1.2.1 Unless parties agree to the contrary, following shall be the limits of variation for items of works under Schedule G1;

(a) For Items related to work of foundation	No Limits
(b) For Items in Schedule G1 related to works other than foundation	25%

13.1.3(1) If the Contractor determines at any time that a Change of Scope will, if adopted, (i) accelerate completion, (ii) reduce the cost to the Authority of executing, maintaining or operating the Railway Project, (iii) improve the efficiency or value to the Authority of the completed Railway Project, or (iv) otherwise be of benefit to the Authority, it shall prepare a proposal with relevant details, as under :-

(a) for works under schedule G, and for items covered under schedule G1 beyond the limits of variation mentioned in article 13.1.2.1, at its own cost; or

(b) for works under schedule G1 within the limits of variation mentioned in article 13.1.2.1, as per cost derived on the basis of accepted rates of respective items under schedule G1.

The Contractor shall submit such proposal, supported with the relevant details including the amount of reduction in the Contract Price, if any, to the Authority to consider such Change of Scope. The Authority shall, within 15 (fifteen) days of receipt of such proposal, either accept such Change of Scope with modifications, if any, and initiate proceedings there for in accordance with this Article 13 or reject the proposal and inform the Contractor of its decision.

(2) In case Change of Scope is proposed by Authority Engineer to the contractor is for items covered under schedule G1 within the limits of variation mentioned in article 13.1.2.1, the contractor shall accept and continue the works as per rate accepted for those items/ schedules under schedule G1.]

In case Change of Scope is proposed by Authority Engineer to the contractor [is for the items not covered either in the scope of work under schedule G, or within the limits of variation mentioned in article 13.1.2.1 for the items under schedule G1,] the contractor shall, within 15 (fifteen) days of receipt of such proposal, either accept such Change of Scope with modifications, if any, and initiate proceedings therefore in accordance with this Article 13 or reject the proposal and inform the authority of its decision.

For the avoidance of doubt, the Parties agree that the Contractor shall not undertake any Change of Scope without a Change of Scope Order being issued by the Authority, save and except any Works necessary for meeting any Emergency.]

13.2 Procedure for Change of Scope

13.2.1 In the event of the Authority determining that a Change of Scope is necessary, it may direct the Authority Engineer to issue to the Contractor a notice specifying in reasonable detail the works and services contemplated thereunder (the "**Change of Scope Notice**").

13.2.2 Upon receipt of a Change of Scope Notice from Authority Engineer, the Contractor shall, with due diligence, provide to the Authority Engineer such information as is necessary, together with preliminary documentation in support of:

(a) the impact of the Change of Scope on the Project Completion Schedule, if the works or services are required to be carried out during the Construction Period; and

(b) the options for implementing the proposed Change of Scope and the effect, if any, each such option would have on the costs and time thereof; including the following details:

(i) breakup of the quantities, unit rates and cost for different items of work;

(ii) proposed design for the Change of Scope [if required]; and

(iii) proposed modifications, if any, to the Project Completion Schedule of the Railway Project.

For the avoidance of doubt, the Parties expressly agree that, subject to the provisions of Clause 13.4.2, the Contract Price shall be increased or decreased, as the case may be, on account of Change of Scope.

13.2.3 The Contractor's quotation of rates/costs for the Change of Scope shall be determined on the following principles:

(A) The rate for various items to be executed through change of scope order shall be estimated on the basis of analysis of rates (AOR) of Zonal Railway, CORE, whichever is applicable for item other than building works and as per CPWD's AOR for building works and by applying the prevailing market rates of various input construction materials, labour, machinery and T&P.

For working out rate of item in change of scope, the following shall be considered –

(a) Input of man days, quantities of materials etc.

(b) The market rates of various materials, labour, machinery shall be as follows:

i. For materials market rate shall be based on invoices submitted by contractor or Purchase order placed by contractors for the supply of materials

ii. Rates for unskilled, semi-skilled and skilled workers as per the records maintained by the Contractor in accordance with the Laws subject to maximum of those payable as per minimum wages act.

(c) Contractor's overheads and profit at the rate of 15 (Fifteen) percent of the cost arrived by above AOR.

(d) Applicable Taxes.

(B) In case AOR of any items is not available in Zonal Railway's or CORE's AOR then such rates shall be determined as per prevailing market rates in accordance with Good Industry Practice by the Authority Engineer.

13.2.4 Upon reaching an agreement, the Authority shall issue an order (the "**Change of Scope Order**") requiring the Contractor to proceed with the performance thereof. In the event that the Parties are unable to agree, the Authority may:

(a) issue a Change of Scope Order requiring the Contractor to proceed with the performance thereof at the rates and conditions approved by the Authority till the matter is resolved in accordance with Article 24; or

(b) proceed in accordance with Clause 13.5.

13.2.5 The provisions of this Agreement, insofar as they relate to Works and Tests, shall apply *mutatis mutandis* to the works undertaken by the Contractor under this Article 13.

13.3 Payment for Change of Scope

Payment for Change of Scope shall be made in accordance with the payment schedule specified in the Change of Scope Order.

13.4 Restrictions on Change of Scope

13.4.1 No Change of Scope shall be executed unless the Authority has issued the Change of Scope Order save and except any Works necessary for meeting any Emergency.

13.4.2 Unless the Parties mutually agree to the contrary, the total value of all Change of Scope Orders shall not exceed 25% (twenty five per cent) of the Contract Price.

13.4.3 Notwithstanding anything to the contrary in this Article 13, no change arising from any default of the Contractor in the performance of its obligations under this Agreement shall be deemed to be Change of Scope, and shall not result in any adjustment of the Contract Price or the Project Completion Schedule.

13.5 Power of the Authority to undertake works

13.5.1 In the event the Parties are unable to agree to the proposed Change of Scope Orders in accordance with Clause 13.2, the Authority may, after giving notice to the Contractor and considering its reply thereto, award such works or services to any person on the basis of open competitive bidding from amongst bidders who are pre-qualified for undertaking the additional work; provided that the Contractor shall have the option of matching the first ranked bid in terms of the selection criteria, subject to payment of 2% (two per cent) of the bid amount to the Authority[$], and thereupon securing the award of such works or services. For the avoidance of doubt, it is agreed that the Contractor shall be entitled to exercise such option only if it has participated in the bidding process and its bid does not exceed the first ranked bid by more than 10% (ten percent) thereof. It is also agreed that the Contractor shall provide assistance and cooperation to the person who undertakes the works or services hereunder, but shall not be responsible for rectification of any Defects and/or maintenance of works carried out by other agencies.

13.5.2 The works undertaken in accordance with this Clause 13.5 shall conform to the Specifications and Standards and shall be carried out in a manner that it should not cause any disruption to the Project and also minimise adverse effect to main contractor. The provisions of this Agreement, insofar as they relate to Works and Tests, shall apply mutatis mutandis to the works carried out under this Clause 13.5.

[$] The Authority shall transfer 75% (seventy five percent) of the amount so received to the first ranked bidder whose bid shall have been matched by the Contractor.

ARTICLE 14

TRAFFIC REGULATION

14.1 Traffic regulation by the Contractor

14.1.1 The Contractor shall take all the required measures and make arrangements for the safety of any persons and vehicles on or about the Site during the construction of the Railway Project or a Section thereof in accordance with Good Industry Practice, and Applicable Laws. It shall provide, erect and maintain all such barricades, signs, markings, flags, and lights as may be required by Good Industry Practice for the safety of the traffic using any public roads or access along or across the Section under construction.

14.1.2 All works shall be carried out in a manner creating least interference to traffic passing along or across the Railway Project or a Section thereof. The Contractor shall ensure that proper passage is provided for the traffic. Where it is not possible or safe to allow traffic on the existing road or passage, a temporary diversion of proper specifications shall be constructed by the Contractor at its own cost. The Contractor shall take prior approval of the Authority Engineer for any proposed arrangement for traffic regulation during Construction, which approval shall not be unreasonably withheld.

14.1.3 In the event any construction work is required to be executed in close proximity of an existing operating system of Railways, the Contractor shall make arrangements for the safety of such system in accordance with the provisions of the 'Compendium of Instructions on Safety at work Sites' issued by the Authority and Good Industry Practice.

ARTICLE 15

DEFECTS LIABILITY

15.1 Defects Liability Period

15.1.1 The Contractor shall be responsible for all the Defects and deficiencies, except usual wear and tear in the Railway Project or any part thereof, till the expiry of a period of 2 (two) years commencing from the date of Provisional Certificate or expiry of a period 18 (eighteen) months from the date of Completion Certificate, whichever is later(the "**Defects Liability Period**").

15.1.2 Without prejudice to the provisions of Clause 15.1.1, for KAVACH System, the Defects Liability Period shall be commencing from the date of Completion Certificate for a Period of 4 (four) years. For the avoidance of any doubt, any repairs or restoration because of usual wear or tear in the Project or any Section thereof shall form a part of the Maintenance obligations of the Contractor as specified in Article 15A. Defects Liability Period shall also cover the provisions of extensions as in accordance with Clause 15.6.

15.1.3 Deleted.

15.1.4 Deleted.

15.2 Remedy and rectification of Defects and deficiencies

15.2.1 Without prejudice to the provisions of Clause 15.2.2, the Contractor shall repair or rectify all Defects and deficiencies observed by the Authority Engineer during the Defects Liability Period within a period of 15 (fifteen) days from the date of notice issued by the Authority Engineer, or within such reasonable period as may be determined by the Authority Engineer at the request of the Contractor, in accordance with Good Industry Practice. For the purpose of this clause, the time period of 15 days shall be applicable only to those Defects and Deficiencies which are not affecting train operations of safety. For any defect noticed affecting train operation of train safety, the Contractor shall arrange to rectify it within such reasonable period as may be determined by the Authority Engineer. If the Contractors not able to rectify any fault as decided by the Authority Engineer, the Authority will be at full liberty to make its own efforts to get such defects rectified at Contractor's cost.

15.2.2 During a period of 2 (two) months from the date of issuance of Completion Certificate, the Contractor shall retain sufficient staff and spares at Project for procuring prompt replacement, installation or re-installation of any defective parts of (a) Automatic Train protection system. The spares for the purpose of this clause, shall be separate from any spares supplied within the scope of the Project.

15.3 Cost of remedying Defects

For the avoidance of doubt, any repair or rectification undertaken in accordance with the provisions of Clause 15.2, including any additional tests, shall be carried out by the Contractor at its own risk and cost, to the extent that such rectification or repair is attributable to:

(a) the design of the Project;

(b) Works, Plant, Materials or workmanship not being in accordance with this Agreement and the Specifications and Standards;

(c) improper maintenance during construction of the Railway Project by the Contractor; or

(d) failure by the Contractor to comply with any other obligation under this Agreement.

15.4 Contractor's failure to rectify Defects

In the event that the Contractor fails to repair or rectify such Defect or deficiency within the period specified in Clause 15.2, the Authority shall be entitled to get the same repaired, rectified or remedied at the Contractor's cost so as to make the Railway Project conform to the Specifications and Standards and the provisions of this Agreement. All costs consequent thereon shall, after due consultation with the Authority and the Contractor, be determined by the Authority Engineer. The cost so determined, and an amount equal to 20% (twenty percent) of such cost as Damages, shall be recoverable by the Authority from the Contractor and may be deducted by the Authority from any monies due to the Contractor.

15.5 Contractor to search cause

15.5.1 The Authority Engineer may instruct the Contractor to examine the cause of any Defect in the Works or part thereof before the expiry of the Defects Liability Period.

15.5.2 In the event any Defect identified under Clause 15.5.1 is attributable to the Contractor, the Contractor shall rectify such Defect within the period specified by the Authority Engineer, and shall bear the cost of the examination and rectification of such Defect.

15.5.3 In the event such Defect is not attributable to the Contractor, the Authority Engineer shall, after due consultation with the Authority and the Contractor, determine the costs incurred by the Contractor on such examination and notify the same to the Contractor, with a copy to the Authority, and the Contractor shall be entitled to payment of such costs by the Authority.

15.6. Extension of Defects Liability Period

15.6.1 The Defects Liability Period shall be deemed to be extended till the identified Defects under Clause 15.2 have been remedied.

15.6.2 Any Materials or Works with Defects identified under Clause 15.2 and replaced or repaired during the Defects Liability Period or the extended Defects Liability Period, as the case may be, would be further warranted for a period of twelve (12) months from the date of completion of such repair or replacement.

15.6.3 The Contractor shall upon termination or expiry of this Agreement or upon expiry of the Defects Liability Period, assign any outstanding benefit in respect of any subcontract or any warranty, to the Authority or to such other person as the Authority may direct.

Article 15A

Maintenance

15A.1 **Maintenance Obligations of the Contractor**

(i) The Contractor shall maintain the Project of Modern Signalling System KAVACH for a period of 15 (fifteen) years, commencing from the date of the Completion Certificate (the "Maintenance Period"). For the performance of its Maintenance obligations, the Contractor shall be paid:

(a) $ 1.5% of the total Capital cost of KAVACH equipment (A + B) as indicated in schedule G per annum, for the Defect Liability Period (i.e first four years from the date of completion certificate).

(b) $ 3% of the total Capital cost of KAVACH equipment (A + B) as indicated in schedule G per annum, from completion of Defect Liability Period till completion of Maintenance Period.

Above amount for the performance of Contractors Maintenance obligations shall be, inclusive of all taxes. The amount payable for maintenance shall be adjusted to reflect any increase or decrease arising out of variation in WPI to be determined in accordance with the provisions of Clause 17.9a. It is further agreed that the Contract Price hereunder shall be reckoned with reference to the amount specified in Clause 17.1.1, which shall be adjusted to the extent of Change of Scope and the works withdrawn under the provisions of Clause 8.3.3, but shall not include any price adjustments in pursuance of Clause 17.8.

(ii) During the Maintenance Period, the Authority shall provide to the Contractor access to the Site for Maintenance in accordance with this Agreement. The obligations of the Contractor hereunder shall include:

(a) Permitting safe, smooth and uninterrupted flow of traffic on the Project KAVACH;

(b) Undertaking routine maintenance including prompt repairs of Station equipments, LC Gate equipments, Track side equipments, Onboard Locomotive equipments, RF Network equipments Test Bench, NMS, Lab model, Loco KAVACH equipment, Break Interface Unit. For the avoidance of doubt, the electricity charges for operation of infrastructure installed along the project length, except the infrastructure being used by the Contractor for its own use, shall be borne by the Authority;

(c) undertaking repairs to the equipments and structures;

(d) informing the Authority of any unauthorised use of the Project KAVACH.

$ *This does not include Towers, OFC System and Signalling System other than KAVACH System.*

(iii) In respect of any Defect or deficiency not specified in Schedule-Q, the Contractor shall, at its own cost, undertake repair or rectification in accordance with Good Industry Practice, save and except to the extent that such Defect or deficiency shall

have arisen on account of any willful default or neglect of the Authority or a Force Majeure Event.

(iv) The Contractor shall remove promptly from the Project area any waste materials (including hazardous materials and waste water), rubbish and other debris (including, without limitation, accident debris) and keep the Project area in a clean, tidy and orderly condition, and in conformity with the Applicable Laws, Applicable Permits and Good Industry Practice.

15A.2 **Maintenance Requirements**

15A.2.1 The Contractor shall ensure and procure that at all times during the Maintenance Period, the Project KAVACH conforms to the maintenance requirements set forth in Schedule-Q (the "Maintenance Requirements").

15A.2.2 **Maintenance Support for Project KAVACH System**

(i) To provide maintenance support in accordance with the provisions of this Agreement, the Contractor shall, without prejudice to its Maintenance Obligations, set up and operate, round the clock, a control centre (the "Helpline") connected to the Divisional Control Centre/Test Room of the Authority. The Helpline shall provide such advice and guidance to the Divisional Control Centre/Test Room/ Field Maintainers as may be necessary for performing its Maintenance Obligations hereunder.

(ii) The Parties agree that the location of the Control Centre (Helpline) shall be restricted to project jurisdiction or Divisional Head Quarter as the case may be.

(iii) The Authority shall, upon request from the Contractor, provide suitable covered space at Divisional Control Centre to facilitate the Contractor in performing its Maintenance Obligations.

15A.3 **Maintenance Programme**

(i) The Contractor shall prepare a monthly maintenance programme (the "Maintenance Programme") in consultation with the Authority Engineer and submit the same to the Authority Engineer not later than 10 (ten) days prior to the commencement of the month in which the Maintenance programme is to be executed. For this purpose, a joint monthly inspection by the Contractor and the Authority Engineer shall be undertaken. The Maintenance Programme shall contain the following:

(a) The condition of the KAVACH equipment/system in the format prescribed by the Authority Engineer;

(b) the proposed maintenance Works; and

(c) Deployment of resources for maintenance Works.

15A.4 **System Closure**

(i) The Contractor shall not close any working or operational equipment/system of the Project for undertaking maintenance works except with the prior written approval of the Authority Engineer. Such approval shall be sought by the Contractor through a written request to be made at least 3 (three) days before the proposed closure of operational equipment/system and shall be accompanied by particulars thereof. Within 3 (three) business days of receiving such request, the Authority Engineer shall grant permission with such modifications as it may deem necessary and a copy of such permission shall be sent to the Authority.

(ii) Upon receiving the permission pursuant to Clause 15A.4 (i), the Contractor shall be entitled to close the designated working or operational equipment/system for the period specified therein, the Contractor shall, in the event of any delay in re-opening such equipment/system, pay Damages to the Authority calculated at the rate of 0.1% (zero point one per cent) of the monthly maintenance payment for each hour of delay until the equipment/system has been re-opened for traffic. In the event of any delay in re-opening such equipment/system or in the event of emergency decommissioning and closure to traffic of the whole or any part of the Project KAVACH due to failure of the Contractor, the Contractor shall pay damages to the Authority at double the above rate, without prejudice the rights of the Authority under this Agreement including Termination thereof.

15A.5 **Reduction of Payment for Non-performance of Maintenance Obligations**

(i) In the event that the Contractor fails to repair or rectify any Defect or deficiency set forth in Schedule-Q within the period specified therein, it shall be deemed as failure of performance of Maintenance obligations by the Contractor and the Authority shall be entitled to effect reduction in monthly lump sum payment for maintenance in accordance with Clause 17.5b and Schedule-R, without prejudice to the rights of the Authority under this Agreement, including Termination thereof.

(ii) If the nature and extent of any Defect justifies more time for its repair or rectification than the time given by the Authorities Engineer's, the Contractor shall be entitled to additional time in conformity with Good Industry Practice. Such additional time shall be determined by the Authority Engineer and conveyed to the Contractor and the Authority with reasons thereof.

15A.6 **Authority's right to take remedial measures**

In the event the Contractor does not maintain and/or repair the Project KAVACH or any part thereof in conformity with the Maintenance Requirements, the Maintenance Manual or the Maintenance Programme, as the case may be, and fails to commence remedial works within 10 (ten) days of receipt of the Maintenance Inspection Report under Clause 15B.2 or a notice in this behalf from the Authority or the Authority Engineer, as the case may be, the Authority shall, without prejudice to its rights under this Agreement including Termination thereof, be entitled to undertake such remedial measures at the cost of the Contractor, and to recover its cost from the Contractor. In addition to recovery of the aforesaid cost, a sum equal to 20% (twenty per cent) of such cost shall be paid by the Contractor to the Authority as Damages.

15A.7 **Restoration of loss or damage to Project KAVACH System**

Save and except as otherwise expressly provided in this Agreement, in the event that the Project KAVACH or any part thereof suffers any loss or damage during the Maintenance from any cause attributable to the Contractor, the Contractor shall, at its cost and expense, rectify and remedy such loss or damage forthwith so that the Project KAVACH conforms to the provisions of this Agreement.

15A.8 **Overriding powers of the Authority**

(i) If in the reasonable opinion of the Authority, the Contractor is in material breach of 5 its obligations under this Agreement and, in particular, the Maintenance Requirements, and such breach is causing or likely to cause material hardship or danger to the Users, the Authority may, without prejudice to any of its rights under this Agreement including Termination thereof, by notice require the Contractor to take reasonable measures immediately for rectifying or removing such hardship or danger, as the case may be.

(ii) In the event that the Contractor, upon notice under Clause 15A.8 (i), fails to rectify or remove any hardship or danger within a reasonable period, the Authority may exercise overriding powers under this Clause 15A.8 (ii) and take over the performance of any or all the obligations of the Contractor to the extent deemed necessary by it for rectifying or removing such hardship or danger; provided that the exercise of such overriding powers by the Authority shall be of no greater scope and of no longer duration than is reasonably required hereunder; provided further that any costs and expenses incurred by the Authority in discharge of its obligations hereunder shall be recovered by the Authority from the Contractor, and the Authority shall be entitled to deduct any such costs and expenses incurred from the payments due to the Contractor under Clause 17.5b for the performance of its Maintenance obligations.

(iii) In the event of a national emergency, civil commotion or any other circumstances specified in Clause 19.3, the Authority may take over the performance of any or all the obligations of the Contractor to the extent deemed necessary by it, and exercise such control over the Project KAVACH or give such directions to the Contractor as may be deemed necessary; provided that the exercise of such overriding powers by the Authority shall be of no greater scope and of no longer duration than is reasonably required in the circumstances which caused the exercise of such overriding power by the Authority. For the avoidance of doubt, it is agreed that the consequences of such action shall be dealt in accordance with the provisions of Article 19. It is also agreed that the Contractor shall comply with such instructions as the Authority may issue in pursuance of the provisions of this Clause 15A.8 (iii), and shall provide assistance and cooperation to the Authority, on a best effort basis, for performance of its obligations hereunder.

(iv) Notwithstanding anything hereinabove, the Authority reserves the right to determine the contract as per provisions of Article 21.3 during the maintenance period.

15A.9 **Taking over Certificate**

The Maintenance Requirements set forth in Schedule-Q having been duly carried out, Maintenance Period as set forth in Clause 15A.1 having been expired and Authority Engineer determining the Tests on Completion of Maintenance to be successful in accordance with Schedule-S, the Authority will issue Taking Over Certificate to the Contractor substantially in the format set forth in Schedule-T.

ARTICLE 15 B

Supervision and Monitoring during Maintenance

15B.1 **Inspection by the Contractor**

(i) The Authority Engineer shall undertake regular inspections to evaluate continuously the compliance with the Maintenance Requirements.

(ii) The Contractor shall carry out a detailed inspection of designated equipment/system in accordance with Schedule-Q or the guidelines contained in latest RDSO Technical Advisory Notes (TANs) issued time to time. Report of this inspection together with details of proposed maintenance works as required shall be conveyed to the Authority Engineer forthwith. The Contractor shall complete the proposed maintenance works and send a compliance report to the Authority Engineer.

15B.2 **Inspection and payments**

(i) The Authority Engineer may inspect the Project KAVACH at any time, but at least once every month, to ensure compliance with the Maintenance Requirements. It shall make a report of such inspection ("Maintenance Inspection Report") stating in reasonable detail the Defects or deficiencies, if any, with particular reference to the Maintenance Requirements, the Maintenance Manual, and the Maintenance Programme, and send a copy thereof to the Authority and the Contractor within 10 (ten) days of such inspection.

(ii) The Authority Engineer shall compile the inspection reports issued by Railway Personnel from time to time and advise Contractor to undertake corrective action in time bound manner.

(iii) After the Contractor submits to the Authority Engineer the Monthly Maintenance Statement for the Project KAVACH pursuant to Clause 17.5a, the Authority Engineer shall carry out an inspection within 10 (ten) days to certify the amount payable to the Contractor. The Authority Engineer shall inform the Contractor of its intention to carry out the inspection at least 3 (three) business days in advance of such inspection. The Contractor shall assist the Authority Engineer in verifying compliance with the Maintenance Requirements.

(iv) For each case of non-compliance of Maintenance Requirements as specified in the inspection report of the Authority Engineer, the Authority Engineer shall calculate the amount of reduction in payment in accordance with the formula specified in Schedule-R.

(v) Any deduction made on account of non-compliance will not be paid subsequently even after establishing the compliance thereof. Such deductions will continue to be made every month until the compliance is procured.

15B.3 **Maintenance Report**

No later than 15 (fifteen) days after a Scheduled Maintenance, Unscheduled Maintenance or any maintenance carried out by the Contractor, as the case may be, the Contractor shall submit, in such form as the Authority may specify, a report containing particulars of maintenance carried out by the Contractor including

i. An analysis of the defects and deficiencies (if any) affecting the performance or safe operation of the Equipment/System;

ii. Details of Failure including date and time of such Failure, time of rectification of failures etc counter signed by Authority Engineer.

15B.4 **Reports of Unusual Occurrence**

The Contractor shall, during the Maintenance Period, prior to the close of each day, send to the Authority and the Authority Engineer, by facsimile or e- mail, a report stating accidents and unusual occurrences on the Project KAVACH relating to the safety and security of the Users and Project KAVACH. A monthly summary of such reports shall also be sent within 3 (three) business days of the closing of month. For the purposes of this Clause 15B.5, accidents and unusual occurrences on the Project KAVACH shall include:

(1.a) accident/unusual incidences;

(1.b) damaged/dislodged/fire/theft of fixed equipment;

(1.c) any prolong/repeated failure of system during the month; and

(1.d) any other unusual occurrence

ARTICLE 16

AUTHORITY ENGINEER

16.1 Appointment of the Authority Engineer

16.1.1 The Authority shall appoint a railway engineer /Project Management Services (PMS) Agency, to be the engineer under this Agreement (the "**Authority Engineer**").

16.1.2 The appointment of the Authority Engineer shall be made no later than 30 (Thirty) days from the date of this Agreement. The Authority shall notify the appointment or replacement of the Authority Engineer to the Contractor.

16.1.3 The staff of the Authority Engineer shall include suitably qualified engineers and other professionals who are competent to assist the Authority Engineer to carry out its duties.

16.2 Duties and functions of the Authority Engineer

16.2.1 The Authority Engineer shall perform its duties and discharge its functions in accordance with the provisions of this Agreement, and substantially in accordance with the duties and responsibilities set forth in Annex 1 of Schedule L, but subject to obtaining prior written approval of the Authority before determining:

(a) any Time Extension;

(b) any additional cost to be paid by the Authority to the Contractor;

(c) the Termination Payment;

(d) providing Power Block or Traffic Block or necessary disconnections to the Contractor;

(e) approval of signalling & interlocking plan and route control chart; and alterations in ESP if essentially required;

(f) approval of disconnections for modification of signalling and telecom works, or

(g) any other matter which is not specified in (a) to (f)above and which creates an obligation or liability on either Party for a sum exceeding Rs.5,000,000 (Rupees fifty lakh).

16.2.2 No decision or communication of the Authority Engineer shall be effective or valid unless it is accompanied by an attested true copy of the approval of the Authority for and in respect of any matter specified in Clause 16.2.1.

16.2.3 The Authority Engineer shall submit regular periodic reports, at least once every month, to the Authority in respect of its duties and functions assigned to him for the project. Such reports shall be submitted by the Authority Engineer within 10 (ten) days of the beginning of every month.

16.2.4 A true copy of all communications sent by the Authority to the Authority Engineer and by the Authority Engineer to the Authority shall be sent forthwith by the Authority Engineer to the Contractor.

16.2.5 A true copy of all communications sent by the Authority Engineer to the Contractor and by the Contractor to the Authority Engineer shall be sent forthwith by the Authority Engineer to the Authority.

16.3 Authorised signatories

The Authority Engineer will designate and notify to the Contractor up to 2 (two) persons under him to sign for and on behalf of the Authority Engineer, and any communication or document required to be signed by the Authority Engineer shall be valid and effective only if signed by any of the designated persons; provided that the Authority Engineer may, by notice in writing, substitute any of the designated persons by any of its employees.

16.4 Instructions of the Authority Engineer

16.4.1 The Authority Engineer may issue to the Contractor instructions for remedying any Defect. The Contractor shall take such instructions from the Authority Engineer only.

16.4.2 The instructions issued by the Authority Engineer shall be in writing. However, if the Authority Engineer issues any oral instructions to the Contractor, it shall confirm in writing the oral instructions within 2 (two) working days of issuing them.

16.4.3 In case the Contractor does not receive the confirmation of the oral instructions within the time specified in Clause 16.4.2, the Contractor shall seek the written confirmation of the oral instructions from the Authority Engineer and shall obtain acknowledgement from the Authority Engineer of the communication seeking written confirmation. In case of failure of the Authority Engineer to reply to the Contractor within 2 (two) days of the receipt of the communication from the Contractor, the Contractor may not carry out the instruction.

16.5 Determination by the Authority Engineer

16.5.1 The Authority Engineer shall consult with each Party in an endeavour to reach agreement wherever this Agreement provides for the determination of any matter by the Authority Engineer. If such agreement is not achieved, the Authority Engineer shall make a fair determination in accordance with this Agreement having due regard to all relevant circumstances. The Authority Engineer shall give notice to both the Parties of each such agreement or determination, with supporting particulars.

16.5.2 Each Party shall give effect to each agreement or determination made by the Authority Engineer in accordance with the provisions of this Agreement. Provided, however, that if any Party disputes any instruction, decision, direction or determination of the Authority Engineer, the Dispute shall be resolved in accordance with the Dispute Resolution Procedure as per article 24.

16.6 Remuneration of the Authority Engineer

The remuneration, cost and expenses of the Authority Engineer shall be borne by the Authority.

16.7 Replacement of the Authority Engineer

16.7.1 The Authority may, in its discretion, replace the Authority Engineer at any time, but only upon appointment of another Authority Engineer in accordance with Clause 16.1.

16.7.2 If the Contractor has reasons to believe that the Authority Engineer is not discharging its duties and functions in accordance with the provisions of this Agreement, it may make a written representation to the Authority and seek replacement of the Authority Engineer. Upon receipt of such representation, the Authority shall hold a tripartite meeting with the Contractor and Authority Engineer and make best efforts for an amicable resolution of the Dispute. After due consideration, The Authority will decide about the replacement of Authority Engineer or otherwise. However , if Contractor is not satisfied with decision of Authority, the Dispute shall be resolved in accordance with Depute Resolution Procedure as per article 24.In the event that the Authority Engineer is to be replaced, the Authority shall appoint forthwith another Authority Engineer in accordance with Clause 16.1.

16.8 Interim Arrangement

In the event that the Authority has not appointed an Authority Engineer, or the Authority Engineer so appointed has relinquished its functions, the Authority may, in the interim, designate and authorise any person to discharge the functions of the Authority Engineer in accordance with the provisions of this Agreement, save and except that such person shall not exercise any functions relating to review, comment, approval or inspection as specified in this Agreement for and in respect of the Authority Engineer, and such functions shall be discharged as and when an Authority Engineer is appointed in accordance with the provisions of this Agreement. Provided, however, that nothing contained in this Clause 16.8 shall in any manner restrict the rights of the Authority to enforce compliance of the provisions of this Agreement.

Part IV

Financial Covenants

ARTICLE 17

PAYMENTS

17.1 Contract Price

17.1.1 The Authority shall make payments to the Contractor for the Works on the basis of the lump sum price accepted by the Authority in consideration of the obligations specified in this Agreement for an amount of **Rs.** 371,25,45,071/- (Rs. Three seventy one crore twenty five lakhs fourty five thousand and seventy one rupees) under schedule G and on the basis of actual work done for an amount of Rs. 14,45,76,481.30/- (the "**Contract Price**" =**Sum of Rs.** 371,25,45,071/- **(Schedule G) and Rs.** 14,45,76,481.30/- **(Schedule G1C))** is **Rs** 385,71,21,552.30/-, which shall be subject to adjustments in accordance with the provisions of this Agreement. For the avoidance of doubt, the Parties expressly agree that the Contract Price shall not include the cost of Maintenance, which shall be paid separately in accordance with the provisions of Clause 17.5b. The Parties further agree that save and except as provided in this Agreement, the Contract Price shall be valid and effective until issue of Completion Certificate.

17.1.2 The Contract Price includes all duties, taxes, royalty, and fees that may be levied in accordance with the laws and regulations in force as on the Base Month on the Contractor's equipment, Plant, Materials and supplies acquired for the purpose of this Agreement and on the on the Works undertaken under this Agreement. Nothing in this Agreement shall relieve the Contractor from its responsibility to pay any tax including any tax that may be levied in India on profits made by it in respect of this Agreement.

17.1.3 The Contract Price shall not be adjusted for any change in duties, taxes etc. specified in Clause 17.1.2 above, save and except as specified in Clauses 17.8 and 17.13.

17.1.4 The Contract Price shall not be adjusted to take account of any unforeseen difficulties or costs, unless otherwise provided for in this Agreement.

17.1.5 Unless otherwise specified in this Agreement, the Contract Price covers all the Contractor's obligations for the Works under this Agreement and all things necessary for the Construction thereof and for the rectification of any Defects in the Railway Project.

17.1.6 All payments under this Agreement shall be made in Indian Rupees.

17.2 Advance Payment

17.2.1 Upon receiving request from Contractor, the Authority shall make an advance payment (the "**Advance Payment**"), up to 10% (ten percent)[14] of the Contract Price, for mobilisation expenses and for acquisition of equipment, which shall carry simple interest at the rate of Bank Rate plus 5% per annum and shall be made in two instalments of up to maximum 5% (five per cent) of the contract price each.

---

[14] Deleted.

17.2.2 The Contractor may apply to the Authority for the first instalment of the Advance Payment at any time after the Appointed Date, along with an irrevocable and unconditional guarantee from a Bank for an amount equivalent to 110% (one hundred and ten per cent) of such instalment, substantially in the form provided at Annex-III of Schedule-F, to remain effective till the complete and full repayment thereof.

17.2.3 At any time, after 60 (sixty) days from the Appointed Date, the Contractor may apply to the Authority for the second instalment of the Advance Payment along with an irrevocable and unconditional guarantee from a Bank for an amount equivalent to 110% (one hundred and ten per cent) of such instalment, substantially in the form provided at Annex-III of Schedule-F, to remain effective till the complete and full repayment thereof along with proof of utilization of 1st instalment.

17.2.4 The instalments of Advance Payment shall generally be paid by the Authority to the Contractor within 15 (fifteen) days of the receipt of its respective requests in accordance with the provisions of this Clause 17.2.

17.2.5 The Advance Payment shall be recovered through proportionate deductions to be made in the Interim Payments Certificates issued in accordance with the provisions of Clause 17.5.2. Deductions of Advance Payment shall commence from the Interim Payment Certificate in which the cumulative interim payments certified shall have reached 50% (fifty percent) of the Contract Price. The total amount recovered in each Interim Payment Certificate shall be equal to 30% (thirty per cent) of the amount of interim payment due and payable under such Interim Payment Certificate, and interest on the amount being recovered to be calculated from the date of disbursement of the Advance Payment to the date of recovery until the entire Advance Payment together with interest is recovered. For the avoidance of doubt, the Parties agree that in the event the total payment specified in any Interim Payment Certificate exceeds the limit of 50% (fifty per cent) of the Contract Price, the proportionate of recovery hereunder shall be restricted to the amount exceeding 50% (fifty per cent) of the Contract Price. By way of illustration, the Parties agree that if the first recovery of say, Rupees 'x' is made after 20 (twenty) months from the date of 1st (first) instalment of the Advance Payment, the interest will be recovered on Rupees 'x' for a period of 20 (twenty) months; and when the next recovery is made in the following month for say, Rupees 'y', interest on Rupees 'y' will be computed for a period of 21 (twenty one) months. The Parties further agree that no payments in excess of 90% (ninety per cent) of the Contract Price shall be released until the Advance Payment, including interest thereon, has been fully recovered.

17.2.6 If the Advance Payment has not been fully repaid prior to Termination under Clause 19.7 or Article 21, as the case may be, the whole of the balance then outstanding shall immediately become due and payable by the Contractor to the Authority. In the event of Termination due to Contractor's Default, the Advance Payment shall be deemed to carry interest at annual rate of 4% (four per cent) above the Bank Rate from the date of Advance Payment to the date of recovery by encashment of bank guarantee for the Advance Payment. For the avoidance of doubt, the aforesaid interest shall be payable on each instalment of the Advance Payment, regardless of whether the instalment or any part thereof has been repaid to the Authority prior to Termination.

17.2.7 For large value (Contract price not less than 500 cr.) and complex projects, the Authority shall make Advance Payment up to 15% (fifteen per cent) of the Contract Price. The payment shall be made in two installments of up to maximum 7.5% (seven

and half per cent) of the contract price each on fulfilment of conditions stipulated in clause 17.2.2 and 17.2.3.

17.3 Procedure for estimating the payment for the Works

17.3.1 The Authority shall make interim payments to the Contractor, as certified by the Authority Engineer on completion of a Stage, for a length, number or area as specified, and valued in accordance with the proportion of the Price assigned to each item and its stage and payment procedure in Schedule-G *or/and as per actual execution of items as specified for works under schedule G1*.

17.3.2 The Contractor shall base its claim for interim payment for the stages completed for works under schedule G or***/and*** as per execution of items for works under schedule G1 till the end of the month for which the payment is claimed, valued in accordance with Clause 17.3.1, supported with necessary particulars and documents in accordance with this Agreement.

17.3.3 Any reduction in the Contract Price arising out of Change of Scope or the Works withdrawn under Clause 8.3, as the case may be, shall not affect the amounts payable for the items or stage payments thereof which are not affected by such Change of Scope or withdrawal. For the avoidance of doubt and by way of illustration, the Parties agree that if the amount assigned to [Important Bridges and/or Major Bridges] is reduced from Rs.100 crore to Rs. 80 crore owing to Change of Scope or withdrawal of Works, as the case may be, the reduction in payment shall be restricted to the relevant payments for [Important Bridges and/or Major Bridges] and the payment due in respect of all other stage payments under the item [Important Bridges and/or Major Bridges] shall not be affected in any manner. The Parties further agree that the adjustments arising out of the aforesaid modifications shall be carried out in a manner that the impact of such modifications is restricted to the said Change of Scope or withdrawal, as the case may be, and does not alter the payments due for and in respect of items or stage payments which do not form part of such Change of Scope or withdrawal.

17.4 Stage Payment Statement for Works

The Contractor shall submit a statement (the "**Stage Payment Statement**"**)**, in 3 copies, by the 7th (seventh) day of a month to the Authority Engineer in the form set forth in Schedule-M, showing the amount calculated in accordance with Clause 17.3 to which the Contractor considers itself entitled for the completed stage(s) of Works under schedule G or***/and*** completed items of works under schedule G1. The Stage Payment Statement shall be accompanied with the progress reports and any other supporting documents. The Contractor shall not submit any claim for payment of incomplete stages of work. In the event that there is no claim for a month in accordance with the provisions of this Clause 17.4, the Contractor shall submit a nil claim to the Authority Engineer.

17.5 Stage Payment for Works

17.5a **Monthly Maintenance Statement of the Project KAVACH**

The Contractor shall submit to the Authority Engineer a monthly maintenance statement ("Monthly Maintenance Statement") in 3 (three) copies by the 7th (seventh)

day of each month in the format set forth in Schedule-M for the Maintenance of the Project KAVACH during the previous month.

17.5b **Payment for Maintenance of the Project KAVACH**

(i) Within 15 (fifteen) days of receipt of the Monthly Maintenance Statement from the Contractor pursuant to Clause 17.5a, the Authority Engineer shall verify the Contractor's monthly maintenance statement and certify the amount to be paid to the Contractor taking into account:

(a) Compliance with the Maintenance Requirements; and

(b) reduction for non-compliance with the Maintenance Requirement in accordance with Clause 17.5b.

The Authority Engineer shall deliver to the Authority an IPC approving or amending the monthly maintenance statement to reflect the amount due to the Contractor in accordance with this Agreement.

(ii) If the Maintenance Requirements set forth in Schedule-Q are not met, reduction in payments shall be made in accordance with the provisions of Schedule-R. The reductions for non-compliance with the Maintenance Requirements shall be applied on the basis of monthly inspections by the Authority Engineer.

(iii) The deduction made on account of non-compliance with the Maintenance Requirements shall not be subsequently considered for payment after the compliance is achieved by repair or rectification.

(iv) The monthly lump sum amount payable for Maintenance shall be $1/12^{th}$ (one-twelfth) of the annual cost of Maintenance as specified in Clause 15A.1.

(v) The Authority shall pay to the Contractor every quarter any amount due under any IPC under this Clause 17.5b. The payment shall be made no later than 30 (thirty) days from the date of submission of the last IPC for the relevant quarter.

17.5.1 Within 04 (four) days of receipt of the Stage Payment Statement from the Contractor pursuant to Clause 17.4, the Authority Engineer shall broadly determine the amount due to the Contractor and recommend the release of 80 (eighty) percent of the amount so determined as part payment against the Stage Payment Statement, pending issue of the Interim Payment Certificate (IPC) by the Authority Engineer. Within 03 (three) days of the receipt of recommendation of the Authority Engineer as above, the Authority shall make electronic payment directly to the Contractor's bank account.

17.5.2 Within 20 (twenty) days of the receipt of the Stage Payment Statement referred to in Clause 17.4, the Authority Engineer shall determine and shall deliver to the Authority and the Contractor an IPC certifying the amount due and payable to the Contractor, after adjusting the payments already released to the Contractor against the said statement. For the avoidance of doubt, the Parties agree that the IPC shall specify all the amounts that have been deducted from the Stage Payment Statement and the reasons there for.

17.5.3 In cases where there is a difference of opinion as to the value of any stage, the opinion of the Authority Engineer shall prevail and interim payments shall be made to the Contractor on this basis; provided that the foregoing shall be without prejudice to the Contractor's right to raise a Dispute.

17.5.4 The Authority Engineer may, for reasons to be recorded, withhold from payment:

(a) the estimated value of work or obligation that the Contractor has failed to perform in accordance with this Agreement and in respect of which the Authority Engineer had notified the Contractor; and

(b) the estimated cost of rectification of any Works which have not been constructed in accordance with this Agreement.

17.5.5 Payment by the Authority shall not be deemed to indicate the Authority acceptance, approval, consent or satisfaction with the work done.

17.5.6 In the event the amounts released by the Authority under Clause 17.5.1 exceed the amount finally determined by the Authority Engineer pursuant to Clauses 17.5.2 to 17.5.4, the difference thereof shall be accounted for in the next IPC.

17.6 Payment of Damages

17.6.1 The Contractor as well as the Authority may claim Damages due and payable to it in accordance with the provisions of this Agreement.

17.6.2 The Authority Engineer shall verify and check the claim and issue the IPC within 20 (twenty) days of the receipt of the claim under Clause 17.6.1, after making adjustments in accordance with the provisions of this Agreement. The Authority shall pay to the Contractor the amount due under such IPC within a period of 30 (thirty) days from the date of the submission of the claim under this Clause 17.6. In the event of the failure of the Authority to make payment to the Contractor within the specified time, the Authority shall be liable to pay to the Contractor interest thereon and the provisions of Clause 17.7 shall apply *mutatis mutandis* thereto.

17.7 Time of payment and interest

17.7.1 The Authority shall pay to the Contractor any amount due under any payment certificate issued by the Authority Engineer in accordance with the provisions of this Article 17, or in accordance with any other clause of this Agreement as follows:

(a) Payment shall be made no later than 30 (thirty) days from the date of submission of the Stage Payment Statement by the Contractor to the Authority Engineer for certification in accordance with the provisions of Clause 17.4 for an IPC; provided, however, that in the event the IPC is not issued by the Authority Engineer within the aforesaid period of 30 (thirty) days, the Authority shall pay the amount shown in the Contractor's Stage Payment Statement and any discrepancy therein shall be adjusted in the next payment certificate; and

(b) payment shall be made no later than30 (thirty) days from the date of submission of the Final Payment Certificate for Works along with the discharge submitted to the Authority Engineer for certification in accordance with the provisions of Clause 17.12.

17.7.2 In the event of failure of the Authority to make payment to the Contractor within the time period specified in this Clause 17.7, the Authority shall be liable to pay to the Contractor interest at a rate equal to the Bank Rate plus 3%, calculated at quarterly rests, on all sums remaining unpaid from the date by which the same should have been paid, calculated in accordance with the provisions of Clause 17.7.1 (a) and (b) and till the date of actual payment.

17.8 Price adjustment for Works

17.8.1 The amounts payable to the Contractor for Works shall be adjusted in accordance with the provisions of this Clause 17.8.

17.8.2 Subject to the provisions of Clause 17.8.3, the amounts payable to the Contractor for Works shall be adjusted in the IPC issued by the Authority Engineer for the increase or decrease in the index cost of inputs for the works, by the addition or subtraction of the amounts determined by the formulae specified in Clause 17.8.4.

17.8.3 To the extent that any compensation or reimbursement for increase or decrease in costs to the Contractor is not covered by the provisions of this or other Clauses in this Agreement, the costs and prices payable under this Agreement shall be deemed to include the amounts required to cover the contingency of such other increase or decrease of costs and prices.

17.8.4 The Contract Price for Works under schedule G shall be adjusted for increase or decrease in rates and prices of labour, Materials, fuel and lubricants, equipment, Machinery, Plant and other Materials or inputs in accordance with the principles, procedures and formulae specified below:[15]

(a) Price adjustment shall be applied on completion of the specified stage of the respective item of work in accordance with Schedule-G. The 1st Quarter will start from Bid Due date month;

(b) Adjustment for each item of work/stage shall be made separately;

(c) The following expressions and meanings are assigned to the value of the work done for civil and track work:

EW = Value of work done for the completion of a stage under the item earthwork;

BRIMP = Value of work done for the completion of a stage under the item Important Bridges;

BR = Value of work done for the completion of a stage under the items Major Bridges, Minor Bridges, RCC box/pipe culverts, Flyovers, RUB, and ROB in accordance with Schedule-G;

---

[15] The following changes may be made for project specific cases:
(a) Deleted.
(b) Deleted.
(c) Deleted.

TRK = Value of work done for the completion of a stage under the item Track Works;

TUNL = Value of work done for the completion of a stage under the items Tunnel;

OEW = Value of work done for the completion of a stage under the item Other Engineering Works;

INVCIV = Value of work done for under the item inventory;

INTGTESTCIV = Value of work done for the item integrated testing and commissioning of the Railway Project.

(d) Price adjustment for change in costs of civil and track work shall be paid in accordance with the following formula:

(i) VEW= 0.85 EW x [PLB x (LBi – LBo)/LBo + PC x (Ci – Co)/Co + PF x (Fi –Fo)/Fo + PMACH x (MACHi – MACHo)/MACHo + POTH x (OTHi - OTHo)/OTHo];

(ii) VBRIMP = 0.85 BRIMP x [PLB x (LBi – LBo)/LBo + PC x (Ci – Co)/Co + PS x (Si – So)/So + PF x (Fi –Fo)/Fo + PMACH x (MACHi – MACHo)/MACHo + POTH x (OTHi - OTHo)/OTHo];

(iii) VBR = 0.85 BR x [PLB x (LBi – LBo)/LBo + PC x (Ci – Co)/Co + PS x (Si – So)/So + PF x (Fi – Fo)/Fo + PMACH x (MACHi – MACHo)/MACHo + POTH x (OTHi - OTHo)/OTHo];

(iv) VTRK = 0.85 TRK x [PLB x (LBi – LBo)/LBo + PC x (Ci – Co)/Co + PS x(Si – So)/So + PF x (Fi –Fo)/Fo + PMACH x (MACHi – MACHo)/MACHo + POTH x (OTHi – OTHo)/OTHo + PR x (Ri - Ro)/Ro];

(v) VTUNL = 0.85 TUNL x [PLB x (LBi – LBo)/LBo + PC x (Ci – Co)/Co + PS x (Si – So)/So + PF x (Fi – Fo)/Fo + PMACH x (MACHi – MACHo)/MACHo + POTH x (OTHi - OTHo)/OTHo + PXLP x (XLPi – XLPo)/XLPo];

(vi) VOEW = 0.85 OEW x [PLB x (LBi – LBo)/LBo + PC x (Ci – Co)/Co + PS x(Si – So)/So + PF x (Fi – Fo)/Fo + PMACH x ((MACHi – MACHo)/MACHo + POTH x (OTHi - OTHo)/OTHo];

(vii) VINVCIV = 0.85 INVCIV x [PR x (Ri – Ro)/Ro + POTH x (OTHi - OTHo)/OTHo]; and

(viii) VINTGTESTCIV = 0.85 INTGTESTCIV x [PLB x (LBi – LBo)/LBo = POTH x (OTHi - OTHo)/OTHo];

Where

VEW = Increase or decrease in the cost of earthwork during the period under consideration due to changes in the rates for relevant components as specified in sub-paragraph (e);

VBRIMP = Increase or decrease in the cost of Important Bridges during the period under consideration due to changes in the rates for relevant components as specified in sub-paragraph (e);

VBR = Increase or decrease in the cost of Major Bridges, Minor Bridges, Flyovers, RCC box/pipe culverts ROB/RUB) during the period under consideration due to changes in the rates for relevant components as specified in sub-paragraph (e);

VTRK = Increase or decrease in the cost of track works during the period under consideration due to changes in the rates for relevant components as specified in sub-paragraph (e);

VTUNL = Increase or decrease in the cost of tunnels during the period under consideration due to changes in the rates for relevant components as specified in sub-paragraph (e);

VOEW = Increase or decrease in the cost of Other Engineering Works during the period under consideration due to changes in the rates for relevant components as specified in sub-paragraph (e);

VINVCIV = Increase or decrease in the cost of inventory during the period under consideration due to changes in the rates for relevant components as specified in sub-paragraph (e);

VINTGTESTCIV = Increase or decrease in the cost of integrated testing and commissioning during the period under consideration due to changes in the rates for relevant components as specified in sub-paragraph (e);

PC, PF, PLB, PMACH, POTH, PR, PS and PXLP are the percentages of cement, fuel and lubricants, labour, Plant Machinery and tools, other materials, rails, steel/ components (including strands and steel cables), and explosives respectively for the relevant item as specified in sub-paragraph (e);

Co = The wholesale price index as published by the Ministry of Commerce and Industry, Government of India (hereinafter called "**WPI**") for sub-group Cement, Lime & Plaster for the month of the Base Month;

Ci = The WPI for sub-group Cement, Lime & Plaster for the average price index of the 3 months of the quarter under consideration;

Fo = The wholesale price index as published by the Ministry of Commerce and Industry, Government of India (hereinafter called "**WPI**") for group Fuel & Power for the month of the Base Month

Fi = The WPI for group Fuel & Power for the average price index of the 3 months of the quarter under consideration

LBo = The consumer price index for industrial workers – All India, published by Labour Bureau, Ministry of Labour, Government of India, (hereinafter called "**CPI**") for the month of the Base Month;

LBi = The CPI for industrial workers – All India for the average price index of the 3 months of the quarter under consideration;

MACHo = The wholesale price index as published by the Ministry of Commerce and Industry, Government of India (hereinafter called "**WPI**") for category- k "Manufacturing of Machinery for Mining, quarrying and construction' under (R) Manufacturing of Machinery and Equipment for the month of the Base Month;

MACHi = The WPI for category- k "Manufacturing of Machinery for Mining, quarrying and construction' under (R) Manufacturing of Machinery and Equipment for the average price index of the 3 months of the quarter under consideration;

OTHo = The wholesale price index as published by the Ministry of Commerce and Industry, Government of India (hereinafter called "**WPI**") for all commodities for the month of the Base Month;

OTHi = The WPI for all commodities for the average price index of the 3 months of the quarter under consideration;

Ro = The Price for Rails (60kg) published by the Bhilai Plant of the Steel Authority of India for the month of the Base Month;

Ri = The Price for Rails (60kg) published by the Bhilai Plant of the Steel Authority of India for the month which is three months prior to the month to which the IPC relates;

So = The rate provided by the Joint Plant Committee for the relevant category of steel item as mentioned in clause17.8.4(A) as published for the month of the Base Month;

Si = The average rate provided by the Joint Plant Committee for the relevant category of steel item as mentioned in clause17.8.4-A as published for the 3 months of the quarter under consideration;

XLPo = The wholesale price index as published by the Ministry of Commerce and Industry, Government of India (hereinafter called "**WPI**") for explosives for the month of the Base Month; and

XLPi = The WPI for explosives for the average price index of the 3 months of the quarter under consideration.

(e) The following percentages shall govern the price adjustment of the Contract Price:

Component	Earthwork	Important Bridges	Major Bridges/ flyovers/ Minor Bridges, CC box/pipe culverts, ROB/RUB	Track works	Tunnels	Other engineering works	Inventory	Integrated testing and commissioning
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
Cement (PC)	***%	***%	***%	***%	***%	***%	-	-
Explosives (PXLP)	-	-	-	-	***%	-	-	-
Fuel and lubricants (PF)	***%	***%	***%	***%	***%	***%	-	-
Labour (PLB)	***%	***%	***%	***%	***%	***%	-	***%
Machinery and Plants (PMACH)	***%	***%	***%	***%	***%	***%	-	
Other Materials (POTH)	***%	***%	***%	***%	***%	***%	***%	***%
Rail (PR)	-	-	-	***%	-	-	***%	-
Steel (PS)	-	***%	***%	***%	***%	***%	-	-
Total	100%	100%	100%	100%	100%	100%	100%	100%

(f) The following expressions and meanings are assigned to the value of the work done for signalling and telecommunication works:

SIGWK = Value of signalling works for a stage payment of the item signalling works;

INVSIG = Value of inventory for signalling works for a stage payment of the item inventory for signalling works;

INTGTESTSIG = Value of integrated testing and commission for signalling works of the Railway Project;

COMWK= Value of telecommunication works for a stage payment of the item telecommunication works;

INVCOM = Value of inventory for telecommunication works for a stage payment of the item inventory for telecommunication works; and

INTGTESTCOM = Value of integrated testing and commission for telecommunication works of the Railway Project.

(g) Price adjustment for changes in cost of signalling works and telecommunication works shall be paid in accordance with the following formula:

(i) VSIGWK = 0.85 SIGWK x [PELEX x (ELEXi – ELEXo)/ ELEXo + POFC x (OFCi – OFCo)/OFCo + PLB x (LBi – LBo)/LBo + POTH x (OTHi - OTHo)/OTHo + S30C x ($P30C_i$ – $P30C_o$)/ $P30C_o$ + S24C x ($P24C_i$ – $P24C_o$)/ $P24C_o$ + S19C x ($P19C_i$ – $P19C_o$)/ $P19C_o$ + S12C x ($P12C_i$ – $P12C_o$)/ $P120C_o$ + S9C x ($P9C_i$ – $P9C_o$)/ $P9C_o$ + S6C x ($P6C_i$ – $P6C_o$)/ $P6C_o$ + S4C x ($P4C_i$ – $P4C_o$)/ $P4C_o$ + S2C x ($P2C_i$ – $P2C_o$)/ $P2C_o$ + S12C2.5 x ($P12C2.5_i$ – $P12C2.5_o$)/ $P12C2.5_o$ + S2C2.5 x ($P2C2.5_i$ – $P2C2.5_o$)/ $P2C2.5_o$ + S2C25 x ($P2C25_i$ – $P2C25_o$)/ $P2C25_o$ + QC x (PQC_i – PQC_o)/ PQC_o;

(ii) VINVSIG = 0.85 SIGWK x [PELEX x (ELEXi – ELEXo)/ ELEXo + POTH x (OTHi - OTHo)/OTHo];

(iii) VINTGTESTSIG = 0.85 INTGTESTSIG x [PLB x (LBi – LBo)/LBo + POTH x (OTHi - OTHo)/OTHo];

(iv) VCOMWK = 0.85 COMWK x [PELEX x (ELEXi – ELEXo)/ ELEXo + POFC x (OFCi – OFCo)/OFCo + PLB x (LBi – LBo)/LBo + POTH x (OTHi - OTHo)/OTHo + S30C x ($P30C_i$ – $P30C_o$)/ $P30C_o$ + S24C x ($P24C_i$ – $P24C_o$)/ $P24C_o$ + S19C x ($P19C_i$ – $P19C_o$)/ $P19C_o$ + S12C x ($P12C_i$ – $P12C_o$)/ $P120C_o$ + S9C x ($P9C_i$ – $P9C_o$)/ $P9C_o$ + S6C x ($P6C_i$ – $P6C_o$)/ $P6C_o$ + S4C x ($P4C_i$ – $P4C_o$)/ $P4C_o$ + S2C x ($P2C_i$ – $P2C_o$)/ $P2C_o$ + S12C2.5 x ($P12C2.5_i$ – $P12C2.5_o$)/ $P12C2.5_o$ + S2C2.5 x ($P2C2.5_i$ – $P2C2.5_o$)/ $P2C2.5_o$ + S2C25 x ($P2C25_i$ – $P2C25_o$)/ $P2C25_o$ + QC x (PQC_i – PQC_o)/ PQC_o+ PCEQP x (CEQPi – CEQPo)/CEQPo];

(v) VINVCOM = 0.85 SIGWK x [PELEX x (ELEXi – ELEXo)/ ELEXo + PCEQP x (CEQPi – CEQPo)/CEQPo + POTH x (OTHi - OTHo)/OTHo]; and

(vi) VINTGTESTCOM = 0.85 INTGTESTCOM x [PLB x (LBi – LBo)/LBo + POTH x (OTHi - OTHo)/OTHo]. Where

VSIGWK = Increase or decrease in the cost of signalling works during the period under consideration due to changes in the rates for relevant components as specified in sub-paragraph (h);

VINVSIG = Increase or decrease in the cost of inventory for signalling during the period under consideration due to changes in the rates for relevant components as specified in sub-paragraph (h);

VINTGTESTSIG = Increase or decrease in the cost of integrated testing and commissioning of signalling works of the Railway Project during the period under consideration due to changes in the rates for relevant components as specified in sub-paragraph (h);

VCOMWK = Increase or decrease in the cost of communication works during the period under consideration due to changes in the rates for relevant components as specified in sub-paragraph (h);

VINVCOM = Increase or decrease in the cost of inventory for telecommunications works during the period under consideration due to changes in the rates for relevant components as specified in sub-paragraph (h);

VINTGTESTCOM = Increase or decrease in the cost of integrated testing and commissioning of telecommunication works of the Railway Project during the period under consideration due to changes in the rates for relevant components as specified in sub-paragraph (h);

PCEQP, PELEX, PIC, PLB, POFC, and POTH are the percentages of communication equipment, electronics, PVC insulated cables, labour, optical fibre cables, and other materials respectively;

CEQPo = The wholesale price index as published by the Ministry of Commerce and Industry, Government of India (hereinafter called "**WPI**") for communication equipment for the month of the Base Month ;

CEQPi = The WPI for communication equipment for the average price index of the 3 months of the quarter under consideration;

ELEXo = The WPI for electronics for the month of the Base Month;

ELEXi = The WPI for electronics for the average price index of the 3 months of the quarter under consideration;

$P30C_i$ = Price payable per Km as adjusted in accordance with price variation Clause for size 30C x 1.5 sq mm signalling cable

$P30C_o$ = Price per Km of cable as per purchase order/ Contract agreement.

S30C = Percentage of size 30C x 1.5 sq mm signalling cable shall govern the price adjustment of the contract price for signalling and telecommunication works.

$P24C_i$ = Price payable per Km as adjusted in accordance with price variation Clause for size 24C x 1.5 sq mm signalling cable

$P24C_o$ = Price per Km of cable as per purchase order/ Contract agreement.

S24C = Percentage of size 24C x 1.5 sq mm signalling cable shall govern the price adjustment of the contract price for signalling and telecommunication works.

$P19C_i$ = Price payable per Km as adjusted in accordance with price variation Clause for size 19C x 1.5 sq mm signalling cable

$P19C_o$ = Price per Km of cable as per purchase order/ Contract agreement.

S19C = Percentage of size 19C x 1.5 sq mm signalling cable shall govern the price adjustment of the contract price for signalling and telecommunication works.

$P12C_i$ = Price payable per Km as adjusted in accordance with price variation Clause for size 12C x 1.5 sq mm signalling cable

$P12C_o$ = Price per Km of cable as per purchase order/ Contract agreement.

S12C = Percentage of size 12C x 1.5 sq mm signalling cable shall govern the price adjustment of the contract price for signalling and telecommunication works.

$P9C_i$ = Price payable per Km as adjusted in accordance with price variation Clause for size 9C x 1.5 sq mm signalling cable

$P9C_o$ = Price per Km of cable as per purchase order/ Contract agreement.

S9C = Percentage of size 9C x 1.5 sq mm signalling cable shall govern the price adjustment of the contract price for signalling and telecommunication works.

$P6C_i$ = Price payable per Km as adjusted in accordance with price variation Clause for size 6C x 1.5 sq mm signalling cable

$P6C_o$ = Price per Km of cable as per purchase order/ Contract agreement.

S6C = Percentage of size 6C x 1.5 sq mm signalling cable shall govern the price adjustment of the contract price for signalling and telecommunication works.

$P4C_i$ = Price payable per Km as adjusted in accordance with price variation Clause for size 4C x 1.5 sq mm signalling cable

$P4C_o$ = Price per Km of cable as per purchase order/ Contract agreement.

S4C = Percentage of size 4C x 1.5 sq mm signalling cable shall govern the price adjustment of the contract price for signalling and telecommunication works.

$P2C_i$ = Price payable per Km as adjusted in accordance with price variation Clause for size 2C x 1.5 sq mm signalling cable

$P2C_o$ = Price per Km of cable as per purchase order/ Contract agreement.

S2C = Percentage of size 2C x 1.5 sq mm signalling cable shall govern the price adjustment of the contract price for signalling and telecommunication works.

$P12C2.5_i$ = Price payable per Km as adjusted in accordance with price variation Clause for size 12C x 2.5 sq mm signalling cable

$P12C2.5_o$ = Price per Km of cable as per purchase order/ Contract agreement.

S12C2.5 = Percentage of size 12C x 2.5 sq mm signalling cable shall govern the price adjustment of the contract price for signalling and telecommunication works.

$P2C2.5_i$ = Price payable per Km as adjusted in accordance with price variation Clause for size 2C x 2.5 sq mm signalling cable

$P2C2.5_o$ = Price per Km of cable as per purchase order/ Contract agreement.

S2C2.5 = Percentage of size 2C x 2.5 sq mm signalling cable shall govern the price adjustment of the contract price for signalling and telecommunication works.

$P2C25_i$ = Price payable per Km as adjusted in accordance with price variation Clause for size 2C x 25 sq mm signalling cable

$P2C25_o$ = Price per Km of cable as per purchase order/ Contract agreement.

S2C25 = Percentage of size 2C x 25 sq mm signalling cable shall govern the price adjustment of the contract price for signalling and telecommunication works.

PQC_i = Price payable per Km as adjusted in accordance with price variation Clause for size 0.9mm dia, 6 Quad cable.

PQC_o= Price per Km of cable as per purchase order/ Contract agreement.

QC = Percentage of size 0.9mm dia, 6 Quad cable shall govern the price.

LBo = The consumer price index for industrial workers – All India, published by Labour Bureau, Ministry of Labour, Government of India, (hereinafter called "**CPI**") for the month of the Base Month;

LBi = The CPI for industrial workers – All India for the average price index of the 3 months of the quarter under consideration;

OFCo = The WPI for fibre cables for the month of the Base Month;

OFCi = The WPI for fibre cables for the average price index of the 3 months of the quarter under consideration;

OTHo = The WPI for all commodities for the month of the Base Month; and

OTHi = The WPI for all commodities for the average price index of the 3 months of the quarter under consideration.

(h) The following percentages shall govern the price adjustment of the Contract Price for signalling and telecommunication works:

Component	Signalling			Telecommunication		
	Signalling Works	Signalling inventory	Integrated testing and Commissioning	Telecommunication Works	Telecomm inventory	Integrated testing and Commissioning
Electronics (PELEX)	29.836 %	–	–	–	–	–
Communication Equipment (PCEQP)	–	–	–	–	–	–
Optical Fibre Cable (POFC)	16.66 %	–	–	–	–	–
30C x 1.5 sq mm signalling cable(S30C)	–	–	–	–	–	–
24C x 1.5 sq mm signalling cable (S24C)	–	–	–	–	–	–
19Cx 1.5 sq mm signalling cable (S19C)	–	–	–	–	–	–
12C x 1.5 sq mm signalling cable (S12C)	0.552 %	–	–	–	–	–
9C x 1.5 sq mm signalling cable (S9C)	–	–	–	–	–	–
6C x 1.5 sq mm signalling cable (S6C)	–	–	–	–	–	–
4C x 1.5 sq mm signalling cable (S4C)	–	–	–	–	–	–
2C x 1.5 sq mm signalling cable (S2C)	–	–	–	–	–	–
12C x 2.5 sq mm signalling cable (S12C2.5)	–	–	–	–	–	–
2C x 2.5 sq mm signalling cable (S2C2.5)	–	–	–	–	–	–
2C x 25 sq mm signalling cable	–	–	–	–	–	–

(S2C25)						
0.9 mm dia, 6Quad cable (QC)	0.268 %	_	_	_	_	_
Labour (PLB)	26.754 %	_	_	_	_	_
Other materials	25.930 %	100%	_	_	_	_
Total	100%	100%	100%	100%	100%	100%

Note: PVC is not applicable for Loco Kavach or part thereof.

(a) PRICE VARIATION FORMULA FOR SIGNALING & TELECOM CABLE

The price payable for signalling cables is variable as per Price Variation Formula given below:

For Signalling Copper Cables:

P_i= Po+CuF (Cu-Cuo) + CCFcu(CC-CCo) + FeF (Fe-Feo)

For Telecom Copper Cables For Jelly Filled, 0.9 mm dia, 6 quad cable

P_i= Po+CuF (Cu-Cuo) + AlFcu(Al-Alo) + CCFcu (CC-Cco) + FeF (Fe-Feo)

For Aluminium Power Cables:

P_i= Po+AlF (Al-Alo) + CCFAl(CC-CCo) + FeF (Fe-Feo)

Where,

P_i= Price payable per KM as adjusted in accordance with Price variation clause.

Po= Price per KM of cable as per Purchase order.

CuF= Variation factor for Copper

Cuo= Price of copper Rod in Rs. Per MT

CCFCu= Variation factor for PVC Compound for Copper Signalling & Telecom cable

CCo= Price of PVC Compound in Rs. Per MT

AlF= Variation factor for Aluminium

Alo= Price of EC grade LME Aluminium rods (Properzi rods) in Rs. Per MT.

CCFAl = Variation factor for PVC Compound for Aluminium power cable

FeF= Variation factor for Steel

Feo= Price of Steel for Armour (Flat strip 4 mm. x 0.8mm/ Round 1.4mm dia) in Rs. Per MT

(Prices per MT for Cuo, CCo, Feo, Alo as applicable on the 1st working day of the month, one month prior to the deadline for submission of bids. The above prices and indices are as published by IEEMA vide circular reference no. IEEMA (PVC) /CABLE --/--/-- one month prior to the deadline for submission of bids.)

Cu= Price of Copper Rod in Rs. Per MT.

CC= Price of PVC Compound in Rs. Per MT.
Fe= Price of Steel for Armouring (Flat strip 4mm x 0.8 mm/ Round 1.4mm dia) in Rs. Per MT.
Al = Price of EC grade LME Aluminium rods (Properzi rods) in Rs. Per MT. **(Prices per MT for Cu, CC, Fe, Al as prevailing on 1st working day of the calendar month covering the date One month prior to the date of inspection call letter will be applicable for the calculation of updated price. The above prices and indices are as published by IEEMA vide circular reference no. IEEMA (PVC) /CABLE --/--/-- one month prior to the date of inspection.)**
The value of variation factors for copper, steel and PVC Compound are different for different sizes of signalling cables. Accordingly, the PVC formula for some of the types of signalling cable is as given under:-
Underground Railway Signalling Cable unscreened and armoured copper conductor

(i) Size 30 C x 1.5 sq.mm.
$P30C_i=P30Co+0.391(Cu-Cuo)+0.557(CC-CCo)+0.425(Fe-Feo)$

For armouring, price of steel flat strip of size 4mmx0.8mm is to be taken into consideration.

(ii) Size 24C x 1.5 sq.mm
$P24C_i= P24Co+0.313(Cu-Cuo)+ 0.481 (CC-CCo)+0.398(Fe-Feo)$

For armouring, value of steel flat strip of size 4mmx0.8mm is to be taken into consideration.

(iii) Size 19C x 1.5 sq.mm
$P19C_i= P19Co+0.248(Cu-Cuo) + 0.395(CC-CCo)+0.343(Fe-Feo)$

For armouring, value of steel flat strip of size 4mmx0.8mm is to be taken into consideration.

(iv) Size 12C x 1.5 sq.mm
$P12C_i=P12Co+0.157(Cu-Cuo) + 0.277(CC-CCu)+0.289(Fe-Feo)$

For armouring, value of steel wire size 1.4mm dia is to be taken into consideration.

(v) Size 9C x 1.5 sq.mm
$P9C_i= P9Co+0.117(Cu-Cuo)+0.241(CC-CCu)+0.383(Fe-Feo)$

For armouring, value of steel wire size 1.4mm dia is to be taken into consideration.

(vi) Size 6Cx 1.5 sq.mm
$P6C_i= P6Co+0.078(Cu-Cuo)+0.199(CC-CCu)+0.329(Fe-Feo)$

For armouring, value of steel wire size 1.4mm dia is to be taken into consideration.

(vii) Size 4Cx1.5 sq.mm
$P4C_i=P4Co+0.052(Cu-Cuo)+0.152(CC-CCo)+0.277(Fe-Feo)$

For armouring, value of steel wire size 1.4mm dia is to be taken into consideration.

(viii) Size 2C x 4 sq.mm(multistrand)
$P2C_i= P2Co+0.073(Cu-Cuo)+0.156(CC-CCo)+0.3(Fe-Feo)$

For armouring, value of steel wire size 1.4mm dia is to be taken into consideration.

(ix) Size 12C x 2.5 sq.mm
$P12C2.5_i= P12C2.5o+0.282 (Cu-Cuo)+0.371 (CC-CCo)+0.342 (Fe-Feo)$

For armouring, value of steel flat strip of size 4mmx0.8mm is to be taken into consideration.

(x) Size 2C x 2.5 sq.mm

$P2C2.5_i$= P2C2.5o+0.047 (Cu-Cuo)+0.139 (CC-CCo)+0.277 (Fe-Feo)

For armouring, value of steel wire size 1.4mm dia is to be taken into consideration.

(xi) Size 2C x 25 sq.mm PVC insulated, armoured, Aluminium power cable

$P2C25_i$= P2C25o+0.146 (Al-Alo)+0.303 (CC-CCo)+0.306 (Fe-Feo)

For armouring, value of steel flat strip of size 4mmx0.8mm is to be taken into consideration.

(xii) For Jelly filled, 0.9mm dia, 6 quad cable

PQC_i = PQCo + 0.135 (Al-Alo) + 0.139 (Cu-Cuo) + 0.515 (CC-Cco) + 0.693 (Fe-Feo).

For PVC Compound Grade CW-22, is to be taken into consideration.

(i) The following expressions and meanings are assigned to the value of the work done for electrification works:-Deleted.

(j) Price adjustment for changes in cost for electrification works shall be paid in accordance with the following formula: Deleted.

(k) The following percentages shall govern the price adjustment of the Contract Price for electrification works: Deleted.

17.8.4 (A)

(1) Relevant categories of steel for the purpose of operating Price Variation formula as mentioned in this Clause shall be as under:

SL	Classification	Rates to be used for calculating S_Q or S_B
1.	Reinforcement bars and other rounds	Average of per tonne rates of 10mm dia TMT & 25mm dia TMT; confirming IS1786; Fe 500
2.	All types and sizes of angles, channels and joists	Average of per tonne rates of 'Angle 75x75x6mm, Mild Steel Plate 10mm thickness and Channel 150x75mm; confirming IS2062, E250 Gr "A"
3.	All types and sizes of plates	Average of per tonne rates of 'MS Plates 10mm thickness and 25mm thickness; confirming IS2062, E250 Gr "A"
4.	Any other section of steel not covered in the above categories	Average of price for the 3 categories covered under SL 1, 2 & 3 in this table.

(2). Relevant city for referring "JPC (Joint Plant Committee)"rates of steel items (SQ /SB) in different Zonal Railways shall be as under :

SL	City	Railway
1.	Delhi	Northern , North Central, North Eastern, North Western
2.	Kolkata	Eastern, East Central, East Coast, Northeast Frontier, South Eastern, Southeast Central
3.	Mumbai	Central, Western, West Central
4.	Chennai	Southern, South Central & South Western

All these rates shall be as per rates provided by JPC.

17.8.4-B

The Contract Price for Works under schedule G1 shall be adjusted for increase or decrease in rates and prices of labour, Materials, fuel and lubricants, equipment, Machinery, Plant and other Materials or inputs in accordance with the principles, procedures and formulae specified below:

(a) Price adjustment shall be applied on execution of the respective item of work in accordance with Schedule-G1. The 1st Quarter will start from Bid Due date month;

(b) Adjustment for each item of work shall be made as per classification of those item of work. Classification for item/ work for determining applicable components will be mentioned either in the work order against Schedule G1 or sub schedules of G1.

For Civil Engineering Works

SN	Classification / Components		1A & 2	5A	6A	7	8A	9A	1B, 5B, 6B 8B & 9B	1C, 5C, 6C, 8C & 9C	5D,6D, 8D& 9D	5E,6E, 8E& 9E
1	*Fixed*	*	*15*	*15*	*15*	*15*	*15*	*15*	*15*	*15*	*15*	*15*
2	Labour	Lc	20	30	20	50	20	20	0	0	10	25
3	Steel	Sc	0	0	0	0	0	0	85	0	50	0
4	Cement	Cc	0	15	0	0	0	0	0	85	0	0
5	Plant Machinery &Spares	PMc	30	5	20	15	20	30	0	0	10	30
6	Fuel & Lubricants	Fc	25	5	15	15	20	15	0	0	10	20
7	Other Materials	Mc	10	30	30	5	25	20	0	0	5	10
Total			100	100	100	100	100	100	100	100	100	100

*It shall not be considered for any price variation.

The classification mentioned in the table above represents following type of item(s) in the work(s)–

1 Earthwork in Formation

1A All Item(s) excluding 1B or/and 1C

1B Item(s) for supply of Steel

1C Item(s) for supply of Cement

2 Ballast Supply Works

3 DELETED

4 DELETED

5 BuildingWorks

5A All Item(s) excluding 5B or/and 5C or/and 5D or/and 5E

5B Item(s) for supply of Steel

5C Item(s) for supply of Cement

5D Item(s) for Fabrication & Erection of Structures including supply of Steel

5E Item(s) for Fabrication & Erection of Structures excluding supply of Steel.

6 Bridges & Protection work

6A All Item(s) excluding 6B or/and 6C or/and 6D or/and 6E

6B Item(s) for supply of Steel

6C Item(s) for supply of Cement

6D Item(s) for Fabrication, Assembly, Erection& Launching of Girders including supply of Steel

6E Item(s) for Fabrication, Assembly, Erection &Launching of Girders excluding supply of Steel

7 Permanent Way linking Platform,

8 Passenger Amenities

8A All Item(s) excluding 8B or/and 8C or/and 8D or/and 8E

8B Item(s) for supply of Steel item/fittings

8C Item(s) for supply of Cement Item

8D Item(s) for Fabrication & Erection of Structures including supply of Steel

8E Item(s) for Fabrication & Erection of Structures excluding supply of Steel

9 Any Other Works not covered in Classification 1 to 8

9A All Item(s) excluding 9B or/and 9C or/and 9D or/and 9E

9B Item(s) for supply of Steel

9C Item(s) for supply of Cement or/and Grout

9D Item(s) for Fabrication & Erection of Structures including supply of Steel

9E Item(s) for Fabrication & Erection of Structures excluding supply of Steel

Formulae:The Amount of variation in prices in various components (labour,material etc.) shall be worked out by the following formulae:

(i) $L=\frac{(W \text{ or } W_{SF} \text{ or } W_{F} \text{ or } W_{SFL} \text{ or } W_{FL}) \times (L_Q - L_B) \times L_C}{L_B \times 100}$

(ii) $M=\frac{(W \text{ or} W_{SF} \text{or } W_{F} \text{or} W_{SFL} \text{or } W_{FL}) \times (M_Q - M_B) \times M_C}{M_B \times 100}$

(iii) $F = \frac{(W \text{ or } WSF \text{ or } WF \text{ or } WSFL \text{ or } WFL) \times (FQ - FB) \times FC}{FB \times 100}$

(iv) DELETED

(v) $PM = \frac{(W \text{ or } WSF \text{ or } WF \text{ or } WSFL \text{ or } WFL) \times (PMQ - PMB) \times PMC}{PMB \times 100}$

(vi) $S = \frac{(W \text{or} W_S \text{or} W_{SF}) \times (SQ - SB) \times SC}{SB \times 100}$

(vii) $C = \frac{(W \text{or} W_C) \times (CQ - CB) \times CC}{CB \times 100}$

Where,

L Amount of price variation in Labour

M Amount of price variation in Materials

F Amount of price variation in Fuel

PM Amount of price variation in Plant, Machinery and Spares

S Amount of price variation in Steel Supply Item

C Amount of price variation in Cement Supply Item

T Percentage variation payable on the gross value of bill of Concreting (Bill(s) of Quantities for concrete items)

L_C % of Labour Component in the item(s)

M_C % of Material Component in the item(s)

F_C % of Fuel Component in the item(s)

PM_C % of Plant, Machinery and Spares Component in the item(s)

S_C % of Steel Supply item Component in the item(s)

C_C% of Cement Supply item Component in the item(s)

W Gross value of work done by Contractor under work orders in schedule G1 or sub schedule of G1, as per stage payment certificate excluding the Gross value of work under W_S or/and W_C or/and W_{SF} or/and W_F or/and W_{SFL}or/and $W_{FL}$and cost of materials supplied by Railway either free or at fixed rate,

W_S Gross value of work done by Contractor under work orders in schedule G1 or sub schedule of G1, for item(s) of supply of steel.

W_C Gross value of work done by Contractor Gross value of work done by Contractor under work orders in schedule G1 or sub schedule of G1, for item(s) of supply of cement and /or supply of grout material.

W_{SF} Gross value of work done by Contractor Gross value of work done by Contractor under work orders in schedule G1 or sub schedule of G1, for item(s) of Fabrication & Erection of Structures including supply of Steel.

W_F Gross value of work done by Contractor Gross value of work done by Contractor under work orders in schedule G1 or sub schedule of G1, for Fabrication & Erection of Structures excluding supply of Steel.

W_{SFL} Gross value of work done by Contractor Gross value of work done by Contractor under work orders in schedule G1 or sub schedule of G1, for item(s) of Fabrication, Assembly, Erection/Launching of Girders including supply of Steel.

W_{FL} Gross value of work done by Contractor Gross value of work done by Contractor under work orders in schedule G1 or sub schedule of G1, for item(s) of Fabrication, Assembly, Erection/Launching of Girders excluding supply of Steel.

L_B Consumer Price Index for Industrial Workers- All India: Published in R.B.I. Bulletin for the base period

L_Q Consumer Price Index for Industrial Workers- All India: Published in R.B.I. Bulletin for the average price index of the 3 months of the quarter under consideration

M_B Wholesale Price Index: All commodities – as published in the R.B.I. Bulletin for the base period

M_Q Wholesale Price Index: All commodities – as published in the R.B.I. Bulletin for the average price index of the 3 months of the quarter under consideration

F_B The average of official prices of Diesel available on the official website of 'Petroleum Planning and Analysis cell' under Ministry of Petroleum and Natural Gas for Delhi, Kolkata, Mumbai & Chennai, for the base period

F_Q The average of official prices of Diesel available on the official website of 'Petroleum Planning and Analysis cell' under Ministry of Petroleum and Natural Gas for Delhi, Kolkata, Mumbai & Chennai, for the 3 months of the quarter under consideration

PM_B Index Number of Wholesale Prices in India by Groups and Sub Groups (Averages)for 'Manufacture of machinery for mining, quarrying and construction'– published in RBI(Reserve Bank of India) Bulletin, for the base period.

PM_Q Index Number of Wholesale Prices in India by Groups and Sub Groups (Averages)for 'Manufacture of machinery for mining, quarrying and construction'– published in RBI(Reserve Bank of India) Bulletin, for the average price index of 3 months of the quarter under consideration.

S_B The average rate provided by the Joint Plant Committee for the relevant category of steel item as mentioned in Clause 46A.9; for the base period.

S_Q The average rate provided by the Joint Plant Committee for the relevant category of steel item as mentioned in Clause 46A.9; for the 3 months of the quarter under consideration.

C_B Index No. of Wholesale Price Index of sub-group Cement, Lime & Plaster as published in RBI Bulletin for the base period

C_Q No.of Wholesale Price Index of sub-group Cement, Lime & Plasters published in RBI Bulletin for the average price index of the 3 months of the quarter under consideration

Note:--

A) The demands for escalation of cost shall be allowed on the basis of provisional indices as mentioned in the formulae in clause 17.8.6 above. Any adjustment needed to be done based on the finally published indices shall be made as and when they become available.

B) Relevant categories of steel for the purpose of operating Price Variation formula as mentioned in this Clause shall be as under:

SL	Classification	Rates to be used for calculating S_Q or S_B
1.	Reinforcement bars and other rounds	Average of per tonne rates of 10mm dia TMT & 25mm dia TMT; confirming IS1786; Fe 500
2.	All types and sizes of angles, channels and joists	Average of per tonne rates of 'Angle 75x75x6mm, Mild Steel Plate 10mm thickness and Channel 150x75mm; confirming IS2062, E250 Gr "A"
3.	All types and sizes of plates	Average of per tonne rates of 'MS Plates 10mm thickness and 25mm thickness; confirming IS2062, E250 Gr "A"
4.	Any other section of steel not covered in the above categories	Average of price for the 3 categories covered under SL 1, 2 & 3 in this table.

C) Relevant city for referring "JPC (Joint Plant Committee)" rates of steel items (SQ /SB) in different Zonal Railways shall be as under :

SL	City	Railway
1.	Delhi	Northern , North Central, North Eastern, North Western
2.	Kolkata	Eastern, East Central, East Coast, Northeast Frontier, South Eastern, Southeast Central
3.	Mumbai	Central, Western, West Central
4.	Chennai	Southern, South Central & South Western

All these rates shall be as per rates provided by JPC.

17.8.5 In case an IPC relates to a month which is within 3 (three) months from the Base Month, no price adjustment shall be applicable.

17.9 Restrictions on price adjustment

Price adjustment shall be due and payable only in respect of the stages of Works for which the Stage Paymen t Statement has been submitted by the Contractor no later than 30 (thirty) days from the date of the applicable Project Milestone or the Scheduled Completion Date, as the case may be, including any Time Extension granted there for in accordance with the

provisions of this Agreement. For the avoidance of doubt, in the event of submission of any Stage Payment Statement after the period specified herein, price adjustment shall be applicable only until the date of the respective Project Milestone or the Scheduled Completion Date, as the case may be.

17.9a **Price adjustment for Maintenance of Project KAVACH**

Lump sum payment for Maintenance shall be adjusted every quarter for changes in rates and prices of various inputs in accordance with the formula given below:

$V = P \times (Wi - W0)/W0$

Where

V = Increase or decrease in the quarterly lump sum payment

P = Quarterly lump sum payment due to the Contractor after adjusting any reduction in payment for non-compliance of the Maintenance Requirements

W0 = The wholesale price index (all commodities) for the month of the Base Date.

Wi = The wholesale price index (all commodities) for the first day of the quarter under consideration for determining the price adjustment

17.10 Final Payment Statement

17.10.1 Within 60 (sixty) days of receiving the Completion Certificate under Clause 12.4, the Contractor shall submit to the Authority Engineer six copies of a final payment statement (the "**Final Payment Statement**"), with supporting documents, in the form prescribed by the Authority Engineer:

(a) the summary of Contractor's Stage Payment Statements for Works as submitted in accordance with Clause 17.4;
(b) the amounts received from the Authority against each claim; and
(c) any further sums which the Contractor considers due to it from the Authority.

If the Authority Engineer disagrees with or cannot verify any part of the Final Payment Statement, the Contractor shall submit such further information as the Authority Engineer may reasonably require. The Authority Engineer shall deliver to the Authority:

(i) an IPC for those parts of the Final Payment Statement which are not in dispute, along with a list of disputed items which shall then be settled in accordance with the provisions of Article 24; or

(ii) a Final Payment Certificate in accordance with Clause 17.15, if there are no disputed items.

17.10.2 If the Authority Engineer does not prescribe the form referred to in Clause 17.10.1 within 7 (Seven) days of the date of issue of the Completion Certificate, the Contractor shall submit the statement in such form as it deems fit.

17.11 Discharge

Upon submission of the Final Payment Statement under Clause 17.10, the Contractor shall give to the Authority, with a copy to the Authority Engineer, a written discharge confirming that the total of the Final Payment Statement represents full and final settlement of all monies due to the Contractor in respect of this Agreement for all the Works arising out of this Agreement, except for any monies due to either Party on account of any Defect. Provided that such discharge shall become effective only after the payment due has been made in accordance with the Final Payment Certificate issued pursuant to Clause 17.12.

17.12 Final Payment Certificate

17.12.1 Within 30 (thirty) days after receipt of the Final Payment Statement under Clause 17.10, and the written discharge under Clause 17.11, and there being no disputed items of claim, the Authority Engineer shall deliver to the Authority, with a copy to the Contractor, a final payment certificate (the "**Final Payment Certificate**") stating the amount which, in the opinion of the Authority Engineer, is finally due under this Agreement or otherwise. For the avoidance of doubt, before issuing the Final Payment Certificate, the Authority Engineer shall ascertain from the Authority all amounts previously paid by the Authority, all sums due to the Authority, and the balance, if any, due from the Authority to the Contractor or from the Contractor to the Authority, as the case may be.

17.12.2 The Authority shall, in accordance with the provisions of Clause 17.7, pay to the Contractor the amount which is specified as being finally due in the Final Payment Certificate.

17.12a **Final payment statement for Maintenance**

(i) Within 30 (thirty) days after completion of the Maintenance Period, the Contractor shall submit to the Authority Engineer 6 (six) copies of the final payment statement for Maintenance of the Project KAVACH, with supporting documents showing the details set forth below in the form prescribed by the Authority Engineer:

(a) the total amount claimed in accordance with clause 17.5b (i) and

(b) any sums which the Contractor considers to be due to it, with supporting documents.

(ii) The Authority Engineer shall certify final payment within 30 (thirty) days of the receipt of the final payment statement of Maintenance under Clause 17.13 (i), segregating the items of amount payable from the items of amount disallowed. The Authority shall make payment on the basis of the final payment authorised by the Authority Engineer within a period of 30 (thirty) days of the receipt of the Final Payment Statement from the Authority Engineer.

(iii) If the Authority Engineer does not prescribe the form within 15 (fifteen) days of the date of issue of the Completion Certificate, the Contractor shall submit the statement in such form as it deems fit.

17.13 Change in law

17.13.1 If as a result of Change in Law, the Contractor suffers any additional costs in the execution of the Works or in relation to the performance of its other obligations under this Agreement, the Contractor shall, within 15 (fifteen) days from the date it becomes reasonably aware of such addition in costs, notify the Authority with a copy to the Authority Engineer of such additional costs due to Change in Law.

17.13.2 If as a result of Change in Law, the Contractor benefits from any reduction in costs for the execution of this Agreement or in accordance with the provisions of this Agreement, either Party shall, within 15 (fifteen) days from the date it becomes reasonably aware of such reduction in costs, notify the other Party with a copy to the Authority Engineer of such reduction in costs due to Change in Law.

17.13.3 The Authority Engineer shall, within15 (fifteen) days from the date of receipt of notice from the Contractor or the Authority, as the case may be, determine any addition or reduction to the Contract Price, as the case may be, due to the Change in Law.

17.14 Correction of Interim Payment Certificates

The Authority Engineer may by an Interim Payment Certificate make any correction or modification in any previous Interim Payment Certificate issued by the Authority Engineer.

17.15 Authority's claims

If the Authority considers itself to be entitled to any payment from the Contractor under any Clause of this Agreement, it shall give notice and particulars to the Contractor 20 (twenty) days before making the recovery from any amount due to the Contractor, and shall take into consideration the representation, if any, made by the Contractor in this behalf, before making such recovery.

17.16 Bonus for early completion

In the event that the Project Completion Date occurs prior to the Scheduled Completion Date, the Contractor shall be entitled to receive a payment of bonus equivalent to 0.03% (zero point zero three per cent) of the Contract Price for each day by which the Project Completion Date precedes the Scheduled Completion Date, but subject to a maximum of 5% (five per cent) of the Contract Price. Provided, however, that the payment of bonus, if any, shall be made only after the issue of the Completion Certificate. For the avoidance of doubt, the Parties agree that for the purpose of determining the bonus payable hereunder, the Contract Price shall always be deemed to be the amount specified in Clause 17.1.1, and shall exclude any revision thereof for any reason.

ARTICLE 18

INSURANCE

18.1 Insurance for Works

18.1.1 The Contractor shall effect and maintain at its own cost the insurances specified in Schedule-N and as per the requirements of Applicable Laws.

18.1.2 Subject to the provisions of Clause 19.6, the Contractor shall, in accordance with the provisions of this Agreement, be liable to bear the cost of any loss or damage that does not fall within the scope of this Article 18 or cannot be recovered from the insurers.

18.1.3 Subject to the exceptions specified in Clause 18.1.4 below, the Contractor shall fully indemnify, hold harmless and defend the Authority from and against any and all losses, damages, costs, charges and/or claims with respect to:

(a) the death of or injury to any person; or

(b) the loss of or damage to any property;

that may arise out of or in consequence of any breach by the Contractor of this Agreement during the execution of the Works or the remedying of any Defects therein.

18.1.4 Notwithstanding anything stated above in Clause 18.1.3, the Authority shall fully indemnify the Contractor from and against any and all losses, damages, costs, charges, proceedings and/or claims arising out of or with respect to

(a) the use or occupation of land or any part thereof by the Authority;

(b) the damage to property which is the unavoidable result of the execution and completion of the Works, or the remedying of any Defects therein, in accordance with this Agreement; and

(c) the death of or injury to persons or loss of or damage to property resulting from any act or neglect of the Authority, its agents, servants or other contractors, not being employed by the Contractor.

Provided, that in the event of any injury or damage as a result of the contributory negligence of the Contractor, the Authority shall be liable to indemnify the Contractor from and against any and all losses, damages, costs, charges, proceedings and/or claims to the extent proportionate to the liability of the Authority, its servants or agents or other contractors not associated with the Contractor in such injury or damage.

18.1.5 Without prejudice to the obligations of the parties as specified under Clauses 18.1.3 and 18.1.4, the Contractor shall maintain or effect such third party insurances as may be required under Applicable Laws.

18.1.6 The Contractor shall provide to the Authority, within 30 days of the Appointed Date, evidence of professional liability insurance maintained by its

Design Director and/or consultants to cover the risk of professional negligence in the design of Works. The professional liability cover shall be for a sum of not less than [3% (three per cent)] of the Contract Price and shall be maintained until the end of the Defects Liability Period.

18.2 Notice to the Authority

No later than 15 (fifteen) days after the date of this Agreement, the Contractor shall by notice furnish to the Authority, in reasonable detail, information in respect of the insurances that it proposes to effect and maintain in accordance with this Article 18. Within 15 (fifteen) days of receipt of such notice, the Authority may require the Contractor to effect and maintain such other insurances as may be necessary pursuant hereto, and in the event of any difference or disagreement relating to any such insurance, the Dispute Resolution Procedure shall apply.

18.3 Evidence of Insurance Cover

18.3.1 All insurances obtained by the Contractor in accordance with this Article 18 shall be maintained with insurers on terms consistent with Good Industry Practice. Within 10(ten) days of obtaining any insurance cover, the Contractor shall furnish to the Authority notarised true copies of the certificate(s) of insurance, copies of insurance policies and premia payment receipts in respect of such insurance, and no such insurance shall be cancelled, modified, or allowed to expire or lapse until the expiration of at least 45 (forty-five) days after notice of such proposed cancellation, modification or non-renewal has been delivered by the Contractor to the Authority. The Contractor shall act in accordance with the directions of the Authority.

18.3.2 The Contractor shall procure and ensure the adequacy of the insurances at all times in accordance with the provisions of this Agreement.

18.4 Remedy for failure to insure

If the Contractor shall fail to effect and keep in force all insurances for which it is responsible pursuant hereto, the Authority shall have the option to either keep in force any such insurances, and pay such premia and recover the costs thereof from the Contractor, or in the event of computation of a Termination Payment, treat an amount equal to the Insurance Cover as deemed to have been received by the Contractor. If either the Contractor or the Authority fails to comply with any condition of the insurances effected under the contract, the Party so failing to comply shall indemnify the other Party against all direct losses and claims (including legal fees and expenses) arising from such failure.

18.5 Waiver of subrogation

All insurance policies in respect of the insurance obtained by the Contractor pursuant to this Article 18 shall include a waiver of any and all rights of subrogation or recovery of the insurers thereunder against, inter alia, the Authority, and its assigns, successors, undertakings and their subsidiaries, Affiliates, employees, insurers and underwriters, and of any right of the insurers to any set-off or counterclaim or any other deduction, whether by

attachment or otherwise, in respect of any liability of any such person insured under any such policy or in any way connected with any loss, liability or obligation covered by such policies of insurance.

18.6 Contractor's waiver

The Contractor hereby further releases, assigns and waives any and all rights of subrogation or recovery against, inter alia, the Authority and its assigns, undertakings and their subsidiaries, Affiliates, employees, successors, insurers and underwriters, which the Contractor may otherwise have or acquire in or from or in any way connected with any loss, liability or obligation covered by policies of insurance maintained or required to be maintained by the Contractor pursuant to this Agreement (other than third party liability insurance policies) or because of deductible clauses in or inadequacy of limits of any such policies of insurance.

18.7 Cross liabilities

Any such insurance maintained or effected in pursuance of this Article 18 shall include a cross liability clause such that the insurance shall apply to the Contractor and to the Authority as separately insured.

18.8 Accident or injury to workmen

Notwithstanding anything contained in this Agreement, it is hereby expressly agreed between the Parties that the Authority shall not be liable for or in respect of any damages or compensation payable to any workman or other person in the employment of the Contractor or Sub-contractor, save and except as for death or injury resulting from any act, omission or default of the Authority, its agents or servants. The Contractor shall indemnify and keep indemnified the Authority from and against all such claims, proceedings, damages, costs, charges, and expenses whatsoever in respect of the above save and except for those acts, omissions or defaults for which the Authority shall be liable.

18.9 Insurance against accident to workmen

The Contractor shall effect and maintain during the Agreement such insurances as may be required to insure the Contractor's personnel and any other persons employed by it on the Railway Project from and against any liability incurred in pursuance of this Article 18 Provided that for the purposes of this Clause 18.9, the Contractor's personnel/any person employed by the Contractor shall include the Sub-contractor and its personnel. Provided further that in respect of any persons employed by any Sub-contractor, the Contractor's obligations to insure as aforesaid under this Clause 18.9 shall be discharged if the Sub-contractor shall have insured against any liability in respect of such persons in such manner that the Authority is indemnified under the policy. The Contractor shall require such Sub-contractor to produce before the Authority, when required, such policy of insurance and the receipt for payment of the current premium within 10 (ten) days of such demand being made by the Authority.

18.10 Application of insurance proceeds

The proceeds from all insurance claims, except for life and injury, shall be applied for any necessary repair, reconstruction, reinstatement, replacement, improvement, delivery or installation of the Railway Project and the provisions of this Agreement in respect of construction of Works shall apply *mutatis mutandis* to the Works undertaken out of the proceeds of insurance.

18.11 Compliance with policy conditions

The Contractor expressly acknowledges and undertakes to fully indemnify the Authority from and against all losses and claims arising from the Contractor's failure to comply with conditions imposed by the insurance policies effected in accordance with this Agreement.

Part V

Force Majeure and Termination

ARTICLE 19

FORCE MAJEURE

19.1 Force Majeure

As used in this Agreement, the expression "**Force Majeure**" or "**Force Majeure Event**" shall mean occurrence in India of any or all of Non-Political Event, Indirect Political Event and Political Event, as defined in Clauses 19.2, 19.3 and 19.4 respectively, if it affects the performance by the Party claiming the benefit of Force Majeure (the "**Affected Party**") of its obligations under this Agreement and which act or event (a) is beyond the reasonable control of the Affected Party, and (b) the Affected Party could not have prevented or overcome by exercise of due diligence and following Good Industry Practice, and (c) has Material Adverse Effect on the Affected Party.

19.2 Non-Political Event

A Non-Political Event shall mean one or more of the following acts or events:

(a) act of God, epidemic, extremely adverse weather conditions, lightning, earthquake, landslide, cyclone, flood, volcanic eruption, chemical or radioactive contamination or ionising radiation, fire or explosion (to the extent of contamination or radiation or fire or explosion originating from a source external to the Site);

(b) strikes or boycotts (other than those involving the Contractor, Sub-contractors or their respective employees/representatives, or attributable to any act or omission of any of them) interrupting supplies and services to the Railway Project for a continuous period of 24 (twenty-four) hours and an aggregate period exceeding 10 (ten) days in an Accounting Year, and not being an Indirect Political Event set forth in Clause 19.3;

(c) any failure or delay of a Sub-contractor but only to the extent caused by another Non-Political Event;

(d) any judgement or order of any court of competent jurisdiction or statutory authority made against the Contractor in any proceedings for reasons other than (i) failure of the Contractor to comply with any Applicable Law or Applicable Permit, or (ii) on account of breach of any Applicable Law or Applicable Permit or of any contract, or (iii) enforcement of this Agreement, or (iv) exercise of any of its rights under this Agreement by the Authority; or (v) breach of its obligations by the Contractor under its sub-contracts;

(e) the discovery of geological conditions, toxic contamination or archaeological remains on the Site that could not reasonably have been expected to be discovered through a site inspection; or

(f) any event or circumstances of a nature analogous to any of the foregoing.

19.3 Indirect Political Event

An Indirect Political Event shall mean one or more of the following acts or events:

(a) an act of war (whether declared or undeclared), invasion, armed conflict or act of foreign enemy, blockade, embargo, riot, insurrection, terrorist or military action, civil commotion or politically motivated sabotage;

(b) industry-wide or State-wide strikes or industrial action for a continuous period of 24 (twenty-four) hours and exceeding an aggregate period of 10 (ten) days in an Accounting Year;

(c) any civil commotion, boycott or political agitation which prevents construction of the Railway Project by the Contractor for an aggregate period exceeding 10 (ten) days in an Accounting Year;

(d) failure of the Authority to permit the Contractor to continue with its Construction Works, with or without modifications, in the event of stoppage of such work after discovery of any geological or archaeological finds;

(e) any failure or delay of a Sub-contractor to the extent caused by any Indirect Political Event;

(f) any Indirect Political Event that causes a Non-Political Event; or

(g) any event or circumstances of a nature analogous to any of the foregoing.

19.4 Political Event

A Political Event shall mean one or more of the following acts or events by or on account of any Government Instrumentality:

(a) Change in Law, only if consequences thereof cannot be dealt with under and in accordance with the provisions of Clause 17.13;

(b) compulsory acquisition in national interest or expropriation of any Project Assets or rights of the Contractor or of the Sub-Contractors;

(c) unlawful or unauthorised or without jurisdiction revocation of, or refusal to renew or grant without valid cause, any clearance, licence, permit, authorisation, no objection certificate, consent, approval or exemption required by the Contractor or any of the Sub-contractors to perform their respective obligations under this Agreement; provided that such delay, modification, denial, refusal or revocation did not result from the Contractor's or any Sub-contractor's inability or failure to comply with any condition relating to grant, maintenance or renewal of such clearance, licence, authorisation, no objection certificate, exemption, consent, approval or permit;

(d) any failure or delay of a Sub-contractor but only to the extent caused by another Political Event; or

(e) any event or circumstances of a nature analogous to any of the foregoing.

19.5 Duty to report Force Majeure Event

19.5.1 Upon occurrence of a Force Majeure Event, the Affected Party shall by notice report such occurrence to the other Party forthwith. Any notice pursuant hereto shall include full particulars of:

(a) the nature and extent of each Force Majeure Event which is the subject of any claim for relief under this Article 19with evidence in support thereof;

(b) the estimated duration and the effect or probable effect which such Force Majeure Event is having or will have on the Affected Party's performance of its obligations under this Agreement;

(c) the measures which the Affected Party is taking or proposes to take for alleviating the impact of such Force Majeure Event; and

(d) any other information relevant to the Affected Party's claim.

19.5.2 The Affected Party shall not be entitled to any relief for or in respect of a Force Majeure Event unless it shall have notified the other Party of the occurrence of the Force Majeure Event as soon as reasonably practicable, and in any event no later than 10 (ten) days after the Affected Party knew, or ought reasonably to have known, of its occurrence, and shall have given particulars of the probable material effect that the Force Majeure Event is likely to have on the performance of its obligations under this Agreement.

19.5.3 For so long as the Affected Party continues to claim to be affected by such Force Majeure Event, it shall provide the other Party with regular (and not less than weekly) reports containing information as required by Clause 19.5.1, and such other information as the other Party may reasonably request the Affected Party to provide.

19.6 Effect of Force Majeure Event on the Agreement

19.6.1 Upon the occurrence of any Force Majeure

(a) prior to the Appointed Date, both Parties shall bear their respective Force Majeure costs.

(b) after the Appointed Date, the costs incurred and attributable to such event and directly relating to this Agreement (the "**Force Majeure costs**") shall be allocated and paid as follows:

(i) upon occurrence of a Non-Political Event, the Parties shall bear their respective Force Majeure costs and neither Party shall be required to pay to the other Party any costs thereof;

(ii) upon occurrence of an Indirect Political Event, all Force Majeure costs attributable to such Indirect Political Event, and not exceeding the Insurance Cover for such Indirect Political Event, shall be borne by the Contractor, and to the extent Force Majeure costs exceed such Insurance Cover, one half of such excess amount shall be reimbursed by the Authority to the Contractor for the Force Majeure events; and

(iii) upon occurrence of a Political Event, all Force Majeure costs attributable to such Political Event shall be reimbursed by the Authority to the Contractor.

For the avoidance of doubt, Force Majeure costs may include costs directly attributable to the Force Majeure Event, but shall not include debt repayment obligations, if any, of the Contractor.

19.6.2 Save and except as expressly provided in this Article 19, neither Party shall be liable in any manner whatsoever to the other Party in respect of any loss, damage, cost, expense, claims, demands and proceedings relating to or arising out of occurrence or existence of any Force Majeure Event or exercise of any right pursuant hereto.

19.6.3 Upon the occurrence of any Force Majeure Event during the Construction Period, the Project Completion Schedule for and in respect of the affected Works shall be extended on a day for day basis for such period as performance of the Contractor's obligations is affected on account of the Force Majeure Event or its subsisting effects, as may be determined by the Authority Engineer.

19.6.4 Force Majeure costs for any event which results in any offsetting compensation being payable to the Contractor by or on behalf of its sub-contractors shall be reduced by such amounts that are payable to the Contractor by its Sub-contractors.

19.7 Termination Notice for Force Majeure Event

If a Force Majeure Event subsists for a period of 60 (sixty) days or more within a continuous period of 120 (one hundred and twenty) days, either Party may in its discretion terminate this Agreement by issuing a Termination Notice to the other Party without being liable in any manner whatsoever, save as provided in this Article 19, and upon issue of such Termination Notice, this Agreement shall, notwithstanding anything to the contrary contained herein, stand terminated forthwith; provided that before issuing such Termination Notice, the Party intending to issue the Termination Notice shall inform the other Party of such intention and grant 15 (fifteen) days time to make a representation, and may after the expiry of such 15 (fifteen) days period, whether or not it is in receipt of such representation, in its sole discretion issue the Termination Notice.

19.8 Termination Payment for Force Majeure Event

19.8.1 In the event of this Agreement being terminated on account of a Non-Political Event, the Termination Payment shall be an amount equal to the sum payable under Clause 21.5.

19.8.2 If Termination is on account of an Indirect Political Event, the Termination Payment shall include:

(a) any sums due and payable under Clause 21.5; and

(b) the reasonable cost, as determined by the Authority Engineer, of the Plant and Materials procured by the Contractor and transferred to the Authority for use in Construction, only if such Plant and Materials are in conformity with the Specifications and Standards;

19.8.3 If Termination is on account of a Political Event, the Authority shall make a Termination Payment to the Contractor in an amount that would be payable under Clause 21.6.2 as if it were an Authority Default.

19.9 Dispute resolution

In the event that the Parties are unable to agree in good faith about the occurrence or existence of a Force Majeure Event, such Dispute shall be finally settled in accordance with the Dispute Resolution Procedure; provided that the burden of proof as to the occurrence or existence of such Force Majeure Event shall be upon the Party claiming relief and/or excuse on account of such Force Majeure Event.

19.10 Excuse from performance of obligations

If the Affected Party is rendered wholly or partially unable to perform its obligations under this Agreement because of a Force Majeure Event, it shall be excused from performance of such of its obligations to the extent it is unable to perform on account of such Force Majeure Event; provided that:

(a) the suspension of performance shall be of no greater scope and of no longer duration than is reasonably required by the Force Majeure Event;

(b) the Affected Party shall make all reasonable efforts to mitigate or limit damage to the other Party arising out of or as a result of the existence or occurrence of such Force Majeure Event and to cure the same with due diligence; and

(c) when the Affected Party is able to resume performance of its obligations under this Agreement, it shall give to the other Party notice to that effect and shall promptly resume performance of its obligations hereunder.

ARTICLE 20

SUSPENSION OF CONTRACTOR'S RIGHTS

20.1 Suspension upon Contractor Default

Upon occurrence of a Contractor Default, the Authority shall be entitled, without prejudice to its other rights and remedies under this Agreement including its rights of Termination hereunder, to (a) suspend carrying out of the Works or any part thereof, and (b) carry out such Works itself or authorise any other person to exercise or perform the same on its behalf during such suspension (the "**Suspension**"). Suspension hereunder shall be effective forthwith upon issue of notice by the Authority to the Contractor and may extend up to a period not exceeding 90 (ninety) days from the date of issue of such notice.

20.2 Authority to act on behalf of Contractor

During the period of Suspension hereunder, all rights and liabilities vested in the Contractor in accordance with the provisions of this Agreement shall continue to vest in the Contractor and all things done or actions taken, including expenditure incurred by the Authority for discharging the obligations of the Contractor under and in accordance with this Agreement shall be deemed to have been done or taken for and on behalf of the Contractor and the Contractor undertakes to indemnify the Authority for all costs incurred during such period. The Contractor hereby licences and sub-licences respectively, the Authority or any other person authorised by it under Clause 20.1 to use during Suspension, all Intellectual Property belonging to or licenced to the Contractor with respect to the Railway Project and its design, engineering, construction and maintenance, and which is used or created by the Contractor in performing its obligations under the Agreement.

20.3 Revocation of Suspension

20.3.1 In the event that the Authority shall have rectified or removed the cause of Suspension within a period not exceeding 60 (sixty) days from the date of Suspension, it shall revoke the Suspension forthwith and restore all rights of the Contractor under this Agreement. For the avoidance of doubt, the Parties expressly agree that the Authority may, in its discretion, revoke the Suspension at any time, whether or not the cause of Suspension has been rectified or removed hereunder.

20.3.2 Upon the Contractor having cured the Contractor Default within a period not exceeding 60 (sixty) days from the date of Suspension, the Authority shall revoke the Suspension forthwith and restore all rights of the Contractor under this Agreement.

20.4 Termination

20.4.1 At any time during the period of Suspension under this Article 20, the Contractor may by notice require the Authority to revoke the Suspension and issue a Termination Notice. The Authority shall, within 15 (fifteen) days of

receipt of such notice, terminate this Agreement under and in accordance with Article 21 as if it is a Contractor Default under Clause 21.1.

20.4.2 Notwithstanding anything to the contrary contained in this Agreement, in the event that Suspension is not revoked within 90 (ninety) days from the date of Suspension hereunder, the Agreement shall, upon expiry of the aforesaid period, be deemed to have been terminated by mutual agreement of the Parties and all the provisions of this Agreement shall apply, *mutatis mutandis*, to such Termination as if a Termination Notice had been issued by the Authority upon occurrence of a Contractor Default.

ARTICLE 21

TERMINATION

21.1 Termination for Contractor Default

21.1.1 Save as otherwise provided in this Agreement, in the event that any of the defaults specified below shall have occurred, and the Contractor fails to cure the default within the Cure Period set forth below, or where no Cure Period is specified, then within a Cure Period of 60 (sixty) days, the Contractor shall be deemed to be in default of this Agreement (the "**Contractor Default**"), unless the default has occurred as a result of any breach of this Agreement by the Authority or due to Force Majeure. The defaults referred to herein shall include:

(a) The Contractor fails to provide, extend or replenish, as the case may be, the Performance Security in accordance with this Agreement;

(b) subsequent to the replenishment or furnishing of fresh Performance Security in accordance with Clause 7.3, the Contractor fails to cure, within a Cure Period of 30 (thirty) days, the Contractor Default for which the whole or part of the Performance Security was appropriated;

(c) the Contractor does not achieve the latest outstanding Project Milestone due in accordance with the provisions of Schedule-I, subject to any Time Extension, and continues to be in default for 45 (forty five) days;

(d) the Contractor abandons or manifests intention to abandon the construction of the Railway Project without the prior written consent of the Authority;

(e) the Contractor fails to proceed with the Works in accordance with the provisions of Clause 10.1 or stops Works for 30 (thirty) days without reflecting the same in the current programme and such stoppage has not been authorised by the Authority Engineer;

(f) the Project Completion Date does not occur within the period specified in Schedule-I for the Scheduled Completion Date, or any extension thereof;

(g) failure to complete the Punch List items within the periods stipulated there for in Clause 12.3;

(h) the Contractor fails to rectify any Defect, the non rectification of which shall have a Material Adverse Effect on the Project, within the time specified in this Agreement or as directed by the Authority Engineer;

(i) the Contractor subcontracts the Works or any part thereof in violation of this Agreement or assigns any part of the Works without the prior approval of the Authority;

(j) the Contractor creates any Encumbrance in breach of this Agreement;

(k) an execution levied on any of the assets of the Contractor has caused a Material Adverse Effect ;

(l) the Contractor is adjudged bankrupt or insolvent, or if a trustee or receiver is appointed for the Contractor or for the whole or material part of its assets that has a material bearing on the Project;

(m) the Contractor has been, or is in the process of being liquidated, dissolved, wound-up, amalgamated or reconstituted in a manner that would cause, in the reasonable opinion of the Authority, a Material Adverse Effect;

(n) a resolution for winding up of the Contractor is passed, or any petition for winding up of the Contractor is admitted by a court of competent jurisdiction and a provisional liquidator or receiver is appointed and such order has not been set aside within 90 (ninety) days of the date thereof or the Contractor is ordered to be wound up by a court except for the purpose of amalgamation or reconstruction; provided that, as part of such amalgamation or reconstruction, the entire property, assets and undertaking of the Contractor are transferred to the amalgamated or reconstructed entity and that the amalgamated or reconstructed entity has unconditionally assumed the obligations of the Contractor under this Agreement; and provided that:

(i) the amalgamated or reconstructed entity has the capability and experience necessary for the performance of its obligations under this Agreement; and

(ii) the amalgamated or reconstructed entity has the financial standing to perform its obligations under this Agreement and has a credit worthiness at least as good as that of the Contractor as at the Appointed Date;

(o) any representation or warranty of the Contractor herein contained which is, as of the date hereof, found to be materially false or the Contractor is at any time hereafter found to be in breach thereof;

(p) the Contractor submits to the Authority any statement, notice or other document, in written or electronic form, which has a material effect on the Authority's rights, obligations or interests and which is false in material particulars;

(q) the Contractor has failed to fulfil any obligation, for which failure Termination has been specified in this Agreement;

(r) the Contractor has failed to make any payment to the Authority within the period specified in this Agreement; or

(s) the Contractor commits a default in complying with any other provision of this Agreement if such a default causes a Material Adverse Effect on the Project or on the Authority.

21.1.2 Without prejudice to any other rights or remedies which the Authority may have under this Agreement, upon occurrence of a Contractor Default, the Authority shall be entitled to terminate this Agreement by issuing a Termination Notice to the Contractor; provided that before issuing the Termination Notice, the Authority shall by a notice inform the Contractor of

its intention to issue such Termination Notice and grant 15 (fifteen) days to the Contractor to make a representation, and may after the expiry of such 15 (fifteen) days, whether or not it is in receipt of such representation, issue the Termination Notice.

21.1.3 After termination of this Agreement for Contractor Default, the Authority may complete the Works and/or procure its completion through any other entity. The Authority and such entity may, for this purpose, use any Materials, Plant and equipment, Contractor's documents and other design documents made by or on behalf of the Contractor.

21.2 Termination for Authority Default

21.2.1 In the event that any of the defaults specified below shall have occurred, and the Authority fails to cure such default within a Cure Period of 90 (ninety) days or such longer period as has been expressly provided in this Agreement, the Authority shall be deemed to be in default of this Agreement (the "**Authority Default**") unless the default has occurred as a result of any breach of this Agreement by the Contractor or due to Force Majeure. The defaults referred to herein shall include:

(a) the Authority commits a material default in complying with any of the provisions of this Agreement and such default has a Material Adverse Effect on the Contractor;

(b) the Authority has failed to make payment of any amount due and payable to the Contractor within the period specified in this Agreement;

(c) the Authority has failed to provide, within a period of 180 (one hundred and eighty) days from the Appointed Date, the environmental clearances and forest clearances required for construction of the Railway Project;

(d) the Authority repudiates this Agreement or otherwise takes any action that amounts to or manifests an irrevocable intention not to be bound by this Agreement; or

(e) the Authority Engineer fails to issue the relevant Interim Payment Certificate within 60 (sixty) days after receiving a statement and supporting documents.

21.2.2 Without prejudice to any other right or remedy which the Contractor may have under this Agreement, upon occurrence of an Authority Default, the Contractor shall be entitled to terminate this Agreement by issuing a Termination Notice to the Authority; provided that before issuing the Termination Notice, the Contractor shall by a notice inform the Authority of its intention to issue the Termination Notice and grant 15 (fifteen) days to the Authority to make a representation, and may after the expiry of such 15 (fifteen) days, whether or not it is in receipt of such representation, issue the Termination Notice.

21.3 Right of Authority to Determine the Contract

Notwithstanding anything herein above, the Authority shall be entitled to determine and terminate the contract at any time should, in the Authority's opinion, the cessation of work becomes necessary owing to paucity of funds or from any other cause whatever, in which case it shall be treated as Authority Default and Termination Payment shall be made as per clause 21.6 below. Notice in writing from the Authority of such determination and the reasons there for shall be conclusive evidence thereof. The termination shall take effect 30 (thirty) days from the date of notice hereunder.

21.4 Requirements after Termination

Upon Termination of this Agreement in accordance with the provisionsof this Article 21, the Contractor shall comply with and conform to the following:

(a) deliver to the Authority all Plant and Materials which shall have become the property of the Authority under this Article 21;

(b) deliver all relevant records, reports, Intellectual Property and other licences pertaining to the Works, other design documents and in case of Termination occurring after the Provisional Certificate has been issued, the "**as built**" Drawings for the Works;

(c) transfer and/or deliver all Applicable Permits to the Authority to the extent permissible under Applicable Laws; and

(d) vacate the Site within 15 (fifteen) days.

21.5 Valuation of Unpaid Works

21.5.1 Within a period of 45 (forty-five) days after Termination under Clause 21.1, 21.2 or 21.3, as the case may be, has taken effect, the Authority Engineer shall proceed in accordance with Clause 16.5 to determine as follows the valuation of unpaid Works (the "**Valuation of Unpaid Works**"):

(a) value of the completed stage of the Works under schedule G or***/and*** as per actual execution of items as specified for works under schedule G1, less payments already made; and

(b) reasonable value of the partially completed stages of works as on the date of Termination, only if such works conform with the Specifications and Standards.

and shall adjust from the sum thereof (i) any other amounts payable or recoverable, as the case may be, in accordance with the provisions of this Agreement; and (ii) all taxes due to be deducted at source.

21.5.2 The Valuation of Unpaid Works shall be communicated to the Authority, with a copy to the Contractor, within a period of 45 (forty five) days from the date of Termination.

21.6 Termination Payment

21.6.1 Upon Termination on account of Contractor Default under Clause 21.1, the Authority shall:

(a) encash and appropriate the Performance Security and Retention Money and in the event the Contractor has failed to replenish or extend the Performance Security, claim the amount stipulated in Clause 7.1.1, as agreed pre-determined compensation to the Authority for any losses, delays andcost of completing the Works, if any;

(b) encash and appropriate the bank guarantee, if any, to the extent of the outstanding Advance Payment and interest thereon; and

(c) pay to the Contractor, by way of Termination Payment, an amount equivalent to the Valuation of Unpaid Works after adjusting any other sums payable or recoverable, as the case may be, in accordance with the provisions of this Agreement, and all taxes due to be deducted at source.

21.6.2 Upon Termination on account of an Authority Default under Clause 21.2 or under Clause 21.3, the Authority shall:

(a) return the Performance Security/Maintenance Security and Retention Money forthwith;

(b) encash and appropriate the bank guarantee, if any, to the extent of the outstanding Advance Payment, including interest thereon; and

(c) pay to the Contractor, by way of Termination Payment, an amount equal to:

(i) Valuation of Unpaid Works;

(ii) the reasonable cost, as determined by the Authority Engineer, of the Plant and Materials procured by the Contractor and transferred to the Authority for its use, only if such Plant and Materials are in conformity with the Specifications and Standards;

(iii) the reasonable cost of temporary works, as determined by the Authority Engineer; and

shall adjust from the sum thereof (i) any other amounts payable or recoverable, as the case may be, in accordance with the provisions of this Agreement, and (ii) all taxes due to be deducted at source.

21.6.3 Termination Payment shall become due and payable to the Contractor within 30 (thirty) days of a demand being made by the Contractor to the Authority with the necessary particulars, after the Valuation of Unpaid Works has been communicated by the Authority Engineer, and in the event of any delay, the Authority shall pay interest at the Bank Rate plus 3% (three percent), calculated at quarterly rests, on the amount of Termination Payment remaining unpaid; provided that such delay shall not exceed 90 (ninety) days. For the avoidance of doubt, it is expressly agreed that Termination Payment shall constitute full discharge by the Authority of its payment obligations in respect thereof hereunder.

21.6.4 The Contractor expressly agrees that Termination Payment under this Article 21 shall constitute a full and final settlement of all claims of the Contractor on account of Termination of this Agreement and that it shall not have any further right or claim under any law, treaty, convention, contract or otherwise.

21.7 Other rights and obligations of the Parties

Upon Termination for any reason whatsoever

(a) property and ownership in all Materials, Plant and Works and the Railway Project shall, as between the Contractor and the Authority, vest in the Authority in whole, free from any and all Encumbrances; provided that the foregoing shall be without prejudice to Clause 21.6;

(b) risk of loss or damage to any Materials, Plant or Works and the care and custody thereof shall pass from the Contractor to the Authority; and

(c) the Authority shall be entitled to restrain the Contractor and any person claiming through or under the Agreement from entering upon the Site or any part of the Project except for taking possession of materials, stores, implements, construction plants and equipment of the Contractor, which have not been vested in the Authority in accordance with the provisions of this Agreement.

21.8 Survival of rights

Notwithstanding anything to the contrary contained in this Agreement any Termination pursuant to the provisions of this Agreement shall be without prejudice to the accrued rights of either Party including its right to claim and recover money damages, insurance proceeds, security deposits, and other rights and remedies, which it may have in law or Agreement. All rights and obligations of either Party under this Agreement, including Termination Payments, shall survive the Termination to the extent such survival is necessary for giving effect to such rights and obligations.

Part VI

Other Provisions

ARTICLE 22

ASSIGNMENT AND CHARGES

22.1 Restrictions on assignment and charges

This Agreement shall not be assigned by the Contractor to any person, save and except with the prior consent in writing of the Authority, which consent the Authority shall be entitled to decline without assigning any reason.

22.2 Hypothecation of Materials or Plant

Notwithstanding the provisions of Clause 22.1, the Contractor may pledge or hypothecate to its lenders, any Materials or Plant prior to their incorporation in the Works. Further, the Contractor may, by written notice to the Authority, assign its right to receive payments under this Agreement either absolutely or by way of charge, to any person providing financing to the Contractor in connection with the performance of the Contractor's obligations under this Agreement. The Contractor acknowledges that any such assignment by the Contractor shall not relieve the Contractor from any obligations, duty or responsibility under this Agreement. For the avoidance of doubt, all Materials and Plants shall, upon their incorporation into Works, be free from any and all Encumbrances without the Authority being required to make any payment to any person on account of any costs, compensation, expenses and charges for such Materials, Plants and Works.

ARTICLE 23

LIABILITY AND INDEMNITY

23.1 **General indemnity:** The Contractor will indemnify, defend, save and hold harmless the Authority and its officers, servants, agents, Government Instrumentalities and Government owned and/or controlled entities/enterprises, (the "Authority Indemnified Persons") against any and all suits, proceedings, actions, demands and third party claims for any loss, damage, cost and expense of whatever kind and nature, whether arising out of any breach by the Contractor of any of its obligations under this Agreement or from any negligence under the Agreement, including any errors or deficiencies in the design documents, or tort or on any other ground whatsoever, except to the extent that any such suits, proceedings, actions, demands and claims have arisen due to any negligent act or omission, or breach or default of this Agreement on the part of the Authority Indemnified Persons.

23.2 Indemnity by the Contractor

23.2.1 Without limiting the generality of Clause 23.1, the Contractor shall fully indemnify, hold harmless and defend the Authority and the Authority Indemnified Persons from and against any and all loss and/or damages arising out of or with respect to:

(a) failure of the Contractor to comply with Applicable Laws and Applicable Permits;

(b) payment of taxes required to be made by the Contractor in respect of the income or other taxes of the Sub-contractors, suppliers and representatives; or

(c) non-payment of amounts due as a result of Materials or services furnished to the Contractor or any of its Sub-contractors which are payable by the Contractor or any of its Sub-contractors.

23.2.2 Without limiting the generality of the provisions of this Article 23, the Contractor shall fully indemnify, hold harmless and defend the Authority Indemnified Persons from and against any and all suits, proceedings, actions, claims, demands, liabilities and damages which the Authority Indemnified Persons may hereafter suffer, or pay by reason of any demands, claims, suits or proceedings arising out of claims of infringement of any domestic or foreign patent rights, copyrights or other Intellectual Property, proprietary or confidentiality rights with respect to any materials, information, design or process used by the Contractor or by the Sub-contractors in performing the Contractor's obligations or in any way incorporated in or related to the Project. If in any such suit, action, claim or proceedings, a temporary restraint order or preliminary injunction is granted, the Contractor shall make every reasonable effort, by giving a satisfactory bond or otherwise, to secure the revocation or suspension of the injunction or restraint order. If, in any such suit, action, claim or proceedings, the Railway Project, or any part thereof or comprised therein, is held to constitute an infringement and its use is permanently enjoined, the Contractor shall promptly make every reasonable effort to secure for the Authority a licence, at no cost to the Authority, authorising continued use of the infringing work. If the Contractor is unable to secure such licence within a reasonable time, the Contractor shall, at its own expense, and without impairing the Specifications and Standards, either replace the affected work, or part, or process thereof with non-infringing work or part or process, or modify the same so that it becomes non-infringing.

23.3 Notice and contest of claims

In the event that either Party receives a claim or demand from a third party in respect of which it is entitled to the benefit of an indemnity under this Agreement (the "**Indemnified Party**") it

shall notify the other Party (the "**Indemnifying Party**") within 15 (fifteen) days of receipt of the claim or demand and shall not settle or pay the claim without the prior approval of the Indemnifying Party, which approval shall not be unreasonably withheld or delayed. In the event that the Indemnifying Party wishes to contest or dispute the claim or demand, it may conduct the proceedings in the name of the Indemnified Party, subject to the Indemnified Party being secured against any costs involved, to its reasonable satisfaction.

23.4 Defence of claims

23.4.1 The Indemnified Party shall have the right, but not the obligation, to contest, defend and litigate any claim, action, suit or proceeding by any third party alleged or asserted against such Party in respect of, resulting from, related to or arising out of any matter for which it is entitled to be indemnified hereunder, and reasonable costs and expenses thereof shall be indemnified by the Indemnifying Party. If the Indemnifying Party acknowledges in writing its obligation to indemnify the Indemnified Party in respect of loss to the full extent provided by this Agreement, the Indemnifying Party shall be entitled, at its option, to assume and control the defence of such claim, action, suit or proceeding, liabilities, payments and obligations at its expense and through the counsel of its choice; provided it gives prompt notice of its intention to do so to the Indemnified Party and reimburses the Indemnified Party for the reasonable cost and expenses incurred by the Indemnified Party prior to the assumption by the Indemnifying Party of such defence. The Indemnifying Party shall not be entitled to settle or compromise any claim, demand, action, suit or proceeding without the prior written consent of the Indemnified Party, unless the Indemnifying Party provides such security to the Indemnified Party as shall be reasonably required by the Indemnified Party to secure the loss to be indemnified hereunder to the extent so compromised or settled.

23.4.2 If the Indemnifying Party has exercised its rights under Clause 23.3, the Indemnified Party shall not be entitled to settle or compromise any claim, action, suit or proceeding without the prior written consent of the Indemnifying Party (which consent shall not be unreasonably withheld or delayed).

23.4.3 If the Indemnifying Party exercises its rights under Clause 23.3, the Indemnified Party shall nevertheless have the right to employ its own counsel, and such counsel may participate in such action, but the fees and expenses of such counsel shall be at the expense of the Indemnified Party, when and as incurred, unless:

(a) the employment of counsel by such party has been authorised in writing by the Indemnifying Party; or

(b) the Indemnified Party shall have reasonably concluded that there may be a conflict of interest between the Indemnifying Party and the Indemnified Party in the conduct of the defence of such action; or

(c) the Indemnifying Party shall not, in fact, have employed independent counsel reasonably satisfactory to the Indemnified Party, to assume the defence of such action and shall have been so notified by the Indemnified Party; or

(d) the Indemnified Party shall have reasonably concluded and specifically notified the Indemnifying Party either:

(i) that there may be specific defences available to it which are different from or additional to those available to the Indemnifying Party; or

(ii) that such claim, action, suit or proceeding involves or could have a material adverse effect upon it beyond the scope of this Agreement:

Provided that if Sub-clauses (b), (c) or (d) of this Clause 23.4.3 shall be applicable, the counsel for the Indemnified Party shall have the right to direct the defence of such claim, demand, action, suit or proceeding on behalf of the Indemnified Party, and the reasonable fees and disbursements of such counsel shall constitute legal or other expenses hereunder.

23.5 No consequential claims

Notwithstanding anything to the contrary contained in this Article 23, the indemnities herein provided shall not include any claim or recovery in respect of any cost, expense, loss or damage of an indirect, incidental or consequential nature, including loss of profit, except as expressly provided in this Agreement.

23.6 Survival on Termination

The provisions of this Article 23shall survive Termination.

ARTICLE 24

DISPUTE RESOLUTION

24.1 Conciliation of Disputes

24.1.1 All disputes and differences of any kind whatsoever arising out of or in connection with the contract, whether during the progress of the work or after its completion and whether before or after the determination of the contract, shall be referred by the Contractor to the "Authority" through “Notice of Dispute” provided that no such notice shall be served later than 30 days after the date of issue of Completion Certificate by the Authority Engineer. Authority shall, within 30 days after receipt of the Contractor’s “Notice of Dispute”, notify the name of conciliator(s) to the Contractor. In case Authority fails to fix Conciliator within 30 days, Contractor shall be free to approach Dispute Adjudication Board (DAB) for adjudication of Dispute.

24.1.2 The Conciliator(s) shall assist the parties to reach an amicable settlement in an independent and impartial manner within the terms of contract. If the parties reach agreement on a settlement of the dispute, they shall draw up and sign a written settlement agreement duly signed by Authority Engineer, Contractor and conciliator(s). When the settlement agreement is signed, it shall be final and binding on the parties. The conciliators shall be paid fee as fixed by Ministry of Railways time to time, which shall be shared equally by the parties.

24.1.3 The parties shall not initiate, during the conciliation proceedings, any reference to DAB or arbitral or judicial proceedings in respect of a dispute that is the subject matter of the conciliation proceedings.

24.1.4 The conciliation shall be carried out as per ‘The Arbitration and Conciliation Act, 1996’ and the proceedings may be terminated as per Section 76 of the above Act.

24.2 Dispute Adjudication Board (DAB)

24.2.1 A dispute/s if not settled through conciliation, shall be referred to DAB. The DAB shall consist of a panel of three Retired Railway Officers not below senior administrative grade (SAG). The DAB shall be formed within 90 days of signing of Contract Agreement. For this purpose, the Authority will maintain a panel of DAB members. The complete panel, which shall not be less than five members, shall be sent by Authority to the Contractor to nominate one member of the DAB from the panel as Contractor’s nominee within two weeks of receipt of the panel. On receipt of Contractor’s nominee, the Authority shall nominate one member from the same panel as Authority’s nominee for the DAB. Both above nominees shall jointly select presiding member of the DAB from the same panel.

24.2.2 The appointment of DAB shall be effectuated by way of a tri-partite agreement among the Authority, Contractor and the respective DAB members. The terms of the remuneration of each member shall be as fixed by Ministry of Railways from time to time. Each party shall be responsible for paying one-half of this remuneration.

24.2.3 If one or more of the members appointed refuses to act as DAB member, or is unable or unwilling to perform his functions as DAB member for any reason whatsoever or dies or in the opinion of the Authority fails to act without undue delay, the parties shall terminate the mandate of such DAB member and thereupon new DAB member shall be appointed in the same manner, as the outgoing DAB member had been appointed.

24.2.4 The appointment of any member may be terminated by mutual agreement of both Parties, but not by the Authority or the Contractor acting alone. Unless otherwise agreed by both the Parties, the appointment of the DAB (including each member) shall expire upon expiry of this Contract Agreement.

24.2.5 Before start of DAB proceedings, each DAB member shall give the following certificate to the Authority and the Contractor:

"I have no any past or present relationship in relation to the subject matter in dispute, whether financial, business, professional or other kind. Further, I have no any past or present relationship with or interest in any of the parties whether financial, business, professional or other kind, which is likely to give rise to justifiable doubts as to my independence or impartiality."

24.2.6 DAB proceedings shall be conducted as decided by the DAB. The DAB shall give its decision within 90 days of a Dispute referred to it by any of the Parties, duly recording the reasons before arriving at the decision. The DAB shall decide the issue within terms and conditions of the contract. This time limit shall be extendable subject to the Parties mutual agreement.

24.2.7 The DAB decision shall not be binding on both the Parties. In case any party is not satisfied by the decision of DAB, then the aggrieved party may approach Standing Arbitral Tribunal for arbitration proceedings. However, even if the aggrieved party had proceeded for Arbitration as per provisions of this agreement, 75% of award amount, pending adjudication by Standing Arbitral Tribunal/Court of Law, shall be made by party to other party. In case payment is to be made by Authority to Contractor, the terms & conditions as incorporated in the Ministry of Railways letter No. 2016/CE(I)/CT/ARB/3(NITI Aayog)/Pt. dated 08th Mar,2017 as amended time to time shall be followed. However, in case Contractor has to pay to the Authority, then 75% of the award amount shall be deducted by the Authority from the running bills or other dues of the Contractor, pending adjudication by Standing Arbitral Tribunal/Court of Law.

24.2.8 No dispute shall be referred to Standing Arbitral Tribunal unless the same has been referred to DAB for adjudication. However, in case DAB is not formed due to any reason, the disputes can be directly referred to Standing Arbitral Tribunal to adjudicate the dispute.

24.2.9 In the specific cases of any misconduct by any of the members of the DAB, the parties shall have the right to specifically bring it to the notice of the DAB such conduct, through a statement filed with necessary documents in proof of such misconduct and the DAB, after taking NOTICE of such conduct initiate the replacement of the member concerned, in the same manner the member to be replaced was appointed.

24.2.10 Once the decision is given by DAB, DAB cannot review the decision at its own or on the request of one party, unless both parties agree for review of decision by DAB.

24.2.11 In case DAB decision is not challenged by either party within 180 days of receipt of decision of DAB, the decision shall be considered as final and parties would be barred for referring the same to Standing Arbitral Tribunal for adjudication.

24.2.12 The obligation of the Authority and the Contactor shall not be altered by reasons of issue being or under reference to DAB.

24.2.13 The DAB shall conduct the proceedings at Jabalpur or any other convenient venue which shall be decided by DAB in consultations with parties.

24.2.14 It is a term of this contract that the Parties shall not approach any Court of Law for settlement of such disputes or differences unless an attempt has first been made by the parties to settle such disputes or differences through DAB and Standing Arbitral Tribunal.

24.3 Standing Arbitral Tribunal

24.3.1 The arbitration proceedings shall be conducted as per 'The Arbitration and Conciliation Act, 1996'. The Arbitral Tribunal shall consist of a panel of three Retired Railway Officers not below senior administrative grade (SAG). The Standing Arbitral Tribunal shall be formed within 90 days of signing of Contract document. For this purpose, the Authority shall maintain a panel of arbitrators. The complete panel, which shall not be less than five members, shall be sent by Authority to the Contractor to nominate one arbitrator from the panel as Contractor's nominee within two weeks of receipt of the panel. On receipt of Contractor's nominee, the Authority shall appoint above contractor's nominee as well as another from the same panel as Authority's nominee as arbitrators. Both above arbitrators shall jointly select presiding arbitrator from the same panel.

24.3.2 If the Contractor fails to select the contractor's nominee from the panel within two weeks of the receipt of the said panel, the Authority shall, after giving one more opportunity to contractor to nominate one as contractor's nominee within next two weeks, appoint two arbitrators from the same panel. Both above arbitrators shall jointly select presiding arbitrator from the same panel.

24.3.3 If one or more of the Arbitrators appointed refuses to act as Arbitrator, withdraws from his office as Arbitrator, or vacates his office or is unable or unwilling to perform his functions as Arbitrator for any reason whatsoever or dies or in the opinion of the Authority fails to act without undue delay, the parties shall terminate the mandate of such arbitrator and thereupon new arbitrator shall be appointed in the same manner, as the outgoing arbitrator had been appointed.

24.3.4 Before start of arbitration proceedings, each appointed arbitrator shall give the following certificate to the Authority and the Contractor:

"I have no any past or present relationship in relation to the subject matter in dispute, whether financial, business, professional or other kind. Further, I have no any past or present relationship with or interest in any of the parties whether financial, business, professional or other kind, which is likely to give rise to justifiable doubts as to my independence or impartiality in terms of The Arbitration and Conciliation Act, 1996."

24.3.5 In the specific cases of any misconduct by any of the members of the TRIBUNAL, the parties shall have the right to specifically bring it to the notice of the TRIBUNAL such conduct, through a statement filed with necessary documents in proof of such misconduct and the TRIBUNAL, after taking NOTICE of such conduct initiate the replacement of the member concerned, in the same manner the member to be replaced was appointed.

24.3.6 Each party has to prepare and furnish to Standing Arbitral Tribunal and other party, once in a every six months, an account giving full and detailed particulars of all claims, which even after decision of DAB are unsettled, to which the parties may consider themselves entitled to during the last preceding six months. If any dispute has arisen as regards execution of the works under the contract, while submitting the said half yearly claims, the parties shall give full particulars of such dispute in the said submission. After signing Contract agreement, within 6 months, the parties shall submit all the claims from date of award of contract in first submission of claims.

24.3.7 The said communication will be the reference of the dispute to the ARBITRAL TRIBUNAL appointed under the present agreement.

24.3.8 The parties shall submit all the relevant documents in support of their claims and the reasons for raising the dispute to the TRIBUNAL.

24.3.9 The said claims of the parties so referred to ARBITRAL TRIBUNAL so far it relates to the disputed claims, shall be treated as Statement of Claims of the parties and the ARBITRAL TRIBUNAL shall call upon the other party to submit its reply. The ARBITRAL TRIBUNAL after giving an opportunity of being heard to both the parties, decide the dispute within a period of Four months from the date of communication of the dispute under clause 24.3.6 above. The Arbitral Tribunal will pass a reasoned award in writing, while deciding the Dispute. Once the award is declared, the Arbitral Tribunal cannot review the same except what is permissible in terms of provisions contained in Arbitration and Conciliation Act. The parties shall be entitled to the remedies under the Arbitration and Conciliation Act 1996 or any amendment thereof.

24.3.10 The parties agree that all the claims of any nature whatsoever, which the parties may have in respect of the work of the preceding six months, should be made in the said Statements of half yearly claims. If the parties do not raise the claim, if any, arising from the work done in the preceding six months in the statement of half yearly claim, to Standing Arbitral Tribunal, the parties shall be deemed to have waived and given up the claims. The ARBITRAL TRIBUNAL shall not entertain such disputes, which have not been raised in the statement of half yearly Claim before the Standing Arbitral Tribunal and such claims will stand excluded from the scope of arbitration and beyond the terms of reference to the ARBITRAL TRIBUNAL.

24.3.11 The parties agree that where the Arbitral award is for payment of money, no interest shall be payable on the whole or any part of the money for any period till the date on which the award is made.

24.3.12 The obligation of the Authority and the Contactor shall not be altered by reasons of arbitration being conducted during the progress of work. Neither party shall be suspended the work on account of arbitration and payments to the contractor shall continue to be made in terms of the contract and /or as awarded (except when Award is challenged in the Court in which case the payments would be as per the court's orders)

24.3.13 The ARBITRAL TRIBUNAL shall remain in force during the entire period the PRINCIPAL CONTRACT is in force and until the closure of the PRINCIPAL CONTRACT with the final no claim certificate, which will be filed with ARBITRAL TRIBUNAL.

24.3.14 The Arbitral Tribunal shall conduct the Arbitration proceedings at Jabalpur or any other convenient venue which shall be decided by Tribunal in consultation with both parties.

24.3.15 The cost of arbitration shall be borne equally by the respective parties. The cost shall inter-alia include fee of the arbitrators as per the rates fixed by the Indian Railways from time to time.

24.3.16 It is a term of this contract that the Contractor shall not approach any Court of Law for settlement of such disputes or differences unless an attempt has first been made by the parties to settle such disputes or differences through conciliation, DAB and Standing Arbitral Tribunal.

24.3.17 Even in case arbitration award is challenged by a party in the Court of Law, 75% of award amount, pending adjudication by Court of Law, shall be made by party to other party. In case payment is to be made by Authority to Contractor, the terms & conditions as incorporated in the Ministry of Railways letter No. 2016/CE(I)/CT/ARB/3(NITI Aayog)/Pt. dated 08th Mar,2017 as amended time to time shall be followed. However, in case Contractor has to pay to the Authority, then 75% of the award amount shall be deducted by the Authority from the running bills or other dues of the Contractor, pending adjudication by Court of Law.

24.3.18 The contract shall be governed by the law for the time being in force in the Republic of India. In case of any disputes/differences resulting in court cases between Contractor & Authority, the jurisdiction shall be of Courts at Jabalpur only.

ARTICLE 25

MISCELLANEOUS

25.1 Governing law and jurisdiction

This Agreement shall be construed and interpreted in accordance with and governed by the laws of India, and the courts at Jabalpur shall have exclusive jurisdiction over matters arising out of or relating to this Agreement.

25.2 Waiver of immunity

Each Party unconditionally and irrevocably:

(a) agrees that the execution, delivery and performance by it of this Agreement constitute commercial acts done and performed for commercial purpose;

(b) agrees that, should any proceedings be brought against it or its assets, property or revenues in any jurisdiction in relation to this Agreement or any transaction contemplated by this Agreement, no immunity (whether by reason of sovereignty or otherwise) from such proceedings shall be claimed by or on behalf of the Party with respect to its assets;

(c) waives any right of immunity which it or its assets, property or revenues now has, may acquire in the future or which may be attributed to it in any jurisdiction; and

(d) consents generally in respect of the enforcement of any judgement or award against it in any such proceedings to the giving of any relief or the issue of any process in any jurisdiction in connection with such proceedings (including the making, enforcement or execution against it or in respect of any assets, property or revenues whatsoever irrespective of their use or intended use of any order or judgement that may be made or given in connection therewith).

25.3 Delayed payments

The Parties hereto agree that payments due from one Party to the other Party under the provisions of this Agreement shall be made within the period set forth therein, and if no such period is specified, within 30 (thirty) days of receiving a demand along with the necessary particulars. In the event of delay beyond such period, the defaulting Party shall pay interest for the period of delay calculated at a rate equal to Bank Rate plus 3% (three percent), save and except as otherwise specified in this Agreement. All interest payment under this Agreement shall, save and except as otherwise specified, be calculated at quarterly rests, and recovery thereof shall be without prejudice to the rights of the Parties under this Agreement including Termination thereof.

25.4 Waiver

25.4.1 Waiver, including partial or conditional waiver, by either Party of any default by the other Party in the observance and performance of any provision of or obligations under this Agreement:

(a) shall not operate or be construed as a waiver of any other or subsequent default hereof or of other provisions of or obligations under this Agreement;

(b) shall not be effective unless it is in writing and executed by a duly authorised representative of the Party; and

(c) shall not affect the validity or enforceability of this Agreement in any manner.

25.4.2 Neither the failure by either Party to insist on any occasion upon the performance of the terms, conditions and provisions of this Agreement or any obligation thereunder nor time or other indulgence granted by a Party to the other Party shall be treated or deemed as waiver of such breach or acceptance of any variation or the relinquishment of any such right hereunder.

25.5 Liability for review of Documents and Drawings

Except to the extent expressly provided in this Agreement:

(a) no review, comment or approval by the Authority or the Authority Engineer of any Document or Drawing submitted by the Contractor nor any observation or inspection of the construction of the Railway Project nor the failure to review, approve, comment, observe or inspect hereunder shall relieve or absolve the Contractor from its obligations, duties and liabilities under this Agreement, Applicable Laws and Applicable Permits; and

(b) the Authority shall not be liable to the Contractor by reason of any review, comment, approval, observation or inspection referred to in Sub-clause (a) above.

25.6 Exclusion of implied warranties etc.

This Agreement expressly excludes any warranty, condition or other undertaking implied at law or by custom or otherwise arising out of any other agreement between the Parties or any representation by either Party not contained in a binding legal agreement executed by both Parties.

25.7 Survival

25.7.1 Termination shall:

(a) not relieve the Contractor or the Authority, as the case may be, of any obligations hereunder which expressly or by implication survive Termination hereof; and

(b) except as otherwise provided in any provision of this Agreement expressly limiting the liability of either Party, not relieve either Party of any obligations or liabilities for loss or damage to the other Party arising out of, or caused by, acts or omissions of such Party prior to the effectiveness of such Termination or arising out of such Termination.

25.7.2 All obligations surviving Termination shall only survive for a period of 3 (three) years following the date of such Termination.

25.8 Entire Agreement

This Agreement and the Schedules together constitute a complete and exclusive statement of the terms of the agreement between the Parties on the subject hereof, and no amendment or modification hereto shall be valid and effective unless such modification or amendment is agreed to in writing by the Parties and duly executed by persons especially empowered in this behalf by the respective Parties. All prior written or oral understandings, offers or other communications of every kind pertaining to this Agreement are abrogated and withdrawn. For the avoidance of doubt, the Parties hereto agree that any obligations of the Contractor arising from the Request for Proposal and bid submissions, as the case may be, shall be deemed to form part of this Agreement and treated as such.

25.9 Severability

If for any reason whatsoever, any provision of this Agreement is or becomes invalid, illegal or unenforceable or is declared by any court of competent jurisdiction or any other instrumentality to be invalid, illegal or unenforceable, the validity, legality or enforceability of the remaining provisions shall not be affected in any manner, and the Parties will negotiate in good faith with a view to agreeing to one or more provisions which may be substituted for such invalid, unenforceable or illegal provisions, as nearly as is practicable to such invalid, illegal or unenforceable provision. Failure to agree upon any such provisions shall not be subject to the Dispute Resolution Procedure set forth under this Agreement or otherwise.

25.10 No partnership

This Agreement shall not be interpreted or construed to create an association, joint venture or partnership between the Parties, or to impose any partnership obligation or liability upon either Party, and neither Party shall have any right, power or authority to enter into any agreement or undertaking for, or act on behalf of, or to act as or be an agent or representative of, or to otherwise bind, the other Party.

25.11 Third parties

This Agreement is intended solely for the benefit of the Parties, and their respective successors and permitted assigns, and nothing in this Agreement shall be construed to create any duty to, standard of care with reference to, or any liability to, any person not a Party to this Agreement.

25.12 Successors and assigns

This Agreement shall be binding upon, and inure to the benefit of the Parties and their respective successors and permitted assigns.

25.13 Notices

Any notice or other communication to be given by any Party to the other Party under or in connection with the matters contemplated by this Agreement shall be in writing and shall:

(a) in the case of the Contractor, be given by facsimile or e-mail and by letter delivered by hand to the address given and marked for attention of the person set out below or to such other person as the Contractor may from time to time designate by notice to the Authority; provided that notices or other communications to be given to an address outside Jabalpur may, if they are subsequently confirmed by sending a copy thereof by

registered acknowledgement due, air mail or by courier, be sent by facsimile or e-mail to the person as the Contractor may from time to time designate by notice to the Authority; GM(S&T)/West Central Railway, Jabalpur.

(b) in the case of the Authority, be given by facsimile or e-mail and by letter delivered by hand and be addressed to the GM(S&T), West Central Railway, Jabalpur with a copy delivered to the Authority Representative or such other person as the Authority may from time to time designate by notice to the Contractor; provided that if the Contractor does not have an office in Jabalpur , it may send such notice by facsimile or e-mail and by registered acknowledgement due, air mail or by courier; and

(c) any notice or communication by a Party to the other Party, given in accordance herewith, shall be deemed to have been delivered when in the normal course of post it ought to have been delivered and in all other cases, it shall be deemed to have been delivered on the actual date and time of delivery; provided that in the case of facsimile or e-mail, it shall be deemed to have been delivered on the working day following the date of its delivery.

25.14 Language

All notices required to be given by one Party to the other Party and all other communications, Documentation and proceedings which are in any way relevant to this Agreement shall be in writing and in English language.

25.15 Counterparts

This Agreement may be executed in two counterparts, each of which, when executed and delivered, shall constitute an original of this Agreement.

25.16 Confidentiality

The Parties shall treat the details of this Agreement as private and confidential, except to the extent necessary to carry out obligations under it or to comply with Applicable Laws. The Contractor shall not publish, permit to be published, or disclose any particulars of the Works in any trade or technical paper or elsewhere without the previous consent of the Authority.

25.17 Copyright and Intellectual Property rights

25.17.1 As between the Parties, the Contractor shall retain the copyright and other Intellectual Property rights in the Contractor's Documents and other design documents made by (or on behalf of) the Contractor. The Contractor shall be deemed (by signing this Agreement) to give to the Authority a non-terminable transferable non-exclusive royalty-free licence to copy, use and communicate the Contractor's Documents, including making and using modifications of them. This licence shall:

(a) apply throughout the actual or intended working life (whichever is longer) of the relevant parts of the Works,

(b) entitle any person in proper possession of the relevant part of the Works to copy, use and communicate the Contractor's Documents for the purposes of completing, operating, maintaining, altering, adjusting, repairing and demolishing the Works, and

(c) in the case of Contractor's Documents which are in the form of computer programs and other software, permit their use on any computer on the Site and other places as

envisaged by this Agreement, including replacements of any computers supplied by the Contractor:

25.17.2 The Contractor's Documents and other design documents made by (or on behalf of) the Contractor shall not, without the Contractor's consent, be used, copied or communicated to a third party by (or on behalf of) the Authority for purposes other than those permitted under this Clause 25.17.

25.17.3 As between the Parties, the Authority shall retain the copyright and other Intellectual Property rights in this Agreement and other documents made by (or on behalf of) the Authority. The Contractor may, at its cost, copy, use, and obtain communication of these documents for the purposes of this Agreement. They shall not, without the Authority's consent, be copied, used or communicated to a third party by the Contractor, except as necessary for the purposes of the contract.

25.18 Limitation of Liability

25.18.1 Neither Party shall be liable to the other Party for loss of use of any Works, loss of profit, loss of any contract or for any indirect or consequential loss or damage which may be suffered by the other Party in connection with this Agreement.

25.18.2 The total liability of one Party to the other Party under and in accordance with the provisions of this Agreement, save and except as provided in Articles 21 and 23, shall not exceed the Contract Price. For the avoidance of doubt, this Clause shall not limit the liability in any case of fraud, deliberate default or reckless misconduct by the defaulting Party.

ARTICLE 26

DEFINITIONS

26.1 Definitions

In this Agreement, the following words and expressions shall, unless repugnant to the context or meaning thereof, have the meaning hereinafter respectively assigned to them:

"**Accounting Year**" means the financial year commencing from the first day of April of any calendar year and ending on the thirty-first day of March of the next calendar year;

"**Advance Payment**" shall have the meaning as set forth in Clause 17.2.1;

"**Affected Party**" shall have the meaning as set forth in Clause 19.1;

"**Affiliate**" means, in relation to either Party {and/or Members}, a person who controls, is controlled by, or is under the common control with such Party {or Member} (as used in this definition, the expression "control" means, with respect to a person which is a company or corporation, the ownership, directly or indirectly, of more than 50% (fifty per cent) of the voting shares of such person, and with respect to a person which is not a company or corporation, the power to direct the management and policies of such person, whether by operation of law or by contract or otherwise);

"**Agreement**" means this Agreement, its Recitals, the Schedules hereto and any amendments thereto made in accordance with the provisions contained in this Agreement;

"**Applicable Laws**" means all laws, brought into force and effect by GOI or the State Government(s) including rules, regulations and notifications made thereunder, and judgements, decrees, injunctions, writs and orders of any court of record, applicable to this Agreement and the exercise, performance and discharge of the respective rights and obligations of the Parties hereunder, as may be in force and effect during the subsistence of this Agreement;

"**Applicable Permits**" means all clearances, licences, permits, authorisations, no objection certificates, consents, approvals and exemptions required to be obtained or maintained under Applicable Laws in connection with the construction of the Railway Project during the subsistence of this Agreement;

"**Appointed Date**" means that date which is later of:

(a) the 15th day from the date of signing of this Agreement,

(b) the 30th day from the date on which the Contractor has delivered the Performance Security in accordance with the provisions of Article 7;

(c) the date on which the Authority has provided the Right of Way of at least 95% (ninety five per cent) of the core land length and 90% (ninety percent) of the non-core land length of the Railway Project in conformity with the provisions of Clause 4.3 and 8.2;

"Arbitration Act" means the Arbitration and Conciliation Act, 1996 and shall include modifications to or any re-enactment thereof, as in force from time to time;

"**Authority**" shall have the meaning attributed thereto in the array of Parties hereinabove as set forth in the Recitals;

"**Authority Default**" shall have the meaning as set forth in Clause 21.2;

"**Authority Engineer**" shall have the meaning as set forth in Clause 16.1;

"**Authority Representative**" means such person or persons as may be authorised in writing by the Authority to act on its behalf under this Agreement and shall include any person or persons having authority to exercise any rights or perform and fulfil any obligations of the Authority under this Agreement;

"**Bank**" means a Nationalised bank incorporated in India when a Bank Guarantee for Advance Payment (Clause 17.2) is to be submitted and a Scheduled Commercial Bank incorporated in India for all other purposes, or any other bank acceptable to the Authority;

"**Bank Rate**" means the rate of interest specified by the Reserve Bank of India from time to time in pursuance of section 49 of the Reserve Bank of India Act, 1934 or any replacement of such Bank Rate for the time being in effect;

"**Base Month**" means the month just prior to Bid Due Date month. The Quarter for applicability of price adjustment shall be commence from next month after Base Month;

"**Bid**" means the documents in their entirety comprised in the bid submitted by the selected bidder/Consortium in response to the Request for Proposal in accordance with the provisions thereof;

["**Bid Security**" means the bid security provided by the Contractor to the Authority in accordance with the Request for Proposal, and which is to remain in force until substituted by the Performance Security;]

"**Change in Law**" means the occurrence of any of the following after the Base Month:

(a) the enactment of any new Indian law;

(b) the repeal, modification or re-enactment of any existing Indian law;

(c) the commencement of any Indian law which has not entered into effect until the Base Month;

(d) a change in the interpretation or application of any Indian law by a judgement of a court of record which has become final, conclusive and binding, as compared to such interpretation or application by a court of record prior to the Base Month; or

(e) any change in the rates of any of the Taxes or royalties that have a direct effect on the Project;

"**Change of Scope**" shall have the meaning as set forth in Article 13;

"**Change of Scope Notice**" shall have the meaning asset forth in Clause 13.2.1;

"**Change of Scope Order**" shall have the meaning asset forth in Clause 13.2.4;

"**Completion Certificate**" shall have the meaning as set forth in Clause 12.4;

{"**Consortium/Joint Venture**" means the Consortium/Joint Venture of entities which have formed a consortium/joint venture for implementation of this Project;}[$]

"**Construction**" shall have the meaning as set forth in Clause 1.2.1 (f);

[$] This definition may be omitted if the Contractor is not a Consortium/Joint Venture.

"**Construction Period**" means the period commencing from the Appointed Date and ending on the date of the Completion Certificate;

"**Contract Price**" means the amount as specified in Clause 17.1.1;

"**Contractor**" shall have the meaning attributed thereto in the array of Parties hereinabove as set forth in the Recitals;

"**Contractor Default**" shall have the meaning as set forth in Clause 21.1;

"**Core Land**" means the part of Land essentially needed to open & operationalize the mainline for traffic including the Land required for laying the mainline tracks and its Signalling/ Telecom/ Overhead Electrification/ Power Supply Installations, Operational Buildings(station building, huts, gumties etc), as shown in item No. 3(a) of Annexure-I of Schedule-A;

"**Cure Period**" means the period specified in this Agreement for curing any breach or default of any provision of this Agreement by the Party responsible for such breach or default and shall:

(a) commence from the date on which a notice is delivered by one Party to the other Party asking the latter to cure the breach or default specified in such notice;

(b) not relieve any Party from liability to pay Damages or compensation under the provisions of this Agreement; and

(c) not in any way be extended by any period of Suspension under this Agreement; provided that if the cure of any breach by the Contractor requires any reasonable action by the Contractor that must be approved by the Authority or the Authority Engineer hereunder, the applicable Cure Period shall be extended by the period taken by the Authority or the Authority Engineer to accord their approval;

"**Damages**" shall have the meaning as set forth in paragraph (w) of Clause 1.2.1;

"**Defect**" means any defect or deficiency in Construction of the Works or any part thereof, which does not conform with the Specifications and Standards;

"**Defects Liability Period**" shall have the meaning as set forth in Clause 15.1;

"**Dispute**" shall have the meaning as set forth in Clause 24.1.1;

"**Dispute Resolution Procedure**" means the procedure for resolution of Disputes as set forth in Article 24;

"**Drawings**" means all of the drawings, calculations and documents pertaining to the Railway Project as set forth in Schedule-H, and shall include 'as built' drawings of the Railway Project;

"**Document**" **or** "**Documentation**" means documentation in printed or written form, or in tapes, discs, drawings, computer programmes, writings, reports, photographs, films, cassettes, or expressed in any other written, electronic, audio or visual form;

"**Emergency**" means a condition or situation that is likely to endanger the safety or security of the individuals on or about the Railway Project, including Users thereof, or which poses an immediate threat of material damage to the Works or any of the Project Assets;

"**Encumbrances**" means, in relation to the Railway Project, any encumbrances such as mortgage, charge, pledge, lien, hypothecation, security interest, assignment, privilege or priority of any kind having the effect of security or other such obligations, and shall include any designation of loss

payees or beneficiaries or any similar arrangement under any insurance policy pertaining to the Railway Project, where applicable herein but excluding utilities referred to in Clause 9.1;

"**EPC**" means engineering, procurement and construction;

"**Final Payment Certificate**" shall have the meaning as set forth in Clause 17.12.1;

"**Final Payment Statement**" shall have the meaning as set forth in Clause 17.10.1;

"**Force Majeure**" **or** "**Force Majeure Event**" shall have the meaning ascribed to it in Clause 19.1;

["**GAD**" **or** "**General Arrangement Drawings**" shall have the meaning as set forth in Clause 4.1.3 (c);]

"**GOI**" **or** "**Government**" means the Government of India;

"**Good Industry Practice**" means the practices, methods, techniques, designs, standards, skills, diligence, efficiency, reliability and prudence which are generally and reasonably expected from a reasonably skilled and experienced contractor engaged in the same type of undertaking as envisaged under this Agreement and which would be expected to result in the performance of its obligations by the Contractor in accordance with this Agreement, Applicable Laws and Applicable Permits in reliable, safe, economical and efficient manner;

"**Government Instrumentality**" means any department, division or sub-division of the Government or the State Government and includes any commission, board, authority, agency or municipal and other local authority or statutory body, including panchayat, under the control of the Government or the State Government, as the case may be, and having jurisdiction over all or any part of the Railway Project or the performance of all or any of the services or obligations of the Contractor under or pursuant to this Agreement;

"IEEMA" means Indian Electrical and Electronics Manufacturers Association

"**Important Bridge**" means a bridge having a linear waterway of 300 metres or a total water way of 1000 sqm or more;

"**Indemnified Party**" means the Party entitled to the benefit of an indemnity pursuant to Article 23 ;

"**Indemnifying Party**" means the Party obligated to indemnify the other Party pursuant to Article 23;

"**Indirect Political Event**" shall have the meaning as set forth in Clause 19.3;

"**Insurance Cover**" means the aggregate of the maximum sums insured under the insurances taken out by the Contractor pursuant to Article18, and includes all insurances required to be taken out by the Contractor under Clauses 18.1 and 18.9 but not actually taken, and when used in the context of any act or event, it shall mean the aggregate of the maximum sums insured and payable or deemed to be insured and payable in relation to such act or event;

"**Intellectual Property**" means all patents, trademarks, service marks, logos, get-up, trade names, internet domain names, rights in designs, blue prints, programmes and manuals, drawings, copyright (including rights in computer software), database rights, semi-conductor, topography rights, utility models, rights in know-how and other intellectual property rights, in each case whether registered or unregistered and including applications for registration, and all rights or forms of protection having equivalent or similar effect anywhere in the world;

"**Interim Payment Certificate**" or "**IPC**" means the interim payment certificate issued by the Authority Engineer for payment to the Contractor in respect of Contractor's claims for payment raised in accordance with the provisions of this Agreement;

{"**Lead Member**" shall, in the case of a Consortium/Joint Venture, mean the member of such Consortium/Joint Venture who shall have the authority to bind the contractor and each member of the Consortium/Joint Venture; and shall be deemed to be the Contractor for the purposes of this Agreement;}[$]

"**LOA**" **or** "**Letter of Acceptance**" means the letter of acceptance referred to in Recital (D);

"**Maintenance Manual**" shall have the meaning ascribed to it in Clause 10.6;

"**Major Bridge**" means a bridge having a linear waterway of 18 metres or more or which has a clear opening of 12 metres or more in spans;

"**Manuals**" shall mean the manuals specified in Schedule-D;

"**Material Adverse Effect**" means a material adverse effect of any act or event on the ability of either Party to perform any of its obligations under and in accordance with the provisions of this Agreement and which act or event causes a material financial burden or loss to either Party;

"**Materials**" are all the supplies used by the Contractor for incorporation in the Works or for the maintenance of the Railway Project;

"**Minor Bridge**" means a bridge having a linear waterway of less than 18 metres or which has a clear opening of less than 12 metres or in spans;

"Non-Core Land" means the Land required for the project line other than the Core-Land, as shown in item No. 3(b) of Annexure-I of Schedule-A;

"**Non-Political Event**" shall have the meaning as set forth in Clause 19.2;

"**Parties**" means the parties to this Agreement collectively and "Party" shall mean any of the parties to this Agreement individually;

"**Performance Security**" shall have the meaning as set forth in Clause 7.1;

"**Plant**" means the apparatus and machinery intended to form or forming part of the Works;

"**Political Event**" shall have the meaning as set forth in Clause 19.4;

"**Power Block**" means the length of the railway line between two railway stations, on which the overhead equipment (OHE) is de-energised and earthed to enable the Contractor to execute construction or maintenance works;

"**Programme**" shall have the meaning as set forth in Clause 10.1.3;

"**Project**" means the construction and maintenance of the Railway Project in accordance with the provisions of this Agreement, and includes all works, services and equipment relating to or in respect of the Scope of the Project;

[$] This definition may be omitted if the Contractor is not a Consortium/Joint Venture.

"**Project Assets**" means all physical and other assets relating to (a) tangible assets such as civil works and equipment including [foundations, embankments, pavements, road surface, interchanges, bridges, culverts, road over-bridges, drainage works, traffic signals, sign boards, kilometre-stones, electrical systems, communication systems, rest areas, relief centres, maintenance depots and administrative offices]; and (b) Project Facilities situated on the Site;

"**Project Completion Date**" means the date on which the last Completion Certificate is issued;

"**Project Completion Schedule**" means the progressive Project Milestones set forth in Schedule-I for completion of the Railway Project on or before the Scheduled Completion Date;

"**Project Facilities**" means all the amenities and facilities to be constructed on the Site, as described in Schedule-C;

"**Project Milestone**" means the project milestone set forth in Schedule-I and includes the Scheduled Completion Date;

"**Proof Consultant**" shall have the meaning as set forth in Clause 10.2.2;

"**Provisional Certificate**" shall have the meaning as set forth in Clause 12.2;

"**Punch List**" shall have the meaning as set forth in Clause 12.2.1;

"**Quality Assurance Plan**" or "**QAP**" shall have the meaning as set forth in Clause 11.2.1**;**

"**Railway Project**" means the Works specified in this Agreement onthe railway line from *** to *** having a length of *** kms in *** Zone;

"**Re.**", "**Rs.**" Or "**Rupees**" or "**Indian Rupees**" means the lawful currency of the Republic of India;

"**Request for Proposals**" or "**RFP**" shall have the meaning as set forth in Recital 'C';
"**Retention Money**" shall have the meaning set forth in Clause 7.5.1;

"**Right of Way**" means the constructive possession of the Site free from encroachments and encumbrances, together with all way leaves, easements, unrestricted access and other rights of way, howsoever described, necessary for construction of the Railway Project in accordance with this Agreement;

"RINL" means Rashtriya Ispat Nigam Limited

"**Safety Consultant**" shall have the meaning as set forth in clause 10.2.11

"**Scheduled Completion Date**" shall be the date as set forth in Clause 10.3.1;

"**Scope of the Project**" shall have the meaning as set forth in Clause 2.1;

"**Section**" means the portion of the railway line between two block stations;

"**Site**" shall have the meaning as set forth in Clause 8.1;

"**Specifications and Standards**" means the specifications and standards relating to the quality, quantity, capacity and other requirements for the Railway Project, as set forth in Schedule-D, and any modifications thereof, or additions thereto, as included in the design and engineering for the Railway Project submitted by the Contractor to, and expressly approved by, the Authority;

"**Stage Payment Statement"** shall have the meaning as set forth in Clause 17.4;

"**Structures**" means an elevated railway line or a flyover, as the case may be;

"**Sub-contractor**" means any person or persons to whom a part of the Works has been subcontracted by the Contractor and the permitted legal successors in title to such person, but not an assignee to such person;

"**Suspension**" shall have the meaning as set forth in Article 20;

"**Taxes**" means any Indian taxes including excise duties, customs duties, value added tax, sales tax, local taxes, cess and any impost or surcharge of like nature (whether Central, State or local) on the goods, Materials, equipment and services incorporated in and forming part of the Railway Project charged, levied or imposed by any Government Instrumentality, but excluding any interest, penalties and other sums in relation thereto imposed on any account whatsoever. For the avoidance of doubt, Taxes shall not include taxes on corporate income;

"**Termination**" means the expiry or termination of this Agreement;

"**Termination Notice**" means the communication issued in accordance with this Agreement by one Party to the other Party terminating this Agreement;

"**Termination Payment**" means the amount payable by either Party to the other upon Termination in accordance with Article 21;

"**Terms of Reference**" **or** "**TOR**" shall have the meaning as set forth in Clause 16.2.1;

"**Tests**" means the tests set forth in Schedule-J to determine the completion of Works in accordance with the provisions of this Agreement;

"**Time Extension**" shall have the meaning as set forth in Clause 10.4.1;

"**Traffic Block**" means the length of railway line between two railway stations, on which traffic is blockedwith or without OHE being de-energised to enable construction or maintenance works to be undertaken.

"**User**" means a person who travels or intends to travel on the Railway Project or any part thereof on any train or vehicle;

"**Valuation of Unpaid works**" shall have the meaning as set forth in Clause 21.5.1;

"**Works**" means all works including survey and investigation, design, engineering, procurement, construction, Plant, Materials, temporary works and other things necessary to complete the Railway Project in accordance with this Agreement; and

"**WPI**" means the wholesale price index for various commodities as published by the Ministry of Commerce and Industry, GOI and shall include any index which substitutes the WPI, and any reference to WPI shall, unless the context otherwise requires, be construed as a reference to the WPI published for the period ending with the preceding month.

IN WITNESS WHEREOF THE PARTIES HAVE EXECUTED AND DELIVERED THIS AGREEMENT AS OF THE DAY, MONTH AND YEAR FIRST ABOVE WRITTEN.

SIGNED, SEALED AND	SIGNED, SEALED AND
DELIVERED	DELIVERED

For and on behalf of	For and on behalf of
[West Central Railway] by:	THE CONTRACTOR by:
(Signature)	(Signature)
(Name)	(Name)
(Designation)	(Designation)

In the presence of:

1.

2.

{COUNTERSIGNED and accepted by:

Name and particulars of other members of the Consortium/Joint Venture}

Schedules

SCHEDULE - A

(See Clauses 2.1 and 8.1)

SITE OF THE PROJECT

1 The Site

1.1 Site of the Railway Project shall include the land, buildings, structures and track works as described in Annex-I of this Schedule-A.

1.2 The dates of handing over Right of Way to the Contractor are specified in Annex-II of this Schedule-A.

1.3 An inventory of the Site including the land, buildings, structures, track works, trees and any other immovable property on, or attached to, the Site shall be prepared jointly by the Authority's Representative and the Contractor, and such inventory shall form part of the memorandum referred to in Clause 8.2.1 of this Agreement.

1.4 The alignment plans of the Railway Project are specified in Annex-III.

1.5 The status of the environment clearances and forest clearances obtained or awaited is given in Annex IV.

Annex - I
(Schedule-A)

Site[16]

PROJECT: Survey, design, supply, installation, testing and commissioning of trackside KAVACH (Indian Railway Automatic Train Protection System) equipments at stations/LC Gates/IBS locations including OFC works, erection of towers and associated Civil/Track/Electrical works required for KAVACH in ITARSI-MANIKPUR, MAHDEIYA-BINA MALKHERI-MAHADEOKHERI, Entire KATNI COMPLEX, BINA MALKHERI-AGASOD, SATNA-REWA, KAIMA-SAGMA, BANSAPAHAR-OHAN section of Jabalpur Division of West Central Railway.

1 Salient features:

The route length of the Railway Project is described below:

Railway	West Central Railway
Name of Division	JABALPUR
Name of Section	ITARSI-MANIKPUR, MAHDEIYA-BINA MALKHERI-MAHADEOKHERI, Entire KATNI COMPLEX, BINA MALKHERI-AGASOD, SATNA-REWA, KAIMA-SAGMA, BANSAPAHAR-OHAN section of Jabalpur Division of West Central Railway.
Max. Permissible Speed	110 KMPH(ET-JBP-MKP),110 KMPH(BINA-KTE), 100 KMPH NKJ-KMZ 90-110 (KTE-SGRL) 110 KMPH (STA-REWA) 3rd line (BINA-KTE):110 KMPH
Number of Lines	Double line (ET-JBP-KTE-MKP), Single Line (BNSP-OHAN, KMA-SAGM) Third Line (NMWP-GEA, BNU-ANA, PHA-GAJ, GAJ-GW, GW-MAKR) Double Line (KMZ-NWMP, GEA-BNU, ANA-PHA) Double line (NKJ-BEHR, JOBA-SGRL), Single Line (BEHR-JOBA) Double Line (STA-HNM, TZR-REWA), Single Line (HNM-TZR)
System of Block working	Absolute Block: (ET-KTE,KTE-MKP,KTE-BINA,KTE-SGRL,STA-REWA) Automatic Signalling Section: Bina Malkhedi-Baghora

[16] Deleted.

2. Route Length

The route length of the Railway Project comprises the section as described below:

S. No	Name of location From	Name of location To	Start (km)	End (km)	Length (km)	Remarks
1	ET	JBP	754.130	990.285	236.155	
2	JBP	KTE	990.285	1081.07	90.785	
3	KTE	MKP	1081.070	1257.07	176.000	
4	MAKR	KTE	979.745	1237.96	258.215	
5	KMA	SGMA	1185.180	1185.92	3.863	Single Line
6	KTE	SGRL	1081.070	1341.125	260.055	
7	STA	REWA	1179.270	1228.67	49.400	
8	BNSP	OHAN	1253.27	-	5.48	Single Line
9	MAKR	MDVK	979.745	-	7.11	
10	MAKR	AGD	979.745	-	7.30	
11	Entire Katni Complex					

3 a. Core Land

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

S. No	Name of location From	Name of location To	Start (km)	End (km)	Land Width (Mtr) Approx.
1	ET	JBP	754.130	990.285	30 meter.
2	JBP	KTE	990.285	1081.070	
3	KTE	MKP	1081.070	1257.070	
4	MAKR	KTE	979.745	1237.960	
5	KMA	SGMA	1185.180	1185.920	
6	KTE	SGRL	1081.070	1341.125	
7	STA	REWA	1179.270	1228.670	
8	BNSP	OHAN	1253.27	-	
9	MAKR	MDVK	979.745	-	
10	MAKR	AGD	979.745	-	
11	Entire Katni Complex			-	

Note: All KMs have been taken from latest approved SIPs.

3 b. Non-Core Land

The non-core land will be available in ET-KTE, KTE-MKP, KTE-BINA, KTE-SGRL, STA-REWA, KMA-SAGMA, BNSP-OHAN sections and entire Katni Complex.

4. Details of Existing Structures:

4.1. **Permanent Way:**
Details of the Permanent Way on the Right of Way are:

NAME OF LOCATION FORM	NAME OF LOCATION TO	REMARK	
ET	JBP		DOUBLE LINE
JBP	KTE		DOUBLE LINE
KTE	MKP		DOUBLE LINE
MAKR	KTE	KMZ-NMWP	FLYOVER
		NMWP-GEA	3rd LINE
		BNU-ANA	
		PHA-GAJ, GAJ-GW	
		GW-MAKR	
		ANA-PHA, GEA-BNU	Double Line
		BJQ-MAKR	Automatic
KMA	SAGM	KMA-SAGM	SINGLE LINE
KTE	SGRL	KTE-BEHR & JOBA-SGRL	DOUBLE LINE
		BEHR-JOBA	SINGLE LINE
STA	REWA	SATNA (STA)-HINAUTA RAMBAN (HNM) & TURKI (TZR)-REWA	DOUBLE LINE
		HINAUTA RAMBAN (HNM)- TURKI (TZR)	SINGLE LINE
KTES	NKJ-A	Continuous track section with slot working	DOUBLE LINE
KTES	KMZ	Continuous track section with slot working	DOUBLE LINE
KTES	KTE	Continuous track section with slot working	DOUBLE LINE
KMZ	NKJ-A	Continuous track section with slot working	Double Line
BNSP	OHAN	OHAN in Jhansi Division of NCR	Single Line
MAKR	MDVK	MDVK in BPL division of WCR	DOUBLE LINE
MAKR	AGD	AGD in Jhansi division of NCR	DOUBLE LINE

Note: 3rd line work is in progress in GEA-BNU and ANA-PHA sections. CRS inspection is also pending.

4.2**.** Important Bridges: : Refer Engineering Annexure-11A

4.3 Major Bridges: Refer Engineering Annexure-11B

4.4. Minor Bridges/Culvert: Refer Engineering Annexure-11C

4.5. Tunnels: Refer Engineering Annexure-11D

4.6. Railway Flyovers: Refer Engineering Annexure-11E.

4.7. Road Under-Bridges (RUB)/ Road Over-Bridges (ROB): Refer Engineering Annexure-11F

4.8 Railway Level Crossings (LCs): Refer Engineering Annexure-11G & Annexure-12A.

4.9 Railway Stations on Railway Project:

SN	Station Code	Station Name	Central Line (Km No.) Approx.	Standard of Interlocking	Type of Interlocking	Make of Interlocking	No. of Routes	No. of Lines	Junction or Not
Itarsi-Manikpur(ex) section									
1	ET	Itarsi	745.130	Std-I	RRI (Metal to Metal)	SIEMENS	628	12	Yes
2	GRO	Gurra	755.97	Std-II	PI (Metal to Metal)	SIEMENS	29	4	No
3	SQL	Sontalai	764.815	Std-IIR	PI (Metal to Metal)	SIEMENS	24	4	No
4	BGTA	Bagratwa	771.686	Std-IIR	PI (Metal to Metal)	SIEMENS	26	4	No
5	GMD	Guramkhedi	784.826	Std-II	PI (Metal to Metal)	SIEMENS	30	4	No
6	SGP	Sohagpur	794.69	Std-IIR	PI (Metal to Metal)	SIEMENS	35	4	No
7	PPI	Piparia	812.46	Std-II	PI (Metal to Metal)	SIEMENS	55	5	No
8	BKH	Bankhedi	831.26	Std-II	PI (Metal to Metal)	SIEMENS	26	4	No
9	SCKR	Salichauka Road	847.99	Std-IIR	PI (Metal to Metal)	ABB	33	4	No
10	GAR	Gadarwara	861.96	Std-II	PI (Metal to Metal)	SIEMENS	36	5	No
11	BNJH	Baranjh	870.28	Std-II	EI	SIEMENS	228	8	Yes
12	BNE	Bohani	874.76	Std-II	PI (Metal to Metal)	ABB	28	4	No
13	KY	Kareli	890.45	Std-II	PI (Metal to Metal)	ABB	34	4	No
14	NU	Narsinghpur	906.22	Std-IIR	PI (Metal to Metal)	SIEMENS	43	4	No
15	GPC	Ghat Pindrai	911.95	Std-IIR	PI (Metal to Metal)	SIEMENS	22	4	No
16	BELD	Belkheda	917.51	Std-IIR	PI(Metal to Metal)	SIEMENS	21	3	No

SN	Station Code	Station Name	Central Line (Km No.) Approx.	Standard of Interlocking	Type of Interlocking	Make of Interlocking	No. of Routes	No. of Lines	Junction or Not
17	KKB	Karakbel	921.8	Std-II	PI (Metal to Metal)	ABB	22	4	No
18	SRID	Shridham	937.207	Std-IIR	PI (Metal to Metal)	ABB	30	4	No
19	BMR	Bikrampur	949.02	Std-IIR	PI (Metal to Metal)	ABB	25	4	No
20	BHTN	Bhitoni	960.633	Std-II	PI (Metal to Metal)	ABB	58	4	No
21	BRGT	Bheraghat	973.774	Std-II	PI (Metal to Metal)	ABB	29	4	No
22	KEQ	Kachhpura	984.275	Std-II	PI (Metal to Metal)	ABB	113	5	Yes
23	MML	Madan Mahal	986.857	Std-II	RRI (Metal to Metal)	SIEMENS	47	4	No
24	JBP	Jabalpur	990.285	Std-IIR	RRI (Metal to Metal)	SIEMENS	412	10	No
25	ADTL	Adhartal	998.373	Std-II	PI (Metal to Metal)	SIEMENS	48	5	No
26	DOE	Deori	1007.134	Std-IIR	PI (Metal to Metal)	SIEMENS	37	4	No
27	GSPR	Gosalpur	1017.66	Std-II	PI (Metal to Metal)	SIEMENS	32	4	No
28	SHR	Sihora Road	1028.69	Std-IIR	PI (Metal to Metal)	SIEMENS	29	4	No
29	DDCE	Dundi	1043.685	Std-II	PI (Metal to Metal)	SIEMENS	29	4	No
30	SBD	Sleemnabad	1053.157	Std-II	PI (Metal to Metal)	SIEMENS	22	4	No
31	NWR	Niwar	1067.79	Std-II	PI (Metal to Metal)	SIEMENS	34	4	No
32	KTE-S	Katni South	1078.98	Standard II for Up &Dn Main line & Standard I for Katni South-New Katni Junction chord line	PI (Metal to Metal)	SIEMENS	117	6	Yes
33	KTE	Katni-A Cabin	1080/12	Std-IR	PI (Metal to Metal)	SIEMENS	116	8	Yes
34		Katni-B Cabin	1081/17	Std-IR	PI (Metal to Metal)	SIEMENS	47		
35	PTWA	Patwara	1089.954	Std-II	PI (Metal to Metal)	SIEMENS	22	4	No
36	JKE	Jhukehi	1098.14	Std-II	PI (Metal to Metal)	SIEMENS	111	11	No
37	PKRD	Pakariyaroad	1107.997	Std-II	PI (Metal to Metal)	SIEMENS	33	4	No
38	UDR	Amdara	1117.785	Std-II	PI (Metal to Metal)	SIEMENS	33	4	No
39	BUU	Bhadanpur	1130.44	Std-IIR	RRI (Metal to Metal)	ABB	24	5	No

SN	Station Code	Station Name	Central Line (Km No.) Approx.	Standard of Interlocking	Type of Interlocking	Make of Interlocking	No. of Routes	No. of Lines	Junction or Not
40	MYR	Maihar	1143.99	Std-IIR	RRI (Metal to Metal)	SIEMENS	146	10	No
41	UHR	Unchehara	1158.166	Std-II	PI (Metal to Metal)	SIEMENS	26	4	No
42	LGCE	Lagargawan	1167.67	Std-II	PI (Metal to Metal)	SIEMENS	26	4	No
43	STA	Satna	1179.27	Std-IIR	RRI (Metal to Metal)	SIEMENS	289	16	Yes
44	SAGM	Sagma	1185.92	Std-II	PI (Metal to Metal)	SIEMENS	65	5	No
45	JTW	Jaitwar	1199.216	Std-IIR	PI (Metal to Metal)	ABB	34	4	No
46	KTHA	Khutaha	1206.663	Std-IIR	PI (Metal to Metal)	ABB	2	2	No
47	CTHR	Chitahara	1214.285	Std-II	PI (Metal to Metal)	ABB	37	4	No
48	MJG	Majhgawan	1219.82	Std-IIR	PI (Metal to Metal)	ABB	31	6	No
49	TKYR	Tikariya	1233.00	Std-IIR	PI (Metal to Metal)	SIEMENS	27	4	No
50	MKD	Markundi	1241.032	Std-II	PI (Metal to Metal)	SIEMENS	25	4	No
51	BQF	Barahmuafi	1248.918	Std-II	PI (Metal to Metal)	ABB	33	4	No
52	BNSP	Bansapahar	1253.271	Std-II	RRI (Metal to Metal)	ABB	63	4	Yes
KMZ-BINA Section									
1	KMZ	Katni Murwara	1235.355	Std-II	RRI (Metal to Metal)	SIEMENS	122	8	Yes
2	NMWP	New Majhgawa Phatak	1232/4-5	Std-II	EI	SIEMENS	47	5	No
3	HDU	Hardua	1221.376	Std-II	EI	KYOSAN K5BMC	133	7	No
4	PTHD	Patohan	1211.764	Std-II	PI (Metal to Metal)	SIEMENS	2	3	No
5	REI	Rithi	1205.61	Std-II	EI	KYOSAN K5BMC	66	6	No
6	BQQ	Bakhleta	1197.445	Std-IIR	EI	KYOSAN K5BMC	55	6	No
7	SYA	Salaia	1187.707	Std-II	EI	KYOSAN K5BMC	88	6	No
8	RTGN	Ratangaon	1180.366	Std-IIR	EI	KYOSAN K5BMC	5	3	No
9	SAO	Sagoni	1169.344	Std-II	EI	KYOSAN K5BMC	108	6	No
10	GEA	Ghatera	1153.155	Std-II	EI	KYOSAN K5BMC	37	4	No
11	BNU	Bandakpur	1142.497	Std-II	EI	KYOSAN K5BMC	96	5	No
12	KYX	Karhiya Bhadoli	1135.236	Std-II	EI	KYOSAN K5BMC	53	5	No

SN	Station Code	Station Name	Central Line (Km No.) Approx.	Standard of Interlocking	Type of Interlocking	Make of Interlocking	No. of Routes	No. of Lines	Junction or Not
13	DMO	Damoh	1126.683	Std-II	EI	KYOSAN K5BMC	181	6	No
14	ANA	Aslana	1114.34	Std-II	EI	KYOSAN K5BMC	61	5	No
15	PHA	Phatharia	1100.485	Std-IIR	EI	KYOSAN K5BMC	58	4	No
16	GAJ	Ganeshganj	1087.577	Std-II	EI	KYOSAN K5BMC	78	4	No
17	GW	Girwar	1073.874	Std-II	EI	HITACHI	89	7	No
18	LDA	Lidhora Khurd	1063.88	Std-IIR	EI	HITACHI	94	7	No
19	MKRN	Makronia	1056.715	Std-II	EI	HITACHI	115	8	No
20	SGO	Sagour	1049.657	Std-II	EI	HITACHI	91	4	No
21	RTZ	Ratona	1042.5	Std-IIR	PI (Metal to Metal)	SIEMENS	2	3	No
22	NOI	Narioli	1031.174	Std-II	EI	KYOSAN K5BMC	102	5	No
23	ISH	Isharwara	1023.612	Std-IIR	EI	KYOSAN K5BMC	50	5	No
24	JRK	Jaruakhera	1014.755	Std-II	EI	KYOSAN K5BMC	58	6	No
25	SMRR	Sumreri	1005.587	Std-II	EI	KYOSAN K5BMC	65	5	No
26	KYE	Khurai	996.946	Std-II	EI	KYOSAN K5BMC	124	6	No
27	BJQ	Baghora	985.084	Std-II	PI (Metal to Metal)	ABB	27	4	No
28	MAKR	Malkhedi	979.745	Std-II	EI	KYOSAN K5BMC	149	6	Yes
29	MDVK	Mahadeokheri	982	Std-IIR	EI	MEDHA	115	5	No
NKJ-Mahdeiya Section									
1	NKJ-A	NKJ-A	1034/0	Std-II	EI	KYOSAN K5BMC	268	15	Yes
2	NKJ-B	NKJ-B	1031/2-8	Std-II	EI	KYOSAN K5BMC	159	11	No
3	NKJC	NKJ-C	1029/7	Std-II	EI	KYOSAN K5BMC	567	21	Yes
4	KTKD	Katngikhurd	1092.943	Std-II	EI	SIEMENS	113	6	No
5	SLHA	Salhanha	1110.436	Std-IIR	EI	SIEMENS	41	4	No
6	PWK	Pipariyakalan	1121.007	Std-IIR	EI	SIEMENS	24	4	No
7	KHBJ	Khanna banjari	1131.765	Std-II	EI	SIEMENS	129	6	No
8	MFQ	Mahroi	1143.623	Std-II	EI	SIEMENS	30	4	No

SN	Station Code	Station Name	Central Line (Km No.) Approx.	Standard of Interlocking	Type of Interlocking	Make of Interlocking	No. of Routes	No. of Lines	Junction or Not
9	VST	Vijaysota	1162.756	Std-II	EI	SIEMENS	34	4	No
10	CTJ	Chhateni	1182.005	Std-II	EI	KYOSAN K5BMC	29	4	No
11	BEHR	Beohari	1192.873	Std-II	EI	KYOSAN K5BMC	85	5	No
12	BARD	Dubrikalan	1208.324	Std-II	PI (Metal to Metal)	SIEMENS	22	2	No
13	JOBA	Joba	1232.177	Std-II	EI	KYOSAN K5BMC	35	4	No
14	MWJ	Marwasgram	1239.665	Std-II	EI	SIEMENS	32	4	No
15	NWB	Niwas road	1256.594	Std-II	EI	SIEMENS	74	6	No
16	BSDL	Bharsandi	1265.796	Std-IIR	EI	SIEMENS	29	4	No
17	SSGJ	SursaraiGhat Jhara	1275.9	Std-II	EI	SIEMENS	26	4	No
18	SGAM	Saraigram	1285.245	Std-IIR	EI	SIEMENS	38	4	No
19	GAJB	Gajrabahra	1295.493	Std-IIR	EI	SIEMENS	57	4	No
20	DRGM	Deoragram	1305.944	Std-IIR	EI	SIEMENS	28	4	No
21	MZHL	Majholi	1314.26	Std-IIR	RRI (Metal to Metal)	ABB	85	6	No
22	BRGW	Bargawan	1322.277	Std-II	PI (Metal to Metal)	ABB	65	5	No
23	GNDI	Gondwali	1328.15	Std-II	EI	SIEMENS	113	6	No
KMA-REWA Section									
1	KMA	Kaima	1185.18	Std-IIR	EI	HITACHI	118	7	Yes
2	SKAR	Sakariya	1191.54	Std-IIR	EI	HITACHI	56	4	No
3	HNM	Hinouta Ramban	1199.222	Std-II	EI	HITACHI	65	5	No
4	BGHI	Baghai Road	1208.25	Std-IIR	PI (Metal to Metal)	SIEMENS	38	3	No
5	TZR	Turki Road	1216.92	Std-IIR	PI (Metal to Metal)	SIEMENS	28	4	No
6	REWA	Rewa	1228.67	Std-II	EI	HITACHI	196	13	No

4.10 Railway Yards: Same as Para 4.9 above.

4.11. Foot Over Bridges (FOBs) on Railway Project: Refer Engineering Annexure-11H.

4.12. Transmission Lines Crossing the Right of Way: Refer Electrical Annexure-13A.

4.13 Underground Power Line Crossing the Right of Way: Refer Electrical Annexure-13B.

4.14. Signalling Infrastructure: Refer Table- 4.9 above.

4.15. Telecommunication Infrastructure: Refer Signal & Telecommunication Annexure-12B.

4.16 Any other structures:

A. **Engineering:**
   i. Fixed over Head Structures -Refer Engineering Annexure-11I
   ii. Permanent Speed Restriction -Refer Engineering Annexure-11J
   iii. Gradient List of section -Refer Engineering Annexure-11M
   iv. Forest Area- Refer Engineering Annexure-11L

B. **Signal & Telecommunication**:
   i. Spare Contact of LC Gate/IBH/Station-Refer S&T Annexure-12C
   ii. Existing Power Supply Details-Refer S&T Annexure-12D
   iii. Existing Microwave Tower Details - Refer S&T Annexure-12E
   iv. IPS Move at Station/LC/IBH- Refer S&T Annexure-12F

C. **TRD:**
   i. TRD Traction Sub Station at a Glance on WCR- Refer TRD Annexure-13C
   ii. TRD Structure SP/SSP Details- Refer TRD Annexure-13D
   iii. Planning of 2X25KV Traction System- Refer TRD Annexure-13E
   iv. AT Availability in the Section- Refer TRD Annexure-13F

D. **Latitude / Longitude RSSI Survey:** Refer Annexure 2A

Details of Towers at existing Stations are as follows:							
Station Code	Station Name	Distance of existing MW tower from R/R (meters)	Height of MW Tower	**"Longitude (Decimal Degree)"**	**"Latitude (Decimal Degree)"**	Whether space available for termination of new 48 Fibre in the existing OFC Room	Type/ Size of Existing Antenna
JBP	Jabalpur	500	100 Mtrs	23' 09" 56.455	79' 57 "24.282	Yes	2 GSM Antenna (RCIL)
NKJ	New Katni Junction	1000	70 Mtrs (Self Supporting Tower)	23' 48"29.5	80'25"58.7	Yes	1xParabolic Antennas 3.3 Dia (Airtel)
NKJ	New Katni Junction	1000	90 Mtrs (Guided Tower)	23' 48"29.5	80'25"58.7	Yes	1 x Yagi antenna (not in use)

Annex - II
(Schedule-A)

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:

The Right of way is available in Itarsi-Manikpur, Bina Malkheri-Katni-Mahdeiya, Satna-Rewa, Kaima-Sagma section.and Bansapahar-Ohan section in WCR jurisdiction However, Forest clearance may have to be obtained for Katni-Mahdeiya, Satna-Manikpur or any other section.

Right of way is available for the entire length of the Project. However, if there is any delay in getting forest clearance for any section, the section may be commissioned without providing continuous coverage. Moreover, the existing Railway towers at JBP and NKJ station can be used subject to availability of space for antenna mounting, placement of Radio equipments, fulfilment of requirement of Kavach system and approval of authority.

Annex - III
(Schedule-A)

Plan and Profile

The proposed alignment plan, L-sections, Engineering Scale Plans (ESPs), Signalling Interlocking Plans (SIPs) of the Railway Project Line are attached. This is based on survey conducted by the Authority. The Contractor shall verify alignment plan, L-sections, ESPs, SIPs for ensuring technical feasibility within the Right of Way boundaries. (Any deviation [positive/negative] from the enclosed Engineering Scale Plans, Approved Alignment plan, L section and Signal Interlocking Plan will be treated as Change of scope.)

Annex - IV
(Schedule-A)

Environment Clearances and Forest Clearances

1. Environment clearances*

(a) The following environment clearances have been obtained:

NIL

(b) The following environment clearances are awaited:

NIL

2. Forest clearances

(a) The following forest clearances have been obtained:

NIL

(b) The following forest clearances are awaited:

NIL

(c) The following forest clearances are required:

Forest clearance for Katni-Singrauli,, Satna-Manikpur and any other sections as applicable.

SCHEDULE - B

(See Clause 2.1)

Development of the Railway Project

Development of the Railway Project shall include design and construction of the Railway Project as described in Annex 1 to this Schedule-B and in Schedule-C.

Annex - I
(Schedule-B)

Description of Railway Project[17]

Detailed description of project, scope of the work, technical requirements and specifications etc. are furnished in Part-III of the EPC tender document titled:

Section-I

1.0 OVERVIEW ON THE PROJECT AND MINIMUM FUNCTIONAL AND TECHNICAL REQUIREMENTS:

1.0.1 The project envisages implementation of Indian Railway Automatic Train Protection (IR-ATP) by means of KAVACH system as per RDSO specification no. RDSO/SPN/196/2020 Version 4.0 or latest and Technical Advisory Note (TAN) no. SIGOTCAS (TAN)/01/2021 version 2.0, dated 18.10.2021 or latest and testing formats issued on the subject by RDSO from time to time. The scope includes Supply, trenching, duct laying, blowing, splicing, termination, etc. of 4x48 fiber OFC with path diversity (2x48 Fibers on each side of the track) in ITARSI - MANIKPUR, Entire KATNI Complex, BANSAPAHAR-OHAN, SATNA-REWA, KAIMA-SAGMA, KMZ-MAKR-~~,~~ NKJ- 'A' cabin-MHDA section of Jabalpur division of West Central Railway. The scope also includes design, supply, Installation & commissioning of 40 meter 3-legged tubular lattice tower, associated works and construction of S&T service buildings at stations, interlocked LCs/IBHs in Itarsi-Manikpur (ex.), Mahdeiya (ex.)-Bina Malkheri, Entire Katni Complex, Satna-Rewa, Kaima-Sagma, Bansapahar-Ohan sections, for installation of KAVACH system. The Scope also includes provison of Loco Kavach (On-Board Kavach) system for 32 loco-motives preferably at Electric Loco Shed NKJ/Diesel Loco Shed NKJ or Location as decided by Authority. For the purpose of this tender, Entire Katni Complex means "(All stations upto Station Limit and interconnecting lines between Katni-'A' cabin, Katni-'B' cabin, Katni South, Katni Murwara, New Katni Junction 'A' cabin, New Katni junction 'B' cabin, New Katni Junction 'C' cabin)."

1.0.2 The technical requirements (non-exhaustive) for the implementation of the KAVACH system are given below. However, these are the minimum technical requirements covering only major items which must be adhered to by the contractor. Approval of the Authority/ Authority's Representative/Authority Engineer must be taken for the technical requirements of other items required for commissioning of KAVACH system in entire sections of JBP division as per latest RDSO specifications. Any deviations from these technical requirements should have prior approval of the Authority/ Authority's Representative/Authority Engineer.

1.0.3 The data and information related to L-section/ Geo technical data provided are indicative and for guidance only. These should be rechecked, verified and modified by conducting site investigation to suit the site conditions. Site Investigation should include but not limited to topographical survey, hydrological survey and geotechnical surveys etc. Any change on account of existing ground conditions mentioned in L- Section/Alignment/ ESPs/SIPs shall not be considered as Change of Scope. For avoidance of doubt, it is clarified that the existing

[17] Deleted

ground conditions are to be validated by bidders before bid and hence no change on this account is payable.

1.0.4 The KAVACH system shall be provided in ITARSI-MANIKPUR (ex.), Mahdeiya (ex) – BAGHORA, Entire KATNI Complex, SATNA-REWA, KAIMA-SAGMA, BANSAPAHAR-OHAN (ex), having Absolute Block system of working and Automatic Block system of working (Bina Malkhedi -Baghora section).

1.0.5 Survey, Design, Drawing and Documentation for the entire project. All drawings and plans are to be designed and submitted to Railway. Approved SIPs, Available existing cable route plan, building plan will be provided by Railway.

1.0.6 The work is to be executed as per provisions of the Indian Railway Signal Engineering Manual (IRSEM) with latest correction slips, Specifications of the systems & latest guidelines issued by Railway Board & RDSO, approved Signalling Plans and WCR's guidelines (if any).

1.0.7 In case of any ambiguity between the drawings and instructions or between any two clauses of the tender document, the decision of Authority/Authority Representative shall be final.

The scope of the work shall include:

2.0 KAVACH Service building:

2.0.1 The scope includes Extension/Modification/Augmentation of Relay Rooms, Equipment Rooms etc. of existing installations in Itrasi-Manikpur(ex.), Katni Murwara-Bina Malkhedi, New Katni Jn 'A' Cabin – Mahdeiya (ex), Kaima-Rewa and Bansapahar–Ohan section. Approximate number of service buildings at stations to be constructed is furnished in the table below. (23 nos. Relay room buildings in ET- MKP section including KTES, KTE 'A' and KTE 'B' cabin & 06 Relay room buildings in Mahdeiya-Bina Malkhedi and Satna - Rewa section and 01 Autohut building in Baghora to Bina Malkhedi section) for KAVACH work. Also, 33 no. of LC/IBH buildings are also to be constructed for installaing LC-Kavach. Any shifting/dismantling work is required for new relay room construction at station is also covered under this project. Ref. Drg for modification in station building is S&T Equipment building/Auto Hut/2022/01 (Annexure-1A). This will involve extension of General Lighting supply from existing distribution board to the newly constructed rooms with suitable protection fuse/MCB.

TABLE: A (R=Required, NR=Not Required)

Sr. No.	Section	Station	Station code	Space in existing Relay room	Requirement of Building
ET-MKP section					
1	ET-MKP	Itarsi	ET	Yes	NR
2	ET-MKP	Gurra	GRO	Yes	NR
3	ET-MKP	Sontalai	SQL	Yes	NR
4	ET-MKP	Bagaratawa	BGTA	No	R
5	ET-MKP	Guramkhedi	GMD	Yes	NR
6	ET-MKP	Sohagpur	SGP	No	R
7	ET-MKP	Pipariya	PPI	No	R
8	ET-MKP	Bankhedi	BKH	No	R
9	ET-MKP	Salichouka	SCKR	No	R
10	ET-MKP	Gadarwara	GAR	No	R
11	ET-MKP	Baranjh-CEN	BNJH CEN	Yes	NR

Sr. No.	Section	Station	Station code	Space in existing Relay room	Requirement of Building
12	ET-MKP	Bohani	BNE	No	R
13	ET-MKP	Kareli	KY	Yes	NR
14	ET-MKP	Narsingapur	NU	No	R
15	ET-MKP	Ghatpindri	GPC	Yes	NR
16	ET-MKP	Belkheda	BELD	Yes	NR
17	ET-MKP	Karakbel	KKB	No	R
18	ET-MKP	Shirdham	SRID	No	R
19	ET-MKP	Bikrampur	BMR	Yes	NR
20	ET-MKP	Bhitoni	BHTN	No	R
21	ET-MKP	Bheraghat	BRGT	No	R
22	ET-MKP	Kachapura	KEQ	No	R
23	ET-MKP	Madanmahal	MML	Yes	NR
24	ET-MKP	Jabalpur	JBP	Yes	NR
25	ET-MKP	Adharthal	ADTL	No	R
26	ET-MKP	Deori	DOE	Yes	NR
27	ET-MKP	Gosalpur	GSPR	No	R
28	ET-MKP	Sihora Road	SHR	Yes	NR
29	ET-MKP	Dundi	DDCE	Yes	NR
30	ET-MKP	Saleemnabad Road	SBD	Yes	NR
31	ET-MKP	Niwar	NWR	Yes	NR
32	ET-MKP	Katni- South	KTE-S	No	R
33	ET-MKP	Katni-A cabin	KTE-A	No	R
34	ET-MKP	Katni-B cabin	KTE-B	No	R
35	ET-MKP	Patwara	PTWA	Yes	NR
36	ET-MKP	Jukhehi	JKE	Yes	NR
37	ET-MKP	Pakaria Road	PKRD	Yes	NR
38	ET-MKP	Amdara	UDR	Yes	NR
39	ET-MKP	Bhadanpur	BUU	No	R
40	ET-MKP	Maihar	MYR	No	R
41	ET-MKP	Unchehra	UHR	Yes	NR
42	ET-MKP	Lagargawan	LGCE	Yes	NR
43	ET-MKP	Satna	STA	Yes	NR
44	ET-MKP	Sagma	SAGM	No	R
45	ET-MKP	Jaitwar	JTW	No	R
46	ET-MKP	Khutha	KTHA	Yes	NR
47	ET-MKP	Chitahra	CTHR	No	R
48	ET-MKP	Majhgawan	MJG	No	R
49	ET-MKP	Tikariya	TKYR	No	R
50	ET-MKP	Markundi	MKD	Yes	NR
51	ET-MKP	Baramaufi	BQF	No	R
52	ET-MKP	Bansapahar	BNSP	Yes	NR
KAIMA-REWA SECTION					
1	STA-REWA	Kaima	KMA	Yes	NR
2	STA-REWA	Sakaria	SKAR	Yes	NR
3	STA-REWA	Hinauta Ramban	HNM	Yes	NR

Sr. No.	Section	Station	Station code	Space in existing Relay room	Requirement of Building
4	STA-REWA	Baghai road	BGHI	No	NR#
5	STA-REWA	Turki road	TZR	No	NR#
6	STA-REWA	Rewa	REWA	No	R
#: At BGHI and TZR, there is no space in existing RR. work of EI is in progress at these stations and Building for EI has already been constructed. Kavach work is to be executed in the same Relay room in which EI is being installed.					
NKJ 'A' cabin-MAHDEIYA (ex.) SECTION					
1	KTE-SGRL	New Katni-A-CEN	NKJ-A CEN	Yes	NR
2	KTE-SGRL	New Katni-B-CEN	NKJ-B CEN	Yes	NR
3	KTE-SGRL	New Katni-C-CEN	NKJ-C-CEN	Yes	NR
4	KTE-SGRL	Katangi Khurd CEN	KTKD-CEN	Yes	NR
6	KTE-SGRL	Salhana cen	SLHA-CEN	Yes	NR
7	KTE-SGRL	Pipariya Kalan	PWK	Yes	NR
8	KTE-SGRL	Khanna Banjari- CEN	KHBJ-CEN	Yes	NR
11	KTE-SGRL	Mahroi	MFQ	Yes	NR
13	KTE-SGRL	Vijaysota	VST	Yes	NR
15	KTE-SGRL	Chateni	CTJ	Yes	NR
16	KTE-SGRL	Beohari	BEHR	Yes	NR
18	KTE-SGRL	Dubrikala	BARD	No	R
20	KTE-SGRL	Joba	Joba	Yes	NR
21	KTE-SGRL	Marwasgram	MWJ	Yes	NR
23	KTE-SGRL	Niwas Road-CEN	NWB-CEN	Yes	NR
26	KTE-SGRL	Bharsendi	BSDL	Yes	NR
27	KTE-SGRL	Sursaraighat jhara	SSGJ	Yes	NR
28	KTE-SGRL	Saraigram	SGAM	Yes	NR
30	KTE-SGRL	Gajarabahra	GAJB	Yes	NR
31	KTE-SGRL	Deoragram	DRGM	Yes	NR
32	KTE-SGRL	Majholi	MZHL	Yes	NR
33	KTE-SGRL	Bargawan	BRGW	Yes	NR
34	KTE-SGRL	Gondwali	GNDI	Yes	NR
35	KTE-SGRL	Mahdeiya	MHDA	Yes	NR
KMZ-BINA MALKHEDI SECTION					
1	KTE-BINA	KATNI MURWARA	KMZ	Yes	NR
2	KTE-BINA	NEW MAJHGAWAN PHATAK	NMWP	No	NR (Spare room to be used for Kavach works)
3	KTE-BINA	HARDUA-CEN	HDU-CEN	Yes	NR
4	KTE-BINA	PATOHAN	PTHD	Yes	NR
5	KTE-BINA	RITHI-CEN	REI-CEN	Yes	NR
6	KTE-BINA	BAKHLETHA-CEN	BQQ-CEN	Yes	NR
7	KTE-BINA	SALAIA-CEN	SYA-CEN	Yes	NR
8	KTE-BINA	RATANGAON	RTGN	Yes	NR
9	KTE-BINA	SAGONI-CEN	SAO-CEN	No	NR (Spare room to be used for Kavach works)
10	KTE-BINA	GHATERA-CEN	GEA-CEN	Yes	NR
11	KTE-BINA	BANDAKPUR-CEN	BNU-CEN	Yes	NR

Sr. No.	Section	Station	Station code	Space in existing Relay room	Requirement of Building
12	KTE-BINA	KARHIYA BHADOLI-CEN	KYX-CEN	Yes	NR
13	KTE-BINA	DAMOH-CEN	DMO-CEN	Yes	NR
14	KTE-BINA	ASLANA-CEN	ANA-CEN	Yes	NR
15	KTE-BINA	PATHARIA	PHA	Yes	NR
16	KTE-BINA	GANESH GANJ-CEN	GAJ-CEN	Yes	NR
17	KTE-BINA	GIRWAR-CEN	GW-CEN	Yes	NR
18	KTE-BINA	LIDHORA KHURD-CEN	LDA-CEN	Yes	NR
19	KTE-BINA	MAKRONIA-CEN	MKRN-CEN	Yes	NR
20	KTE-BINA	SAUGOR-CEN	SGO-CEN	No #	NR
21	KTE-BINA	RATONA	RTZ	No	R
22	KTE-BINA	NARIOLI-CEN	NOI-CEN	Yes	NR
23	KTE-BINA	ISARWARA-CEN	ISH-CEN	Yes	NR
24	KTE-BINA	JERUWA KHERA-CEN	JRK-CEN	Yes	NR
25	KTE-BINA	SUMRERI-CEN	SMRR-CEN	Yes	NR
26	KTE-BINA	KHURAI-CEN	KYE-CEN	Yes	NR
27	KTE-BINA	BAGHORA	BJQ	Yes	NR ##
28	KTE-BINA	AutoHut-2	RH-2	No	R
29	KTE-BINA	BINA MALKHEDI-CEN	MAKR-CEN	Yes	NR

#: At SGO station, space in existing relay room is not available hence KAVACH equipment is planned in old relay room.
##:The existing interlocking at BJQ station is PI and EI work is also under progress. Further space in relay room is also available. If EI is commissioned before KAVACH work, the KAVACH equipment will be installed in EI relay room with direct interfacing with KAVACH equipment. No extra cost is payable on this account.

2.0.2 01 new Relay hut (adjacent to existing Relay Huts for Automatic Signalling) in Bina Malkhedi- Baghora Automatic Signalling section to be constructed as per Annexure-1C. Kavach equipment along with Power Supply equipments (IPS as per Annexure-7), 300AH battery set, Class-A protection, Ring Earth, Fire alarm and Fuse alarm are to installed in new Relay hut. Necessary signalling gears are to be repeated from Existing Relay huts.

2.0.3 In BGHI and TZR station of Kaima-Rewa section, present Interlocking is PI (Metal to Metal) but work of EI is also in progress at these stations. Building for EI has already been constructed. Kavach work is to be executed in the same Relay room in which EI is being installed. If EI is commissioned before execution of Kavach works, then Kavach related data are to directly interfaced from Kavach ready port in EI otherwise Interfacing from existing PI Relay room to be done for Kavach related data.

2.0.4 OFC equipments at OHAN are to be installed in new equipment building to be constructed as per Annexure-1B.

2.0.5 Quantity of service buildings at stations may vary depend upon the site survey to be

conducted by the contractor. The quantity should be approved by Authority/Authority's representative/Authority Engineer**.** All construction to be done conforming to specifications of works of WC Railway. The buildings should be constructed of brick masonry and RCC pillars. Pre-fabricated PORTA Huts are not acceptable for this purpose. All items of building works shall conform to specification of works of W.C. Railway. The building work shall include electrical internal wiring, fitting of tube lights, fans are to be provided in Relay room extension at stations & S&T service Buildings of interlocked LC gates/IBH as per WCR guidelines. Heavy duty 5 star rated Split Air conditioners with voltage stablizers (In stand by arrangement) of appropriate capacity are to be provided in Relay room extension at all stations and one buildings constructed near Autohuts in MAKR-BJQ section as per WCR guideline.

2.0.6 The scope also includes Civil engineering works for construction of S&T Service Buildings (as per Annexure-1B (Drg. No. JBP/S&T/P/TCAS/SB)) at Engg. Interlocked LC gates/ IBH which are not being existing in RF communication zone. This also includes extension of General Lighting supply from existing distribution board to the newly constructed rooms with suitable protection fuse/MCB, extension of Roads up to Service Building from existing roads within Railway boundary and its approach from roadside and trackside. These requirements are indicative & there may be minor changes with regard to dimension of the new rooms, number of new rooms required based on detailed site survey and equipments required to be installed. Approval of Authority/Authority Representative to be obtained with detailed justification w.r.t. alteration in dimension of rooms and/or number of rooms required as given above. No additional payment can be done on this account.

2.0.7 Electrification of the Service Buildings at interlocked LC gates/ IBH not being existing in RF communication zone and at new relay room buildings being constructed at Stations wherever required shall be done with ISI/BIS marked and WCR approved fittings.

2.0.8 The survey of the location of the relay room at the stations has been conducted by the Railways. Proposed building location drawings are uploaded with the details of shifting/ dismantling if required at site.

2.0.9 Methodology of the work of extension of relay rooms shall generally follow the sequence. Clearing the site of construction by shifting of existing utility or dismantling as provisionally indicated in each station drawing and as per survey by bidder has to be ensured. This will not be treated as change of scope.

2.0.10 Construction of new room/s, (Size and location indicated in drawing) at Stations.

2.0.11 Shifting of Signalling assets in newly constructed rooms, if required.

2.0.12 Constructing adequate support for facilitating opening in existing relay room wall of adequate size.

2.0.13 Finally, extension of existing relay room to vacated/newly constructed room by providing adequate size opening.

2.1 Signalling and Telecommunication works:

Provision of KAVACH System

Minimum Scope of the work for KAVACH System include:

2.1.1 The KAVACH System shall be provided to cover all lines in ITARSI – MANIKPUR (ex.), Mahdeiya (ex.) - BINA MALKHEDI, Entire KATNI Complex, SATNA- REWA, KAIMA-SAGMA, BANSAPAHAR – OHAN (ex.) of Jabalpur division of West Central Railway with existing signalling system i.e. Absolute Block System and Automatic block system.

2.1.2 Design, Supply, Installation, Testing and commissioning of On Borad KAVACH equipments in 32 Locomotives and trackside/stationary KAVACH equipment at station/LC/IB location/ Block Section along with associated signalling and telecom works.

2.1.3 The KAVACH system shall be provided as per RDSO specification no. RDSO/SPN/196/2020 Version 4.0 or latest and Technical Advisory Note (TAN) no. SIGOTCAS (TAN)/01/2021 version 2.0, dated 18.10.2021or latest and shall be procured from RDSO approved sources. KAVACH equipments installed at the station and Interlocked LCs/IBHs are to be wired & equipped to their capacity as per requirement of the system and as specified vide RDSO specifications and TAN. All accessories for complete commissioning of KAVACH system to be provided by the contractor. However, supply of SIM cards required under this project is to be done by Railways.

2.1.4 Supply, installation, testing & commissioning of KAVACH and its sub-system shall be as per RDSO Functional Requirements Specification (FRS), System Requirements Specification (SRS) and Annexures A1, A2, A3, B, C, D, E1, F, G, H, I, J, P and Q issued by RDSO time to time and their amendments(if any) and as available on RDSO website.

2.1.5 KAVACH equipment shall consist of (a) Station KAVACH (b) Loco KAVACH (c) RIU (Remote Interface Unit) with at least 32 Field I/P's (c) LC KAVACH & their associated equipment such as Radio Modems, Radio Antenna, GPS Antenna, GSM Antenna, OFC interfaces, NMS interfaces, DMI, Break Interface Unit suitable for different Locomotives, RFID Tags, RFID readers, Signalling Cables, Power cables, OFC and OFC equipments and any other equipments & materials required for execution/commissioing of this work.

2.1.6 Onboard Loco KAVACH Equipment to be installed preferably at New Katni Junction Electric Loco shed and/or New Katni Junction Diesel Loco shed of Jabalpur Division or at any other location in West Central Railway jurisdiction as decided by the Authority and Stationary KAVACH with associated RF tower for communication between Station/LC/IBH KAVACH & On Board KAVACH shall be provided at stations/LC/IBH of ITARSI – MANIKPUR (ex.), Mahdeiya (Ex.)- BINA MALKHEDI, Entire KATNI Complex, SATNA-REWA, KAIMA- SAGMA, BANSAPAHAR –OHAN (ex.) Section.

2.1.6a The On Board Equipment shall be fitted on selected Locomotives along with UHF radio system for communication between On Board KAVACH equipment in Loco & Station KAVACH equipment all along the route. Two Loco KAVACH Test benches are also to be provided at location in West Central Railway jurisdiction as decided by the Authority.

2.1.7 The scope includes Supply, Installation, Programming, Verification and Commissioning of RFID tags including 20 % Spares at Stations and block sections consisting of

interlocked and non-interlocked LCs, IBS & Auto signals.

2.1.8 Guidelines for installation of RFID Tags in the block section to get the benefit of non-signalling based collision prevention feature of KAVACH with KAVACH equipped Locomotives/Cabs in Non-KAVACH territory shall be followed as issued by RDSO and COE dated 28.06.2024.

2.1.9 Painting scheme for sleepers fitted with RFID Tags-

(a) Portion of the sleeper inside the rails to be painted in 'WHITE' and outside rail in 'YELLOW' on either side of the rail.

(b) The concerned RFID Tag no. to be written in BLACK paint with bold capital letters on WHITE paint background (Font of these letters should be such that it should be visible on the sleeper surface).

(c) Quality of paint should be weather proof with long lasting feature.

2.1.10 UHF communication shall be used for communication between Stationary KAVACH and On-board Equipment. Entire stretch including stations and block sections where KAVACH is to be provided shall be covered with UHF communication to have complete coverage of the entire ITARSI – MANIKPUR (ex.), Mahdeiya (Ex.)- BINA MALKHEDI, Entire KATNI Complex, SATNA - REWA, KAIMA- SAGMA, BANSAPAHAR –(ex.) OHAN Section of Jabalpur division of West Central Railway with overlapping radio coverage between adjacent towers as per the preliminary RSSI survey conducted by the Authority (Annexure:2A) and separate RF survey to be done by contractor for this purpose duly approved by authority/authority representative.

2.1.11 LTE network has been planned to be provided by the Authority in this section at a later stage for which RF survey to decide location of towers is being conducted and the report indicating locations of LTE towers will be provided in later stage at the specific request of the bidder.

2.1.12 RF Survey of the UHF for Kavach in all lines of ITARSI - MANIKPUR, MAHDEIYA - BINA MALKHEDI, Entire KATNI Complex, SATNA-REWA, KAIMA-SAGMA, BANSAPAHAR - OHAN of Jabalpur division to be conducted for giving continuous UHF coverage. RF survey to be done by contractor in such a way to locate UHF-Kavach towers at the tower location as per LTE survey.

2.1.13 The scope of work also involves design, supply, fabrication, installation & commissioning of 40-meter-high tubular lattice 3-legged tower as per RDSO drg no. RDSO/TC/TOWER/L/40/180/T/6.5 dated 23.12.2021, suitable for 180 kmph wind speed (up to 6.5 EPA) at stations/IBs/LCs/section including antenna, aviation lamp with provision of fencing around KAVACH tower with requisite cables, modems, antenna, including schematic painting and earthing work etc. The contractor can himself execute the work of towers, only in case he has experience as mentioned in Clause 2.2.2.1/ii of RFP for EPC to value of estimated Tower work as mentioned in schedule ‘G’ of draft EPC Agreement after taking approval from Authority otherwise contractor shall execute Tower work involved in project by engaging sub-contractor as per clause 3.2 of draft EPC agreement having experience of Supply, Fabrication, erection and commissioning of Telecom/electric/spun concrete/spun electric towers or execution of bridge work consisting of construction and launching of steel girders.”

2.1.14 Approved Designs for Towers & Foundations are available on RDSO website for soil bearing capacity of 100 KPA. If these designs are not fit for the purpose, then designing, design adequacy certificate and design report of Tower and/or foundations will be mandated & verified by third party (CPRI or any IITs) and will be approved by Authority/representative of authority. The newly erected tower must be suitable for mounting LTE antenna in addition to UHF antenna.

2.1.15 At sites where Black Cotton Soil is encountered, Cohesive Non-Swelling Soil (CNS) layer (minimum 250 mm or more as advised by Geotechnical Consultant) shall be provided at the foundation bed. In addition, at such sites, backfill soil to be mixed with bought out soil or stone dust to increase its density based on the recommendations of Geotechnical Consultant.

2.1.16 Safety and Execution Guidelines for Works Near Railway Tracks and Tower Foundations:

(a) Barricading Near Railway Tracks: Prior to the commencement of any work near railway tracks, the contractor shall install barricades at a minimum distance of 3.5 meters from the nearest railway track. These barricades must remain in place at all times during the execution of the work. The contractor shall adhere to all safety precautions in accordance with the prevailing practices of West Central Railway.

(b) Safety Measures for Excavation: For excavation work related to tower foundations or HDD pits, the contractor shall take full responsibility for ensuring the safety of workmen and passersby. The contractor shall provide clearly visible markings, including retro-reflective or fluorescent markings for night visibility, caution boards, and barricading at their own cost.

(c) Ownership of Released Barricading Materials: Upon completion of the work, the materials used for barricading shall remain the property of the contractor.

(d) Closure of HDD Pits: All HDD pits must be closed promptly upon the completion of ducting work to ensure site safety and cleanliness.

(e) Plastering of Tower Leg Areas: The area enclosed by the legs of towers shall be finished with 100 mm of cement concrete plastering to ensure cleanliness and prevention of undesirable vegetation including plants, grasses etc.

(f) Provision of Locks for Tower Fencing: The contractor shall provide high quality locks, such as those of Link, Harrison, or Godrej make, for securing the doors installed in the fencing of towers.

(g) All precautions as mentioned vide PCE/WCR's circular no. 17/2015-16 vide letter no. W-HQ/W-4/Track/PCE/CIR/4 dated 30.03.2016 and correction slip no. 1 to above circular vide letter no. W-HQ/W-4/Track/PCE/Cir.74/4 dated 27.02.2018 and Minutes of Meeting vide letter no. 04/01-2025/Rly.Bd dt. 13.01.2025 shall be followed strictly by contractor for the work site protection. Copy of circular and Minutes of Meeting attached.

2.1.17 Towers, antennas, Radio equipments to be provided at such locations to ensure continuous coverage with minimum overlap of 1000 meters (for smooth handover process) in the all lines of ET-KTE, KTE-MKP (ex.), NKJ 'A'– MHDA (ex.), KMZ-MAKR, STA-REWA, KMA-SAGM, BNSP-OHAN (ex.) and entire Katni Complex of Jabalpur division.

2.1.18 In Absolute Block signalling territory, mid-section interlocked LCs/IBHs which are not in RF communication coverage of station tower, independent tower of preferably 40 meters with LC KAVACH equipment at LCs/IBHs shall be installed. If 40 meters tower cannot be installed at any location due to unavoidable circumstances, approval of Authority/Authority's representative/Authority Engineer must be taken beforehand duly giving justifications. All Towers to be provided in Railway Land only. Land Plans have been attached (Annexure- 11K).

2.1.19 LC KAVACH equipments with associated RF towers including requirement of buildings or

RIU shall be installed at following Interlocked Engg. LC/IBS under scope of work for KAVACH:

TABLE:B (R=Required, NR= Not Required)

Sl. No.	Engg. Interlocked LC /IBS	Section	Chainage KM (Approx.)	Requirement of LC KAVACH / Tower/ UHF Antenna	Requirement of RIU at IBH/ LC	Space in existing RR	New Building required
ET-MKP Section							
1	**IBH-226**	ET-GRO	750.17	R	NR	Yes	No
2	**IBH-229**	BGTA-GMD	778.7	R	NR	Yes	No
3	230	BGTA-GMD	782.778	NR	R	-	-
4	231	GMD-SGP	790/15	R	NR	No	Yes
5	**IBH-234**	SGP-PPI	804.157	R	NR	Yes	No
6	234	SGP-PPI	805.35	NR	R*	-	-
7	237	PPI-BKH	817.78	R	NR	No	Yes
8	**IBH-239**	PPI-BKH	822.92	R	NR	Yes	No
9	239	PPI-BKH	823.103	NR	R*	-	-
10	241	PPI-BKH	827.989	NR	R	-	-
11	**IBH-246**	BKH-SCKR	838	R	NR	No	Yes
12	246	BKH-SCKR	838.85	NR	R*	-	-
13	250	BKH-SCKR	846.62	NR	R	-	-
14	**IBH-256**	SCKR-GAR	856.15	R	NR	Yes	No
15	257	SCKR-GAR	858.45	NR	R	-	-
16	260	GAR-BNJH	865.84	R	NR	No	Yes
17	**IBH-268**	BNE-KY	882.12	R	NR	Yes	No
18	**IBH-275**	KY-NU	900.255	R	NR	No	Yes
19	275	KY-NU	901.78	NR	R*	-	-
20	284	BELD-KKB	920.8	NR	R	-	-
21	**IBH-290**	KKB-SRID	930.73	R	NR	Yes	No
22	292	KKB-SRID	934.7	NR	R	-	-
23	295	SRID-BMR	942.3	NR	R*	-	-
24	**IBH-295**	SRID-BMR	943.2	R	NR	Yes	No
25	299	BMR-BHTN	954.1	NR	R*	-	-
26	**IBH-299**	BMR-BHTN	954.996	R	NR	Yes	No
27	301	BMR-BHTN	959.45	NR	R	-	-

Sl. No.	Engg. Interlocked LC /IBS	Section	Chainage KM (Approx.)	Requirement of LC KAVACH / Tower/ UHF Antenna	Requirement of RIU at IBH/ LC	Space in existing RR	New Building required
28	305	BHTN-BRGT	965.5	NR	R	-	-
29	**BTHN-BRGT IBH**	BHTN-BRGT	967.147	R	NR	No	Yes
30	307	BHTN-BRGT	968.33	NR	R*	-	-
31	310	BGRT-KEQ	974.91	NR	R	-	-
32	**BGRT KEQ IBH**	BGRT-KEQ	979.32	R	NR	Yes	No
33	**IBH-318**	JBP-ADTL	994.42	R	NR	Yes	No
34	323	ADTL-DEO	1004.459	NR	R	-	-
35	324	ADTL-DEO	1005.73	NR	R	-	-
36	326	DOE-GSPR	1009.113	NR	R	-	-
37	327	DOE-GSPR	1010.89	NR	R*	-	-
38	**IBH-327**	DOE-GSPR	1011.6	R	NR	Yes	No
39	328	DOE-GSPR	1013.973	NR	R	-	-
40	331	GSPR-SHR	1019.2	NR	R	-	-
41	332	GSPR-SHR	1020.67	NR	R	-	-
42	**IBH-334**	GSPR-SHR	1023.55	R	NR	Yes	No
43	338	SHR-DDCE	1035.15	NR	R*	-	-
44	**IBH-338**	SHR-DDCE	1035.96	R	NR	No	Yes
45	339	SHR-DDCE	1037.675	NR	R	Yes	No
46	340	SHR-DDCE	1041.45	NR	R	-	-
47	342	DDCE-SBD	1047.5	R	NR	No	Yes
48	343	DDCE-SBD	1050.8	NR	R	-	-
49	345	SBD-NWR	1054.64	NR	R	-	-
50	346	SBD-NWR	1057.867	NR	R	-	-
51	**IBH-347**	SBD-NWR	1058.767	R	NR	Yes	No
52	347	SBD-NWR	1060.037	NR	R*	-	-

Sl. No.	Engg. Interlocked LC /IBS	Section	Chainage KM (Approx.)	Requirement of LC KAVACH / Tower/ UHF Antenna	Requirement of RIU at IBH/ LC	Space in existing RR	New Building required
53	**NWR-KTES IBH**	NWR-KTE(S)	1073.45	R	NR	Yes	No
54	353	NWR-KTE(S)	1075.42	NR	R	-	-
55	**IBH-357**	KTE-PTWA	1085.5	R	NR	Yes	No
56	358	PTWA-JKE	1091.55	NR	R	-	-
57	**IBH-372**	UDR-BUU	1124.133	R	NR	Yes	No
58	375	BUU-MYR	1133	NR	R	-	-
59	376	BUU-MYR	1134.15	NR	R*	-	-
60	**IBH-376**	BUU-MYR	1135.82	R	NR	No	Yes
61	378	BUU-MYR	1141.885	NR	R	-	-
62	**IBH-380**	MYR-UHR	1149.49	R	NR	Yes	No
63	**LGCE-STA IBH**	LGCE-STA	1173	R	NR	Yes	No
64	**IBH-392**	SAGM-JTW	1193.33	R	NR	No	Yes
65	**MJG-TKYR IBH**	MJG-TKYR	1225.774	R	NR	Yes	No
66	400	TKYR-MKD	1235.84	NR	R	-	-
67	403A	BNSP-MKP	1254.23	NR	R	-	-
KMZ-MAKR section including MAKR-MDVK & MAKR-AGD Section							
1	LC-310A	MAKR-MDVK	980.995	NR	R	-	-
2	LC - 4	KYE-BJQ	989 / 7-8 (989.712)	NR	R*	-	-
3	IBH-KYE-BJQ	KYE-BJQ	990.546	R	NR	No	Yes
4	LC -8	SMRR-KYE	998 / 0-1	NR	R	-	-
5	LC - 11	JRK-SMRR	1011/8	NR	R*	-	-
6	IBH-JRK-SMRR	JRK-SMRR	1011.436	R	NR	No	Yes
7	LC - 16	NOI-ISH	1028 / 9-10	NR	R	-	-

Sl. No.	Engg. Interlocked LC /IBS	Section	Chainage KM (Approx.)	Requirement of LC KAVACH / Tower/ UHF Antenna	Requirement of RIU at IBH/ LC	Space in existing RR	New Building required
8	IBH-RTZ-NOI	RTZ-NOI	1036/1-2	R	NR	No	Yes
9	LC - 21	SGO-RTZ	1045 / 4-5 (1045.478)	NR	R	-	-
-10	LC - 23	SGO-RTZ	1048.449	NR	R	-	-
11	LC - 26	MKRN-SGO	1050 / 7-8 (1050.729)	NR	R	-	-
12	LC - 27	MKRN-SGO	1051 / 1-2 (1051.125)	NR	R	-	-
13	IBH-MKRN-SGO	MKRN-SGO	1052.47	R	NR	No	Yes
14	LC - 29	MKRN-SGO	1054.05	NR	R	-	-
15	LC - 32	LDA-MKRN	1059 / 2-3	NR	R	-	-
16	IBH-GW-LDA	GW-LDA	1068.65	R	NR	No	Yes
17	IBH-GAJ-GW	GAJ-GW	1079.96	R	NR	No	Yes
18	IBH-PHA-GAJ	PHA-GAJ	1092.225	R	NR	No	Yes
19	IBH-ANA-PHA	ANA-PHA	1107/6-7	R	NR	No	Yes
20	IBH-DMO-ANA	DMO-ANA	1118/30	R	NR	No	Yes
21	LC - 60	KYX-DMO	1128 / 3-4	NR	R	-	-
22	LC - 67	BNU-KYX	1136 / 29-31	NR	R	-	-
23	IBH-GEA-BNU	GEA-BNU	1148/7-8	R	NR	No	Yes
24	IBH-SAO-GEA IBS	SAO-GEA IBS	1160.904	R	NR	No	Yes
25	IBH-RTGN-SAO	RTGN-SAO	1174.962	R	NR	No	Yes

Sl. No.	Engg. Interlocked LC /IBS	Section	Chainage KM (Approx.)	Requirement of LC KAVACH / Tower/ UHF Antenna	Requirement of RIU at IBH/ LC	Space in existing RR	New Building required
26	IBH-BQQ-SYA	BQQ-SYA	1192.755	R	NR	No	Yes
27	LC - 100	PTDH-REI	1206 / 1-2 (1206.183)	NR	R	-	-
28	LC - 102	PTDH-REI	1210 / 1-2	NR	R	-	-
29	IBH-HDU-PTHD	HDU-PTHD	1215.374	R	NR	No	Yes
NKJ 'A' - Mahdeiya Section including entire Katni Complex							
1	IBH-LEK (KTKD-SLHA)	KTKD-SLHA	1100.77	R	NR	No	Yes
2	MFQ-VST IBH Damoy	MFQ-VST	1152.38	R	NR	No	Yes
3	IBH VST-CTJ	VST-CTJ	1172.06	R	NR	No	Yes
4	IBH BEHR-BARD	BEHR-BARD	1201.38	R	NR	No	Yes
5	JOBA-BARD IBH	JOBA-BARD	1219.64	R	NR	No	Yes
6	MWJ-NWB IBH	MWJ-NWB	1248.88	R	NR	No	Yes
7	LC-88	SGAM-GAJB	1287.632	NR	R	No	No
KMA-REWA Section including KMA-SAGMA Section							
Sl. No.	Engg. Interlocked LC/IBS	Section	Chainage KM	Requirement of LC KAVACH / Tower/ UHF Antenna	Requirement of RIU at IBH/ LC	Space in existing RR	New Building required
1	LC 8	HNM-BGHI	1200/2-3	NR	R	-	-
2	LC 11	HNM-BGHI	1203.708	R	NR	No	Yes
3	LC-17	TZR-REWA	1219/0-1	NR	R	-	-
4	LC 18	TZR-	1220.880	R	NR	No	Yes

Sl. No.	Engg. Interlocked LC /IBS	Section	Chainage KM (Approx.)	Requirement of LC KAVACH / Tower/ UHF Antenna	Requirement of RIU at IBH/ LC	Space in existing RR	New Building required
		REWA	(1220/8-9)				

*: Interlocked LCs where IBH is provided, RIU may be provided for repeating of aspects to LC-Kavach at IBH as required or signalling cable may be used for the same.

2.1.19a All Interlocked LC gates & IBS which are under radio coverage of adjacent stationary KAVACH, shall be connected through RIU to adjacent stationary KAVACH through dark fiber with path diversity and in ring protection manner using 4x48 Fiber OFC laid (2x48 fiber OFC in trench on either side of the track). Connectivity of Stations, IBS, LC Gates shall be through OFC in redundant mode in such a way that any single/double fiber cut shall not lead to disruption of Kavach system.

2.1.20 OFC shall be the only media for connecting the various RIUs to the Stationary KAVACH unit. The maximum number of dark fibres shall be four Single mode OFC per ring. Primary and Secondary rings shall be used for ring protection.

2.1.21 In Automatic Block Signalling territory, the signal information of overlap communication zone (of at least two/three signals) shall have to be wired to either side of stations through redundant RIUs for relaying the Movement Authority (MA) information for smooth handing over of Loco KAVACH from one Station KAVACH to another during communication change over between stations to avoid abrupt braking by Loco KAVACH in Auto section.

2.1.22 In Automatic Block Signalling territory, LC-KAVACH/RIUs shall be placed in the new relay huts constructed and Repeater relays of existing ECRs of signal aspects and axle counter VPR/Track circuits TPRs available in ABS huts shall be picked up to interface with LC-Kavach/RIUs if spare contacts in the relays are available. If spare contacts in exiting relays (ECRs/VPRs/TPRs) are not available, new relays must be wired for this purpose. New IPS should be provided in the new relay huts constructed for automatic block signalling territory in BJQ- MAKR section only. AT supply can be extended from exisiting AT supply already available in Auto Hut (RH-2).

2.1.23 WPC and SACFA clearance: The frequency spectrum for the operation for KAVACH is already finalised by Railway Board. In order to avoid complications at later stages, the application for WPC & SACFA shall be filed so that the license remains with Railways. The Contractor shall prepare all the required documents for obtaining WPC clearance and SACFA clearance for use of towers and radios. Payment of various charges and fees towards WPC License, Royalty, Additional Royalty, SACFA, etc. shall be made by Railways only for Non-Dealer Possession Licence or End User Licence. The application for WPC license and SACFA clearance will be filed at Wireless Planning Commission, Ministry of Telecommunication, New Delhi.

2.1.24 Processing of various clearances like wildlife, forest and any other permission / permit /

license from different agencies is to be initiated, processed and liasoned by contractor on behalf of Railways. Wildlife & Forest clearance may be needed in the KTE-SGRL and STA-MKP section or any other section as envisaged in the scope of work. Bidder has to conduct survey before bid for this aspect.

2.1.25 The contractor shall be responsible for obtaining any and all necessary permissions, permits, or licenses from relevant agencies, as required for the execution of the work.

2.1.26 SIM (Preferably Machine to Machine) shall be provided by the Authority for the KAVACH equipment.

2.1.27 Utility shifting works for executing this work, along with their restoration, wherever required, are part of this work. Shifting of cable (signalling/telecom/electrical etc.), location boxes, water pipeline, breakage/restoration of boundary wall etc. is considered as part of this work.

2.1.28 Submission of Safety Case documents. (Document related to ISA certification per KM)

2.1.29 An Independent Safety Assessor (ISA), engaged from the approved panel of RDSO, shall evaluate all aspects of the Kavach system's safety. This includes assessing the behavior of station Kavach systems with various RDSO-approved onboard systems from different manufacturers, the performance and safety of train operations during system or subsystem shutdown/restarts, leading to critical situation, the resilience of the system against potential cyber-attacks, and the identification and mitigation of other potential hazards. The assessments and certifications by the ISA shall ensure the comprehensive Reliability, Availability as per Technical Advisory Note no. **RDSO-SIGOTCAS (TAN)/01/2021 version 2.0, dated 18.10.2021 or latest.**

2.1.30 Testing & commissioning of KAVACH system for the entire section.

2.1.31 Training to Railway staff (1 Lumpsum training package of 200 man-days)

2.1.32 Supply and Installation of (minimum 2 cameras per Building) STQC certified 5 MP IR BULLET CAMERA with motion- sensing capabilities and an IP67 rating (minimum) for water resistance. Supply of CAT-6 cable, OFC for connecting the camera to 2 no. of 64 Channel NVR at JBP control room. Continuous monitoring of all the cameras to be provided at JBP control room. Suitable hard drives also to be provided for storage of all camera recordings for minimum of 30 days. Two no. of cameras to be provided at each buildings in mid-section and each buildings for LC-Kavach equipment.

2.2 **Interlocking Details:**

2.2.1 In ET-MKP section, 07 stations (ET, MML, JBP, BUU, MYR, STA, BNSP) have RRI and 01 station (BNJH) has EI. Rest all stations in ET-MKP section have Metal to Metal PI. In KMZ-Bina Malkhedi-Mahadeokheri section, 01 station (KMZ) has RRI, 03 stations (PTHD, RTZ, BJQ) have Panel interlocking and, 25 station have EI. In KMA-Rewa section, 02 stations (BGHI, TZR) have Panel interlocking and 04 station have EI. In NKJ-SGRL section, 01 station (MZHL) has RRI, 02 stations (BARD, BRGW) have Panel interlocking and 20 station have EI. Details of Signalling infrastructure is given in Annex-I, Sch-A para 4.9- Railway Stations on Railway project.

2.2.2 Wherever Electronic Interlocking is available at Stations/IBS etc. and KAVACH enable port is not available, suitable modifications in EI have to be carried out to provide Kavach Ready EI port for direct interfacing at data level with KAVACH in compliance to Railway Board's letter no. 2018/Sig/18/EI/Gen. dated 04.09.2024 and RDSO letter no. RDSO-SIG0MISC(GEN)/1/2021Part(1) dated 17.08.2024 & WCR S&T HQ letter No. No.WCR/N-HQ/160/Drg-Corrs/Misc.Dt 07/4/2025. Relay interfacing at EI stations will not be permitted without approval of Authority. Station/LC/IBS KAVACH shall be connected to adjacent KAVACH through OFC for exchange of data for achieving cab signalling.

2.2.3 It is envisaged that wherever two contacts are spare in existing relays, the same are to be utilised for input to KAVACH and repeater relays to be opened only when two spare contacts are not available. If spare contacts are not available, then preferably repeater relays (similar to the relays used in existing installation) to be installed in spare spaces in existing relay racks, their back contacts proved in existing interlocking circuits and then front contacts should be utilised for KAVACH system. Repeater relays should be similar to the relays used in existing installation. If there is no spare space in existing relay racks, new relay rack may be installed preferably in existing relay room, spare relays installed and wired including back contact proving. It is further clarified that as far as possible additional relay rack for repeater relays (where spare contacts are not available) shall be provided-in the existing relay room.

2.2.4 At Itarsi station, provision of station KAVACH, RFID Tags, relay interfacing and indoor wiring of all signals controlled by ET for ET-GRO section is not covered under the scope of this work. However provision of tower, UHF antennas, Radio equipments, power supply for radio equipments from relay room to tower radio equipments in redundant manner, Ring earth for tower structure & radio equipments, FDMS, 42 U rack including laying and termination of 2x24 fiber OFC in redundant path with route diversity from relay room to tower radio equipments and laying & termination of 4x48 Fiber OFC with path diversity and ring protection manner at ET station for ET-GRO block section is covered under this work. UHF antennas, Radio equipments and power supply equipments shall be compatible/interoperable with Station Kavach equipment provided by different OEM (Probably HBL).

2.2.5 All signals that are controlled from Gondawali (GNDI) station and existing between Gondawali-Mahdeiya section shall be catered with the Station KAVACH system of Gondawali station. This shall also include indoor wiring and direct interfacing of existing interlocking system with Station KAVACH of GNDI station. Further all signals that are controlled from Bansapahar (BNSP) station and existing between BNSP-OHAN, BNSP-MKP and BNSP-BQF section shall be catered with the Station KAVACH system of BNSP station. This shall also include indoor wiring and direct interfacing of existing interlocking system with Station KAVACH of BNSP station."

2.2.6 As MAKR is commissioned with EI, Provision of Station Kavach and relay interfacing for all Signals controlled by MAKR i.e., for MAKR-BJQ, MAKR-MDVK, MAKR-AGD & MAKR-BINA lines is considered under the scope of this tender. The scope also includes provision of tower, UHF antennas, Radio equipments, power supply for radio equipments from relay room to tower radio equipments in redundant manner, Ring earth for tower structure & radio equipments, FDMS, 42 U rack including laying and termination of 2x24 fiber OFC in redundant path with route diversity from relay room to tower radio equipments

& laying & termination of 4x48 Fiber OFC with path diversity and ring protection manner at MAKR station for communication between MAKR-BJQ section.

2.2.7 RFID tags shall also be provided up to the jurisdiction of Jabalpur division of WCR in Malkhedi-Agasod, Gondawali-Mahdeiya, Bansapahar-Manikpur and Bansapahar-Ohan section.

2.3 Interfacing of the KAVACH system with Existing Interlocking system at stations, Auto Huts and interlocked LC gates/IBHs:

2.3.1 Supply & fixing of powder coated Relay Rack Assembly /Composite Relay Rack Assembly complete with scaffolding, fixtures and accessories including MS Bars / relay frames for fixing of relay plug boards, string rods, fuse strips with bracket, 11 Way Bus Bars with cover and mounting brackets, runway for cable/wires, frame, base assembly etc. Siemens' type or equivalent Q-series relay rack Drg & as per extant practice on W.C. Rly. Rack arrangement as per Sketch no Sk-727 as attached in list of drawings and Rack plan as approved by Engineer in charge. Rack should be made of first-class steel powder coated painting and rack manufacturer's certificate should be submitted. All runway for cables / wires shall be provided with PVC sleeve of proper size.

2.3.2 Supply, fixing, wiring & soldering of Tag Blocks 200 way & 96 way with cover as per IRS: S- 77/2006 (Rev. 1) with latest amendment and Drg No.SA-24751 as per requirement for Relay interlocking.

2.3.3 Installation of Relay Rack Assembly/Composite Relay Rack Assembly including IDF pillars complete with wall supports, scaffolding, ladders, runway for cables, Relay/Relay group base plates, fixing of Tag blocks etc. The work shall be done as per approved plan, extant practice on W.C. Railway & the instructions of Rly. engineer at site.

2.3.4 Supply, fixing & wiring of Relay DC Neutral Line Relay, Non ACI, 24V/60 V DC (Metal to Metal Contact), plug-in-type, as per requirements, conforming to IRS:S-46 with Amdt.1, IRS S 23-88 ; IRS S 34-68 and firm's specification. The relay housing shall contain two miniature identical relays in mini group housing complete with base plate to achieve relay interlocking for automating signalling.

2.3.5 Supply, fixing & wiring of Relay AC Immune, plug in Type, M to C, Twin, DC Neutral, Line relay ACI, Style QNNA1, 24 V DC, 6F-2B & 6F-2B /4F-4B & 4F-4B Contact, Code CDEHX/ACDHJ as per requirements, conforming to BRS:960 ; IRS S 34 ; IRS S 23 ;IRS S 60-78 and firm's specification.

2.3.6 Circuit Wiring / Jumpering as per wiring diagrams in the relay rack / IDF rack / tag block. This includes preparation of jumper sheets duly checked by firm's site supervisor and wire to wire testing as per wiring diagram. Jumper wire and other material like solder wire etc. will be supplied by contractor.

2.4 Indoor Signalling Works:

2.4.1 Alteration in indoor wiring (Wherever Required) by running of Indoor cables and carrying out jumpering as per approved circuit diagram at station including Fixing of

relays & relay groups and other associated works as per standard practices of West central Railway wherever required for commissioning of Kavach.

2.4.2 16/0.2 mm size tinned flexible single core indoor wire IRS:S-76/89 Amend.No.2 or with latest amendment/ specification, PVC coated in different colours and PVC insulated Rly Signalling Indoor 40 core 0.6 mm cables, 60 core 0.6 mm cables & 24 core 1 mm cables as per IRS (S) 76 / 89 amendment II or with latest amendment / specification to be used.

2.4.3 Screw less type Disconnect Terminal block for Four conductors are to be used. (Wherever Required)

2.4.4 For screw less type terminals, disconnect Terminal block for Four conductors with screw less Cage Clamp type/ sliding switch RDSO Specification No. RDSO/SPN/189/2004version 3.0 or latest, for each conductor size up to 2.5 Sq. mm Equivalent of M6 Terminals shall be used. Each Terminal block shall be equipped with two markers on top and bottom, an end plate, 2 end clamps & adequate length rails for fitting terminal blocks.

2.4.5 Power wires with following details shall be supplied by contractor and used as per standard practices of WCR. Power wire (copper, multistrand) as per IS 2465/1984 & IS 694/1990 (1x6Sq.mm), 85 conductors each dia 0.30 +/- 0.01 with insulation thickness of 1.2 mm, nominal conductor resistance 3.30 ohms/km and test parameters as per IRS (S) 76/89; Power wire (copper, multistrand) as per IS 2465/1984 & IS694/1990 (1x16 Sq.mm), 101 Conductors each dia 0.45 +/- 0.01 with insulation thickness of 1.20 mm nominal conductor resistance 1.21 Ohms/Km and test parameters as per IRS(S) 76/89 rev. 2.0 or latest; Power wire (copper, multi strand) as per IS2465/1984 & IS 694/1990 (1x10Sq.mm), 140 conductor each dia 0.30 +/- 0.005 with insulation thickness of 1.2 mm nominal conductor resistance 1.815 ohms/ km and test parameters as per IRS (S) 76/89.

2.4.6 FUSE BLOCK MADE OF PBT/POLYCARBONATE as per IRS S 75/2006 & RDSO Drg No SA-23748 Alt 4 suitable for Cartridge fuse block cylindrical head fuse links, non-deteriorating type low voltage cylindrical head cartridge ELECTRIC fuse 2A as per Spec No IRS/S/78/92 with latest amendments.

2.4.7 PPTC fuses are to be procured from firms conforming to UL Thermistor Standard 1434 and having UL recognition with valid UL file number, viz. Little fuse/ Fuzetec/ Tyco/ Bourn/ Raychem or equivalent etc. Ratings of PPTC fuses shall be as follows: PPTC Fuse: X30, UF090 (Rating 30 VDC, 0.9A, suitable for 24 VDC Circuits); PPTC Fuse: XX120, I-550 (Rating120 VDC, 0.75A, suitablefor110 VAC Circuits)

2.4.8 Resistors and capacitors of appropriate capacity as per RDSO Specification no. RDSO/ SPN/ 144/2006 Rev. 2.0 or latest are also to be supplied for various signalling circuits. Resistors and capacitors should be of make as specified Annexure-VI of the Specification no. RDSO/SPN/165/2023 (Ver. 4.0) amnd. 1 or latest.

2.4.9 CO2 type fire extinguisher of capacity 4.5Kg as per IS Standard having ISI mark for all new relay room extension buildings at stations and service buildings at LC/IBH (2

Nos., per station & 2 no. per interlocked LC gate/IBH.

2.5 Telecommunication infrastructure:

2.5.1 All telecommunication works including survey, design, supply, installation, testing and commissioning for installation of KAVACH system shall be executed in accordance with the provisions of the Indian Railway Telecom Manual. STM-1/ STM-4 along with 24F OFC is available in the entire section.

2.5.2 Telecommunication works in connection with installation of KAVACH system including survey, design, supply, installation, testing and commissioning shall be executed in accordance with the provisions of the Indian Railway Telecom Manual.

2.5.3 The scope includes the supply installation testing & Commissioning of 4x48 Fibers OFC Network with path Diversity in ring protection manner connecting all station KAVACH, RIUs and LC/IB KAVACH in ET-MKP, entire Katni complex, BNSP-OHAN, MHDA-NKJ-'A' cabin, KMZ-MAKR, STA-REWA, KMA-SAGM, section as per RDSO Spec. No. RDSO/SPN/ TC/110/2020 Revision-0 or latest amendments.

2.5.4 Construction of Manhole chamber size 1 M dia. and 600 mm deep as per approval of Engineer in-charge. (Including supply of pre-cast Ferro Cement pre-fabricated joint box) Drawing no. SK/DRM (S&T)/JBP/OFC/10, 11 and Drg No. WCR/Tele/06/05.

2.5.5 Supply and installation of ETSI heavy duty rack of size 2.2mtr (42U) height x 600 width x 600 depth of President/ Selrack/Raychem RPG/Shakti or similar make only with following: 1. Front tinted glass door of full height with lock. 2. Rear MS door of full height with lock. 3. Side panel louvered up to 1/3 height from bottom. 4. Top &bottom cover. Fan housing unit 4. Fan position along with 2 fan of 230 V AC 90 CFM for cabinet cooling. 5. "19" Mounting angles &cable entry provision from top & bottom.6. Rack in grey powder coated finishing on external & internal surfaces.7. Set of Castors- 2 Nos with brakes & 2 Nos without brakes. Accessories to be including with Rack: Earthing kit: 01 No., Cable management manager vertical & horizontal(1U): 2 No., Cable trays 100mm: 2 No., MCB mounting panel: 01 No., Vertical AC mains channel with 8 at each auto hut and station for 48 fiber FMS to be installed in 42 U rack.

2.5.6 Supply and installation of Fiber Monitoring System for monitoring 16 fibers (4 dark fibers from each cable i.e., 2 fibers from fiber no. 1 to 24 and 2 fibers from fiber no. 25 to 48) at each Station/IB hut/LC-KAVACH Unit in ET-MKP section, entire Katni Complex and BNSP-OHAN, MHDA-NKJ-'A' cabin,KMZ-MAKR, STA-REWA, KMA-SAGM section .

(a) A Remote Terminal Unit for monitoring the 8 dark fibres comprising of 2 to 4 port optical switch and capable of monitoring 2 to 4 fibers at a time respectively and covering a monitoring distance of minimum 75 Km OFC network per optical Port. Equipment must be of 32 dB or more dynamic range with 2 to 8 port optical switch output. Powered from both DC 48V and AC 230V, 50Hz. RTU must be able to be fitted in existing 19" Rack. It should able to generate wavelength of 1310nm or 1550nm or 1625nm for monitoring of fibers. Insertion loss must not be more than 1.5db and MTBF must be better than 6 million cycles. It shall also be operated in temperature range of 0 deg C to 50 deg C. Separate RTUs to be provided for monitoring of Fiber cables from each path.

(b) **FMS (Fiber Monitoring Software / Application** software for monitoring optical fiber network) server application with Google Conduita) Basic Fault Management Module for

detecting the fault in the optical fibre under surveillance and provide the optical distance and corresponding surface distance of the fault identified) Map Integration Module displaying fibre route in GIS / Google map and display the visual indication of the faults on the mapc) Network Analysis Module for analysis of the optical fibres under surveillance and provide trend analysis d) Report Generation Module for customizable report generation e) Modem Interface for SMS based alarm escalation for escalation of alarms through SMS to registered users as defined by admin f) Fibre Database Designer Module g) As Built Drawing / GIS Integrator Module h) Configuration Module i) Fault restoration Updating Module for tracking of restoration and updating of the restored fibres j) Interface with customer NOC for Trouble Ticketing k) Integration with Field Mobile Application Module

(c) Server -RAID architecture + Database Server + Online UPS -Hewlett Packard Enterprise (HPE DL360 Gen10 plus Server) 1 X Intel (Intel Xeon Gold 6334) DDR4 SDRAM with ECC 16 GB, upgradable to 32 GB / CISC (x86) architecture / 8 cores/ 3.6GHz/12Mb Cache/ 2 Sockets available on Server & 1 Sockets populated with Processors available on Server/ Rack Form Factor (1 RU) /Type of Interface Type-SATA SSD(Read Intensive with Hot Swappable feature, 8 Slots, 960 GB SATA SSD per Slot capacity)/ Raid level 1,5,6/ 8 controller port/ 12GPSC Port Speed/ 4 GB Raid Cache/ 1200W Platinum Hot power supply/ Windows server 2008/2012 R2 or latest/ My SQL standard edition/ Support Ipv4/Ipv6/Network Card 1G, 10G/ BIS Registered or similar/better configuration compatible with the system and online UPS + Battery for atleast 4 Hrs of Backup on full load. Server shall be supplied with minimum 3 years warrantee. Any problem arised in Hardware and/or Software during warrantee period of the system shall be replaced/repaired free of cost by the contractor.

(d) Workstation Industrial grade Desktop computer with minimum 3 years warrantee for Control office - Processor Intel Core i9 12th generation or better, 16 core, 5 GHz, 32 GB DDR-5 RAM, 1 TB SSD, Operating System: Windows 11 or above - MS office 2021 or better included, MS Project Licenced Version, Quick heal total Security for 3 years or similar - USB Keyboard (Wired), Optical Mouse must be supplied with A-3 size colour inkjet all in one Printer-Suitable UPS for 60 minutes backup. Items shall be equivalent or superior to the specifications To be supplied at KTE and JBP.

(e) GSM Modem + SIM with 1 year from date of commissioning of complete project - GSM modem with RS232 cable and antenna - Supports AT command - Powered by 12V adapter.

(f) Installation & Commissioning (RTUs, FMS Server Application Software loading in Server Machine, Mobile client units and EMS.

(g) Onsite Training of "Monitoring of OFC equipment" and other subsystems at different locations (Training Period 100 Man days)

(h) The contractor shall also provide live monitoring of various equipments including but not limited to routers and switches utilized in forming the networks necessary for station-to-station communication and NMS in addition to fiber monitoring system.

2.6 Tentative Requirement of Tower (40 m) in ITARSI- MANIKPUR (ex), Mahdeiya (ex)-BINA MALKHEDI, Entire KATNI Complex, SATNA-REWA, KAIMA- SAGMA, BANSAPAHAR – OHAN (ex) section:

2.6.1 Based on the RSSI survey conducted by the Authority, 40 m tubular Lattice towers have been planned as per RSSI survey report given in Annexure:2A. The location of the towers may be changed so as to ensure continuous radio coverage & overlapping radio coverage between adjacent towers. At such locations, where there is no Station/LC/IBS is nearby but Tower is to be provided for continuous coverage, S&T Service Buildings [as per Annexure-1B (Drg. No. JBP/S&T/P/TCAS/SB)], general lighting arrangements, Class-A protection, perimetric ring earth, Stationary KAVACH system, Power supply arrangement for radio equipment and Stationary KAVACH system by providing 2X10 KVA AT (except sr. no. 3, 31 & 33 where 2X25 KVA AT supply is to be provided) with CLS panel and mini IPS arrangement shall be provided. The scope shall also include termination of 2x48 F OFC (1x48F OFC from either side of the track which is being terminated at every station, LC, IBH) in 48F FDMS, laying and termination of 2X24 fiber OFC in path diversity from new service building to tower in 24F FDMS with suitable housing arrangement, provision of concrete cable route marker and RFID markers in both trenches from new service building to Tower with minimum 3 nos. in each path- both ends and at least one in middle depending on the length of trench path. Details of such locations where Towers are required for Continuous communication but there is no Station/LC/IBS is present nearby are given as under:

S.No.	Section	Lattitude	Longitude	Remarks
ET-JBP Section				
1	GRO-4.35 Kms	22.6276	77.9093	
2	JHT(Class D Stn)-5 Kms.	22.7831	78.6368	
3	BNE-4Kms	22.9139	78.9548	2X25 KVA AT to be provided
4	Karapgaon (Class D stn)-3.85 Kms	22.9220	79.0296	
STA-KMA Section				
5	TZR-4.5 Kms	24.2172	82.5161	
KTE-SGRL Section				
6	GNDI-2.5Kms	24.5481	81.1376	
7	GAJB-5.75Kms	24.0502	82.2379	
8	SGAM-3.5Kms	24.0228	82.1654	
9	SSGJ-4.8Kms	24.0371	82.0628	
10	SKBR (Class D stn)	24.1038	81.8694	
11	MWJ-4Kms	24.0694	81.6644	
12	JOBA-4.5Kms	24.0970	81.7755	
13	Karapgaon (Class Dstn)-6.5 Kms	23.9985	81.6190	
14	BEHR-4Kms	23.9903	81.3790	
15	CTJ-3.5Kms	23.9913	81.2407	
16	BARA (Class D stn)-3 Kms	24.0007	81.184	
17	Damoy(Class D stn)-4.10Kms	23.9713	80.9978	
18	MFQ-3 Kms	23.9427	80.8924	
19	KHBJ-4.70Kms	23.8768	80.7298	
20	SLHA-6Kms	23.7717	80.5643	
21	LEK (Class D stn)-3.75Kms	23.7589	80.5283	
KMZ-BINA Section				
22	SAO-4 Kms	23.7948	79.8111	
23	GTY-5 Kms	23.7979	79.5753	
24	GEA- 4 Kms	23.8586	79.6352	
25	KYX- 4 Kms	23.8369	79.6352	
26	PHA - 4 Kms	23.9194	79.1546	
27	GAJ -3 Kms	23.8885	79.0441	

28	RTZ 2Kms	23.8328	78.6521	
29	RTZ -8 Kms	23.8659	78.6117	
30	ISH- 4.5Kms	23.9483	78.5130	
JBP-MKP Section				
31	SNRR (Class D stn)-3Kms	23.6087	80.3504	2X25 KVA AT to be provided
32	JKE-5kms	24.0205	80.4651	
33	KTHA-3.8kms	24.8376	80.8672	2X25 KVA AT to be provided
34	MJG-1.5kms	24.9258	80.8118	
35	BNSP-3kms	25.0721	81.0524	

2.7 Level Crossing Gates:

2.7.1 In ET-MKP section, there are total 102 LC gates out of which there are 25 Traffic gates, 41 Engineering Interlocked LC gates and 36 Engineering Non -interlocked LC gates.
Out of 25 Traffic LC gates, 16 Traffic LCs are proposed for closure shortly and rest 9 are also being planned for closure in the long run. Out of 41 Engineering Interlocked LC gates 21 LCs are proposed for closure shortly and rest 20 are also being planned for closure in the long run. As these 66 LCs (Interlocked (Traffic + Engg.)) are not closed yet, these have been shown in the approved SIPs. If these LCs are closed before executing KAVACH work, no associated KAVACH work at these LCs are required to be done. Revised SIPs will be issued accordingly. If these LCs are not closed, associated KAVACH work like provision of RIU with OFC connectivity in ring protection manner with adjacent Station/LC KAVACH or provision of LC KAVACH with associated RF communication tower at these LCs will be provided depending upon the existence of these LCs in RF communication zone. Payment for KAVACH related work at these LCs (if not closed) is part of Schedule G1-C.

Similarly, out of 36 Engineering Non-interlocked LC gates, 24 LCs are proposed for closure and rest 12 are also being planned for closure in the long run. If these LCs are closed before executing KAVACH works, no associated KAVACH work at these LCs are required to be done. If these LCs are not closed, associated KAVACH work like provision of RFID Gate tags at these LCs will be done. Payment for KAVACH related work at these LCs (if not closed) is part of Schedule G1-C. Details of LCs of ET-MKP section is attached below.

(**Table: E**)

SN	Route	Gate No.	Class	Block section/Stn	Approx. Km	Engg/Traffic	I/NI
1	B	227	B	GRO-SQL	756/3-4	TRAFFIC	I
2	B	230	B2	BGTA-GMD	782.776	ENGG.	I
3	B	231	SPL	GMD-SGP	790.938 (790/9-10)	ENGG.	I
4	B	232	SPL	GMD-SGP	793.888 (793/8-9)	TRAFFIC	I

SN	Route	Gate No.	Class	Block section/Stn	Approx. Km	Engg/Traffic	I/NI
5	B	234	B1	SGP-PPI	805.35	ENGG.	I
6	B	237	B1	PPI-BKH	817.78	ENGG.	I
7	B	239	B1	PPI-BKH	823.103	ENGG.	I
8	B	241	B1	PPI-BKH	827.989	ENGG.	I
9	B	242	SPL	PPI-BKH	830.636	TRAFFIC	I
10	B	243	C/M	BKH-SCKR	832.7	ENGG.	NI
11	B	245	B1	BKH-SCKR	836.7	ENGG.	NI
12	B	246	B1	BKH-SCKR	838/28-30	ENGG.	I
13	B	249	B1	BKH-SCKR	844.5	ENGG.	NI
14	B	250	B1	BKH-SCKR	846/19-21	ENGG.	I
15	B	251	SPL	BKH-SCKR	847/6-7	TRAFFIC	I
16	B	252	B1	SCKR-GAR	850.65	ENGG.	NI
17	B	254	B1	SCKR-GAR	853.15	ENGG.	NI
18	B	256	B1	SCKR-GAR	856.95	ENGG.	NI
19	B	257	B1	SCKR-GAR	858.45	ENGG.	I
20	B	258	SPL	SCKR-GAR	861/7-8	TRAFFIC	I
21	B	260	C1	GAR-BNE	865.84	ENGG.	I
22	B	261	C1	GAR-BNE	868.615	TRAFFIC	I
23	B	262	A	BNJH-BNE	871.75	TRAFFIC	I
24	B	263	SPL	BNE-KY	875/2-3	TRAFFIC	I
25	B	264	B1	BNE-KY	877/11-13 (877.350)	ENGG.	NI
26	B	265	B1	BNE-KY	878/29-31 (878.950)	ENGG.	NI
27	B	266	B1	BNE-KY	879/29-880/ (879.950)	ENGG.	NI
28	B	267	B1	BNE-KY	881/4-6 (881.1	ENGG.	NI
29	B	268	B1	BNE-KY	882/20-22	ENGG.	NI
30	B	269	B1	BNE-KY	884/23-25 (884.750)	ENGG.	NI
31	B	270	B1	BNE-KY	885/23-25 (885.750)	ENGG.	NI
32	B	273	B1	KY- NU	892.35	ENGG.	NI
33	B	275	C	KY- NU	901.738	ENGG.	I
34	B	278	SPL	NU - GPC	906/7-8	TRAFFIC	I

SN	Route	Gate No.	Class	Block section/Stn	Approx. Km	Engg/Traffic	I/NI
35	B	283	B1	GPC- BELD	917/1	TRAFFIC	I
36	B	284	C	BELD-KKB	920/8	ENGG.	I
37	B	285	B2	KKB-SRID	922/5-6	TRAFFIC	I
38	B	286	C/M	KKB-SRID	923.75	ENGG.	NI
39	B	287	C/M	KKB-SRID	925.55	ENGG.	NI
40	B	292	A	KKB-SRID	934.7	ENGG.	I
41	B	293	C	KKB-SRID	935.8	ENGG.	NI
42	B	295	B1	SRID-BMR	942.3	ENGG.	I
43	B	299	SPL	SRID-BMR	954.1	ENGG.	I
44	B	300	C/M	BMR- BHTN	956.05	ENGG.	NI
45	B	301	SPL	BMR- BHTN	959/16-18	ENGG.	I
46	B	305	B2	BHTN-BRGT	965.5	ENGG.	I
47	B	307	A	BHTN-BRGT	968.33	ENGG.	I
48	B	308	C/M	BHTN-BRGT	971.95	ENGG.	NI
49	B	309	SPL	BHTN-BRGT	973/7-8	TRAFFIC	I
50	B	310	A	BRGT- KEQ	974/9-10	ENGG.	I
51	B	312	C/M	BRGT- KEQ	978.5	ENGG.	NI
52	B	316	SPL	KEQ-MML	985/25-27	TRAFFIC	I
53	B	323	B1	ADTL- DEO	1004.459	ENGG.	I
54	B	324	B	ADTL- DEO	1005.73	ENGG.	I
55	B	326	SPL	DEO-GSPR	1009.113	ENGG.	I
56	B	327	SPL	DEO-GSPR	1010/8-9	ENGG.	I
57	B	328	B2	DEO-GSPR	1013.973	ENGG.	I
58	B	329	C	DEO-GSPR	1015.350	ENGG.	NI
59	B	330	A2	DOE-GSPR	1017/1	TRAFFIC	I
60	B	331	SPL	GSPR- SHR	1019/6-8	ENGG.	I
61	B	332	SPL	GSPR- SHR	1020/22-24	ENGG.	I
62	B	336	SPL	SHR-DDCE	1029/4-5	TRAFFIC	I
63	B	338	B2	SHR-DDCE	1035.150	ENGG.	I
64	B	339	B1	SHR-DDCE	1037.675	ENGG.	I
65	B	340	C	SHR-DDCE	1041.450	ENGG.	I
66	B	341	C/M	DDCE- SBD	1044/1-2	TRAFFIC	I
67	B	342	SPL	DDCE- SBD	1047/30-32	ENGG.	I
68	B	343	A	DDCE- SBD	1050/28-30	ENGG.	I
69	B	344	B1	DDCE- SBD	1052/28-30 ((1052.836)	TRAFFIC	I

SN	Route	Gate No.	Class	Block section/Stn	Approx. Km	Engg/Traffic	I/NI
70	B	345	SPL	SBD- NWR	1054/24-26	ENGG.	I
71	B	346	SPL	SBD- NWR	1057.867	ENGG.	I
72	B	347	SPL	SBD- NWR	1060.037	ENGG.	I
73	B	349	A	NWR-KTE	1068.87	TRAFFIC	I
74	B	350	C/M	NWR-KTE	1071.25	ENGG.	NI
75	B	351	C/M	NWR-KTE	1072.75	ENGG.	NI
76	B	353	SPL	NWR-KTE	1075.42	ENGG.	I
77	B	355	A	NWR-KTE	1078.193	TRAFFIC	I
78	B	358	A	PTWA- JKE	1091/16-18	ENGG.	I
79	B	360	A	PTWA- JKE	1097/0-1	TRAFFIC	I
80	B	368	C/M	PKRD- UDR	1115.550	ENGG.	NI
81	B	370	C/M	UDR- BUU	1120.650	ENGG.	NI
82	B	372	C/M	UDR- BUU	1124.700	ENGG.	NI
83	B	374	A	UDR- BUU	1130/9	TRAFFIC	I
84	B	375	SPL	BUU- MYR	1133.00	ENGG.	I
85	B	376	B1	BUU- MYR	1134/8-9	ENGG.	I
86	B	377	C/M	BUU- MYR	1139.25	ENGG.	NI
87	B	378	A	BUU- MYR	1141.885	ENGG.	I
88	B	380	C/M	MYR- UHR	1148.750	ENGG.	NI
89	B	381	C/M	MYR- UHR	1155.450	ENGG.	NI
90	B	382	SPL	UHR-LGCE	1158/30-32	TRAFFIC	I
91	B	388	C	STA-SGMA	1183/24-26	ENGG.	NI
92	B	389	C/M	STA-SGMA	1185/8	TRAFFIC	I
93	B	390	C/M	SGMA- JTW	1189/22-24	ENGG.	NI
94	B	391	C/M	SGMA- JTW	1191/8-10	ENGG.	NI
95	B	392	C/M	SGMA- JTW	1192.93	ENGG.	NI
96	B	395	C/M	SGMA- JTW	1202/11-13	ENGG.	NI
97	B	397	SPL	KTHA-CTHR	1213/8-9	TRAFFIC	I
98	B	399	C/M	MJG-TKYR	1230/26-28	ENGG.	NI
99	B	400	SPL	TKYR- MKD	1235/28-30	ENGG.	I
100	B	402	A	MKD-BQF	1241/31-33	TRAFFIC	I
101	B	402-A	C/M	BNSP-OHAN	1254/1-2	ENGG.	NI
102	B	403 A	SPL	BNSP- MKP	1254/2-3	ENGG.	I

2.7.2 In KTE-Bina section, there are total 30 LC gates out of which there are 10 Traffic gates, 15 Engineering Interlocked LC gates and 5 Engineering Non -interlocked LC gates.

Out of 10 Traffic gates, 6 Traffic LCs are proposed for closure in short run and rest 4 LCs are proposed for closure in the long run. Out of 15 Engineering Interlocked LC gates 12 LCs are proposed for closure in short run and rest 3 are proposed to be closed in the long run. As these 25 LCs are not closed yet, these have been shown in the approved SIPs. If these LCs are closed before executing KAVACH work, no associated KAVACH work at these LCs are required to be done. Revised SIPs will be issued accordingly. If these LCs are not closed, associated KAVACH work like provision of RIU with OFC connectivity in ring protection manner with adjacent Station/LC KAVACH or provision of LC KAVACH with associated RF communication tower at these LCs will be provided depending upon the existence of these LCs in RF communication zone. Payment for KAVACH related work at these LCs (if not closed) is part of Schedule G1-C.

Similarly, out of 5 Engineering Non-interlocked LC gates, 4 LCs are proposed for closure in short run and rest 1 LC is proposed for closure in long run. If these LCs are closed before executing KAVACH work, no associated KAVACH work at these LCs are required to be done. If these LCs are not closed, associated KAVACH work like RFID tags at these LCs will be provided. Payment for KAVACH related work at these LCs (if not closed) is part of Schedule G1-C. Details of LCs of KTE-BINA section is attached below: (**Table: F**)

SN	Route	Gate No.	Class	Block section/Stn	Approx. Kms.	Engg /Traffic	I/NI
1	D	310-A	SPL	MAKR-MDVK	980/9-10	ENGG.	I
2	D	4	B2	BJQ-KYE	989/7-8	ENGG.	I
3	D	6	SPL	BJQ-KYE	996/4-5	Traffic	I
4	D	7	SPL	KYE-SMRR	997/4-5	Traffic	I
5	D	8	SPL	KYE-SMRR	998/0-1	ENGG.	I
6	D	11	SPL	SMRR-JRK	1011/8	ENGG.	I
7	D	12	SPL	SMRR-JRK	1014/3-4	Traffic	I
8	D	16	A	ISH- NOI	1028/9-10	ENGG.	I
9	D	18	A	NOI- RTZ	1032/2-3	ENGG.	NI
10	D	20	SPL	NOI- RTZ	1036/6-7	ENGG.	NI
11	D	21	SPL	RTZ- SGO	1045/4-5	ENGG.	I
12	D	23	SPL	SGO- MKRN	1048/4-5	ENGG.	I
13	D	25	SPL	SGO- MKRN	1050/2-3	Traffic	I
14	D	26	SPL	SGO- MKRN	1050/7-8	ENGG.	I
15	D	27	SPL	SGO- MKRN	1051/1-2	ENGG.	I
16	D	29	SPL	SGO- MKRN	1054/0-1	ENGG.	I
17	D	32	SPL	MKRN-LDA	1059/2-3	ENGG.	I
18	D	45	SPL	GAJ-PHA	1099/2-3	Traffic	I

19	D	52	A	PHA-ANA	1113/1-2	Traffic	I
20	D	58	SPL	ANA-DMO	1126/1-2	Traffic	I
21	D	60	SPL	DMO-KYX	1128/3-4	ENGG.	I
22	D	62	A	DMO-KYX	1129/3-4	ENGG.	NI
23	D	65	SPL	DMO-KYX	1133/9-10	Traffic	I
24	D	67	SPL	KYX-BNU	1136/9-10	ENGG.	I
25	D	70	SPL	KYX-BNU	1141/5-6	Traffic	I
26	D	89	SPL	SYA-BQQ	1187/5-6	Traffic	I
27	D	94	C/M	SYA-BQQ	1196/0-1	ENGG.	NI
28	D	98	A	BQQ-REI	1202/4-5	ENGG.	NI
29	D	100	C/M	REI-PTHD	1206/1-2	ENGG.	I
30	D	102	SPL	REI-PTHD	1210/1-2	ENGG.	I

2.7.3 In KTE-SGRL section, there are total 04 LC gates out of which there is 01 Traffic gate, 01 Engineering Interlocked LC gates and 02 Engineering Non -interlocked LC gates.

All 4 LCs are proposed for closure in short run. As these 02 interlocked LCs are not closed yet, these have been shown in the approved SIPs. If these LCs are closed before executing KAVACH work, no associated KAVACH work at these LCs are required to be done. Revised SIPs will be issued accordingly. If these LCs are not closed, associated KAVACH work like provision of RIU with OFC connectivity in ring protection manner with adjacent Station KAVACH or provision of LC KAVACH with associated RF communication tower at these LCs will be provided depending upon the existence of these LCs in RF communication zone. Payment for KAVACH related work at these LCs (if not closed) is part of Schedule G1-C.

Similarly, 2 Engineering Non-interlocked LC gates are proposed for closure in short run. If these LCs are closed before executing KAVACH work, no associated KAVACH work at these LCs are required to be done. If these LCs are not closed, associated KAVACH work like RFID tags at these LCs will be provided. Payment for KAVACH related work at these LCs (if not closed) is part of Schedule G1-C. Details of LCs of KTE-SGRL is attached below:

(**Table: G**)

SN	Route	Gate No	Class	Block section/Stn	Approx. Kms.	Engg/Traffic	I/NI
1	D	59	SPL	JOBA-MWJ	1236/3-4	Engg	NI
2	D	67	SPL	SKBR-NWB	1249/6-7	Engg	NI
3	D	88	SPL	SGAM-JAJB	1287/6-7	Engg	I
4	D	105	SPL	MZHL-BRGW	1321/6-7	Traffic	I

2.7.4 In STA-REWA section, there are total 07 LC gates out of which there are 02 Traffic gates, 04 Engineering Interlocked LC gates and 01 Engineering Non -interlocked LC gate.

Out of 06 interlocked LCs, 04 LCs are proposed for closure in short run and rest 02 LC is proposed for closure in the long run. As these LCs are not closed yet, these have been shown in the approved SIPs. If these LCs are closed before executing KAVACH work, no associated

KAVACH work at these LCs are required to be done. Revised SIPs will be issued accordingly. If these LCs are not closed, associated KAVACH work like provision of RIU with OFC connectivity in ring protection manner with adjacent Station KAVACH or provision of LC KAVACH with associated RF communication tower at these LCs will be provided depending upon the existence of these LCs in RF communication zone. Payment for KAVACH related work at these LCs (if not closed) is part of Schedule G1-C.

Similarly, 1 Engineering Non-interlocked LC gate is proposed for closure in short run. If this LC is closed before executing KAVACH work, no associated KAVACH work at this LC is required to be done. If this LC is not closed, associated KAVACH work like RFID gate tags at this LC will be provided. Payment for KAVACH related work at this LC (if not closed) is part of Schedule G1-C. Details of LCs of STA-REWA section is attached below: (**Table: H**)

SN	Route	Gate No.	Class	Block section/Stn	Approx. Kms.	Engg/Traffic	I/NI
1	D	1	SPL	STA-KMA	1184/4-5	Traffic	I
2	D	2	SPL	KMA-SAKR	1190/7-8	Traffic	I
3	D	8	C/M	HNM-BGHI	1200/2-3	Engg	I
4	D	9	C/M	HNM-BGHI	1201/0-1	Engg	NI
5	D	11	SPL	HNM-BGHI	1203/7-8	Engg	I
6	D	17	SPL	TURKI-REWA	1219/0-1	Engg	I
7	D	18	B2	TURKI-REWA	1220/8-9	Engg	I

2.8 Power Supply arrangements:

2.8.1 Existing 110V DC supply at existing Stations/Interlocked LC Gates/IBS may be used for KAVACH equipments by providing suitable fuse/MCB, if spare capacity is available, otherwise capacity upgradation/augmentation of existing IPS has to be done. All other required supplies for the KAVACH equipments to be derived from the 110V DC supply made available. When the 110V DC supply is to be extended to another building for the use of KAVACH equipment, then at both ends Class-D SPD should be provided. At KAVACH Tower locations where there is no existing Stations/Interlocked LC Gates/IBH, 230V AC supply has to be made available by contractor through 2X10KVA AT with Auto changeover CLS panel. Contractor will also provide 110V DC supply for radio equipments and will have to make all other power supply arrangements also including provision of Class-B & C SPD as provided by Railways in existing IPS rooms. Since only one room is planned for construction at such locations, VRLA batteries of adequate capacity (in any case, it shall not be less than 80AH) shall be provided for KAVACH as well as OFC equipment's with adequate battery backup.

2.8.2 Up gradation of existing power supply at Stations and interlocked LC gates/IBH (By provision of additional Inverters/DC-DC converters etc. of adequate ratings with pre-wired mini cabinet/Chargers of required rating at stations and IBH/LC gates). To cater to additional power supply requirement, miniature IPS DCDP cabinet with required n+1dc dc converter sets is to be provided at the stations and IBH/LC gates. This miniature IPS shall be integrated with the existing IPS at the station by the contractor.

2.8.3 Power supply for UHF full duplex radio equipment (Hot standby) housed in RTU (Radio

tower unit) mounted at RF tower including UHF antenna and Aviation lamp shall not be provided from Power supply used for indoor Kavach system. Separate Power supply through Fuse and MCB to be used for Outdoor equipments (Radio equipments, Aviation lamp etc.) for Kavach of station/interlocked LC/IBH.

2.8.4 In case of new building contiguous with existing relay room building, 10 Sqmm multistrand single core PVC insulated confirming to RDSO specification IRS S 76/89 with latest amendments shall be used and in case of new building which is non-contiguous with existing relay room building, 12 Core Signalling cable shall be used and laid from existing IPS room to Station KAVACH unit for extending 110VDC power supply through suitable MCB arrangement.

2.8.5 The scope also includes augmentation of AT supply from 5KVA to 10KVA/25KVA as instructed by Authority engineer at all interlocked LCs/IB Huts where LC-Kavach is being provided.

2.8.6 SPD/ Surge protector shall be provided for surge protection of power supply equipment.

2.9 Earthing & Surge Protection Devices and associated works:

New Earthing arrangements to be provided at all such locations where new building is being constructed for Kavach works.

2.9.1 Earthing & Surge Protection Devices and associated works to be provided as per RDSO approved Drawings and RDSO Specifications no. RDSO/SPN/144/2006 with latest amendments (Safety and Reliability Requirement of Electronic Signalling Equipment) and TAN 3006 Ver 3.0 dated 08.01.2025 (Earthing bonding surge & lightning protection system for S&T installations) and RDSO/SPN/197/2012 with latest amendments (Code of practice for Earthing & Bonding system for signalling equipments).

2.9.2 Existing Ring earths wherever available at stations shall be connected to the Kavach Relay rack and Kavach equipment rack, otherwise new maintenance free earth for Kavach equipment shall be provided.

2.9.3 Supply Installation, testing and commissioning of Class-A Protection type Surge Protection system as per RDSO DRG/ drawing No. WCR/RLY/DRG.No.2015/02 Consisting of: - a) Active ESE Lightning conductor as per NFC17- 102. b) Should Provide Radius of Protection of 146 m Model No. LAPDX-250 or equivalent, tested from international HV test laboratory Certificate for the same. c)Issued to OEM of Lightning Conductor should be attached with tender. d) CE Certificate e) Authorisation letter from OEM should be attached with tender. f) Stainless steel Material with pointed tip g) Delta T should be greater and equal to 96 Micro seconds. h)In house certificate from Manufacturer should be provided with material. i) It should be testable by means of external tester. j) GI mast 5m with adopter head and base plate for connecting ESE lightening conductor. k) Lightening non resettable type counter having 6 digits display of stainless-steel material having IP 65 protection manufacturer. Class A Protection is to be provided at all-new RR extension buildings at stations and LC/IB KAVACH & RIUs installed at new service buildings (as per Table: 1B)

2.9.4 Supply and installation of separate low maintenance earth for connecting Class-A protection as per RDSO specification No. RDSO/SPN/197/2016 Version 1.0 or latest at all RR extensions at stations (wherever new Relay room extension building are being constructed for Kavach)

2.9.5 Supply and installation of Perimetric / Ring earth (Annexure-8) at interlocked LC/IBS service building and RR extension at stations (where ever new building is being constructed for Kavach) comprising of minimum 8 No. Maintenance free earths connection in ring pattern as per latest RDSO/SPN/197/2016 Version 1.0 or Latest (with Latest Amendment along with BRC, MEEB, SEEB and associated cabling and Copper tapes. Supply of all requites material as per latest RDSO Guide Line.

2.9.6 Connecting existing Ring earth with Kavach equipments, Relay rack where ever Kavach work is being done in the existing Relay room only.

2.10 Automatic Fire detection & alarm system:

Automatic Fire Detection & Alarm System shall be provided at all new relay room extension buildings at stations, LC/IB/ Auto Huts wherever new building has been provided. Also, existing OFC huts of stations (where RR extension is being done or Kavach related works is being done in OFC room) where AFDAS has not been provided, new Fire Alarm system has to be provided. These should be integrated with the existing Fire alarm system either by augmentation of capacity of existing Fire alarm system or Integration of new DPs with existing control Panel of Fire alarm system.Minimum requirements of AFDAS is as below:

2.10.1 Supply, Installation, Testing and commissioning of addressable Fire alarm Control panel as per RDSO Specification **RDSO/SPN/217/2021 Rev. 3.0** with latest amendment.

2.10.2 Supply, Installation, Testing and commissioning of Manual call point as per RDSO Specification RDSO/SPN/217/2021 Rev.3.0 with latest amendment.

2.10.3 Supply, Installation, Testing and commissioning of addressable loop powered wall sounder Beacons as per RDSO Specification RDSO/SPN/217/2021 Rev3.0 with latest amendment.

2.10.4 Supply, Installation, Testing and commissioning of heat and smoke multi sensor as per RDSO Specification RDSO/SPN/217/2021 Rev.3.0 with latest amendment.

2.10.5 Supply, Installation, Testing and commissioning of Linear heat sensing (LHS) interface module for LHS cable as per RDSO Specification RDSO/SPN/217/2021 Rev.3.0 .

2.10.6 Supply, Installation, Testing & Commissioning of Analog Addressable Type Monitor Modules with in-built fault isolator or alternate arrangement which shall isolate the module in case of short circuit the module should have visual indication for its operation & complying to RDSO Specification RDSO/SPN/217/2021 (Rev. 3.0) with latest amendment. Operating temperature: -10 to 60 deg C, Humidity up to 85%, Approval-UL/LPCB Listed.

2.10.7 Supply, Installation, Testing & Commissioning of Analog Addressable loop powered Control module fitted with bi-directional in-built isolator providing two voltage free, single pole, change over relay output complying to RDSO/SPN/217/2021 Ver. 3.0 or latest.

2.10.8 Supply, Installation, Testing and commissioning of Linear heat sensing (LHS) cable as per RDSO Specification RDSO/SPN/217/2021 Rev.3.0 with latest amendment.

2.10.9 Supply, Installation, Testing and commissioning of Fire survival circuit integrity cable each lot having 200 Mtr. Cable with all accessories connecting of all fire alarm devices as per RDSO RDSO/SPN/217/2021 Rev.3.0 with latest amendment. (Unit-Lots).

2.10.10 Supply, testing & commissioning of isolator device to isolate the circuit in case of short circuit, complying to the RDSO/SPN/217/2021 ver. 3.0 or latest.

2.10.11 The Automatic fire detection & alarm system provided at each hut that need to be networked.

2.11 Fuse auto changeover system:

Fuse auto changeover system shall be provided at all new relay room extensions buildings at stations LC/IB Huts wherever new building has been provided with following minimum requirements:

2.11.1 Supply, Installation, testing and commissioning of Fuse Auto changeover system (FACS) for vital fuses as per RDSO specification No. RDSO/SPN/209/2012 Rev.2.0 or latest.

2.11.2 Supply of Indicative Type of fuses of rating 0.6 A, 1.6A.

2.11.3 Fuse alarm system shall be provided at all new relay room extensions buildings at stations with wiring of potential free contacts with data logger.

2.12 Data Loggers:

2.12.1 All the new repeater relays potential free contacts of KAVACH system shall be wired with Data logger for continuous monitoring. Necessary upgradation/alteration in Data logger of specification IRS.S.99/2006 with additional 256 Digital inputs shall be done at all stations in ET-MKP(ex.), KMZ-MAKR, NKJ-'A'-MHDA (ex), KMA-REWA and Entire Katni Complex by providing additional racks/cards if required. This includes programming of data logger for fault diagnostic in suitable structured language in consultation with Railway.

2.12.2 In all the stations where existing data logger has more than 250 spare contacts available, Kavach equipments/relays should be wired in these contacts only with programming of data logger for fault diagnostic in suitable structured language in consultation with Railway. No need for provision of additional digital input card at such stations. Details of Spare contacts of Data logger has been provided in Schedule-A.

2.12.3 Supply of Remote Terminal Unit (RTU) to monitor 128 Digital and 16 Analog inputs as per IRS: S99/2006 (Amd-3) or latest. With one number of inbuilt dual card leased line modem for networking purpose shall be provided. The RTU should be compatible for networking with existing NMDL system of JBP division. RTUs shall be supplied at each location where LC-KAVACH is being provided in a separate building. New RTUs to be provided at all locations wherever new building is being provided for LC-KAVACH. All the RTUs shall be networked and integrated with the existing Data Logger Network with necessary Hardware/Software.

2.12.4 Installations, wiring, testing and commissioning of Remote Terminal Unit (RTU) complete along with accessories with Contractors own wiring & fixing material, This includes loading of NETWORKING software and networking with data logger. This includes programming of RTU for fault diagnostic in suitable structured language in consultation with Railway.

2.12.5 Upgradation of existing RTU at interlocked LCs/IBHs to monitor all digital inputs of Kavach by providing additional cards if required and wiring of all digital inputs of Kavach.

Upgradation of RTUs required only at those interlocked LCs/IBHs where Kavach equipments are provided in existing Relay Rooms of interlocked LCs/IBHs.

2.12.6 The requisite channel/port for networking will be arranged by Railways.

2.12.7 Status of all the systems including redundant systems shall be monitored through Data logger. Exception reports/ alarms shall be sent to maintenance team &Signal Control for taking necessary action well in time before complete system failure.

2.13 Commissioning of 4x48 Fiber OFC backbone:

2.13.1 Commissioning of 4x48 Fiber OFC to provide path redundancy in ring protection manner for preventing breakdown on account of a single OFC cut/failure and facility for remote monitoring and maintenance of the OFC network. The scope also includes but not limited to supply of HDPE duct, single mode 48F OFC, OFC joint chambers, OFC joint closures, 48F Fibre Distribution Management System, 42 U Rack, OFC patch cords, connectors, testing and commissioning of 48F OFC. Supply of completion drawings- (i) Cable Route Plan, (ii) Fibre Termination Plan, and (iii) Power Supply Termination Plan.

2.13.2 The scope includes Supply, installation, testing and commissioning of sliding type FDMS (48 input and 48 output) for OFC as per RDSO specification No. RDSO/SPN/TC/37/2020 Rev.4.0 or latest amendment and suitable for mounting in a 19" 42U rack of APW/Valrack/HCL/Rittle make or similar. It shall provide management of 48 numbers of fibers of armoured optical fiber cable. It shall also provide facility for reconfiguration, expansion and testing. This shall be of compact in design, easy in handling and its constructed structure shall be inherently robust and rigid for all conditions of operation, replacement, storage and transport. Bend radius of Pigtails, patch cords and optical fibers in installed condition should be better than 70 mm dia.

2.13.3 The scope includes Supply and laying of 40 mm outer diameter and 33 mm inner diameter Blue and Green color Permanently Lubricated HDPE duct as per Specification no. RDSO/SPN/ TC/45/2013, Rev.2.0, with latest amendment for each 48 fiber OFC where Blue color and yellow color HDPE ducts shall be used for laying UP side short haul and long haul OFC cables respectively and Green color and orange color HDPE ducts shall be used for laying DN side short haul and long haul OFC cables respectively in different trenches with route diversity in ITARSI- MANIKPUR, Entire KATNI Complex, BANSAPAHAR – OHAN, SATNA-REWA, KAIMA-SAGMA, KMZ-MAKR, NKJ- 'A' cabin-MHDA section as per extant cable laying practice of WCR/ guideline on signalling cable laying issued by RDSO (Annexure-10).

2.13.4 Separate HDPE duct is to be laid for each Optical Fibre Cable, i.e., 4 OFC HDPE ducts will be laid. 01 HDPE duct for 1X48 Fiber OFC each.

2.13.5 4x48 fibers Optical Fiber Cable shall be terminated in Relay Room at each station. Necessary telecom equipments and housing equipments also to be provided.

2.13.6 2x48 F OFC i.e. 1x48 fiber OFC of each side of the track will get terminated at every Interlocked LC gate / IBH in block section as well as at every station (Only 24 fibers of each 48 fiber cable have to be terminated at every Interlocked LC gate /IBH and rest 24 fibers will get through). Remaining 2x48 fiber OFC i.e. 1x48 fiber OFC of each side of the track will get

terminated at every station only and not at mid section LC gate/IBH. These fibers shall be distributed and terminated in such as way that any single/double fiber cut shall not lead to disruption of Kavach system.

2.13.7 2x24 Fiber OFC (1x24 Fiber in separate trench) with path diversity shall be laid from existing Relay Room to OFC cable Huts at each station.

2.13.8 4x48 Fiber OFC (2x48 Fiber in separate trench) with path diversity shall be laid from JBP RRI/station to JBP division Control office.

2.13.9 Separate FDMS has to be provided for each 1x48 Fiber termination at each station, Interlocked LC gate, IBH.

2.13.10 As automatic signalling work is also proposed in the ET-MKP section, OFC loop of minimum 100 meters is to be provided at each Auto hut location. Planned Auto hut locations in ET-MKP section has been provided as Annexure-14

2.13.11 Typical Scheme for OFC termination shall be provided by the contractor and approval of Authority/Authority Engineer shall be obtained before execution of work.

2.13.12 Fiber Monitoring System has to be provided for continuous monitoring of 16 dark fibers (4 dark fibers from each Fiber cable i.e., 2 fibers from fiber no. 1 to 24 and 2 fibers from fiber no. 25 to 48).

2.13.13 Cable laying shall be carried out as per the extent specifications and RDSO guidelines issued on 04.02.2014 vide letter no. RDSO/SIG/2010, Indian Railway Telecom Manual and PCSTE/WCR Technical circulars.

2.13.14 Air Test/Duct Integrity test shall be conducted before blowing OFC and report to be submitted to the Authority/ Authority's representative/Authority Engineer.

2.13.15 Detailed OTDR/Power meter/any Optical source test reports of 4x48 Fiber OFC laid in ITARSI- MANIKPUR, Entire KATNI Complex, BANSAPAHAR-OHAN, KMZ-MAKR, NKJ'A Cabin-MHDA, STA-REWA and KMA-SAGM section shall be prepared and submitted before and after laying of OFC in for approval of the Authority/ Authority's representative /Authority Engineer.

2.13.16 Fixing of RCC cable route marker and RFID markers over cable route at every 50 meter, fixing of GI pipe on culverts, bridge, Preparation of cable way 300 mm wide at the bottom and 300 mm deep in rocky area and refilling the same (after cable laying) with concrete mixture of proportion of 1:3:6 and grouting the ends at either side of the rocky portion using concrete mixture with contractors own cement and other materials.as per Drg. No. SDO/Cable Laying/008. This includes critical track crossings, road crossings, spans in station yard through HDD boring at the depth of 2-3 meter in 120 mm outer dia and 103.5 mm inner dia HDPE pipe as per site conditions and as per instructions of Authority/Authority's representative Engineer/Authority Engineer. This also includes supply of armoured 48 Fiber OFC cable as per RDSO Spec. No. RDSO/SPN/ TC/110/2020 Revision-0 or latest, OFC blowing (through OFC blowing machine), splicing of OFC in the entire section ITARSI-MANIKPUR, Entire KATNI Complex, BANSAPAHAR – OHAN, KMZ-MAKR, NKJ 'A Cabin-MHDA, STA-REWA and KMA-SAGM section and termination at all Stations/IBH/LCs/RIU.

2.13.17 All Schemes, Plans, Drawings and Documentations are to be submitted for approval of the Authority/ Authority's representative/ Authority Engineer before implementation of the same in the field.

2.13.18 All types of loading, unloading & transportation of materials, including cables, and miscellaneous items required as per site requirement and instruction of Authority/Authority's representative/Authority Engineer.

2.13.19 On completion of above works, testing and commissioning of entire system in totality shall be carried out by the Contractor.

2.13.20 **KAVACH on UHF backbone system: -**

(a) UHF- duplex radio communication unit with hot standby provision shall be used by Stationary KAVACH to communicate with Loco KAVACH equipments.

(b) 2 x24 fiber optical cable to be laid with path diversity from R/R (S-KAVACH) to Tower location. Fibers to be terminated at R/R and Tower location as per requirement.

(c) The scope includes Supply and laying of 40 mm outer diameter and 33 mm inner diameter Permanently Lubricated HDPE duct as per Specification no. RDSO/SPN/ TC/45/2013, Rev.2.0, with latest amendment for each 24 fiber OFC in different trenches with route diversity from each Stationary Kavach/LC-Kavach location to RF Towers.

(d) Detailed OTDR/Power meter/any Optical source test reports of 2x24 Fiber OFC laid as above.

(e) Termination of fiber shall be done using FDMS which is supplied, installed by Contractor at Stations/ OFC Hut/IBH Kavach location/LC Gate Kavach Location/RIU Location as planned after Detailed Survey.

(f) The scope includes breaking of Platform, building foundation, brick masonry work for entry of cables at Stations/OFC hut/ IBH Kavach location/LC Gate Kavach Location/RIU Location. This also includes repairing of the same to the original state.

(g) On completion of above work, testing and commissioning of entire system in totality shall be carried out by the contractor and submit report.

(h) Supply, fixing and GPS mapping of RFID Cable route markers along the trench at every 50 meters (Minimum of 3 each path depending on the length of path).

(i) Supply, fixing and GPS mapping of RCC Cable route markers along the trench at every 50 meters (Minimum of 3 each path depending on the length of path).

2.14 Cable laying and associated works:

2.14.1 Cable laying to be done as per provisions and drawings as given in Signal Engineering Manual (APPENDIX–II Chapter 15) for Signalling cables and Indian Railway Telecom Manual for telecom cables, PCSTE/WCR technical Circulars and extant specifications and RDSO guidelines.

2.14.2 OFC/Quad cable/Power/Signalling cable for KAVACH work should be laid with diverse route facility on both side of track.

2.14.3 Digging of 1.20 Meter deep and 0.3-Meter-wide trenches including clearing of roots of trees and bushes and temporary obstruction on these selected routes. **Note:** In case were digging of trench up to 1.20 Meter deep and 0.3-meter wide is not possible, the depth can be reduced as per site conditions with the approval/ directions of the Authority Engineer of the works.

2.14.4 All works of excavation of cable trench 1.0 Meter deep, 0.3 Meter wide on pucca platform/on Road for road crossing and restoration of the platform/ Road surface need to be refilled by the contractor to original condition after laying of GI/DWC pipes.

2.14.5 Supply and laying of permanently lubricated HDPE pipe of size 40/33mm as per technical specification RDSO/SPN/TC/45/2013 rev. 2.0 for OFC Laying, blowing of 24/48 Fiber OFC cable as detailed above.

2.14.6 Back filling and consolidating of cable trench first for 5 CM (in case where bricks are to laid over cables) after laying of cables and then complete back filling & ramming of loose soil as per the technical specifications.

2.14.7 Concrete Cable route markers and RFID Markers with inbuilt GPS (Specs) shall be provided all along the route at a nominal interval of 50 m. Additional markers shall be provided to indicate important points like cable joints, water and sewage mains, power cable, crossings, alignment bends/ curves, etc. The RCC route marker for OFC shall be as per provisions and drawings as given in Signal Engineering Manual (APPENDIX–II Chapter 15) for Signalling cables and Indian Railway Telecom Manual for telecom cables.

2.14.8 Transportation of HDD machine with accessories including handling of store materials, preparation of site and boring for placing of 120mm/103.5 mm permanently lubricated HDPE silicon duct for crossing of OFC at bridges / culverts / track/ pucca road /congested area/swampy areas as per site requirement and as per direction of site Supervisor.

2.14.9 **All works pertaining to horizontal directional drilling (HDD)/boring and trenchless cabling**. It includes supply, transportation and insertion of self-lubricated HDPE pipe and laying of cable in boring under the track/road/ platform/ circulating area by using different size of pipes depending on the total number of cables will be crossed. The depth of horizontal boring should be minimum 2-meter up to 3.0 meter from rail flange/road level/ ground level as per direction of Authority/Authority Engineer. This item will be used for track crossing of running line, road crossing, water logging area or any obstruction and circulating area. By using self-lubricated HDPE pipe of 120mm outer dia and 103.5mm inner dia in the bore and laying of cable in the bore under the track/road/circulating area.

2.14.10 Supply of galvanized perforated G.I pipe of dia of minimum 100 mm. for laying of OFC/Quad/Signalling/Power cables and fixing on girder bridges including supply of connecting sockets, channel angle iron bracket unit for support at an interval of one meter, nuts and bolts of proper sizes and including laying of cable inside the pipe. All materials as required for the work shall be supplied by the contractor.

2.14.11 Supply and fixing of GI pipe 100 mm dia. to carry all the cables with fixing materials and making necessary entry arrangement at relay room extension buildings at stations,

LC Gates, IBHs and other locations decided by the Authority Engineer/Authority Engineer's representative at the time of actual working. Necessary materials including Gi pipe to be supplied by the contractor.

2.14.12 Protection works for cable laying on Steel Girder Culvert/ Bridge & PSC Girder Bridge using duct of 80 mm dia for Steel Girder Bridges/ Culverts with 1:2:4 masonry work for PSC bridge. Necessary materials including duct of 80 mm dia. To be supplied by the contractor.

2.14.13 Excavation of cable trench on pucca platform and placing of GI pipe, 100 mm dia and restoration of the platform surface to the original condition after cable laying and refilling the trench as per site condition. Necessary materials to be supplied by the contractor.

2.14.14 Cutting of solid rock making channels 150 mm wide at the bottom X 200 mm deep by chase cutting &refilling the same after laying of required telecom/signal cables in channel (laying of telecom cables will be paid under different items of schedule) with concrete mixture of portion 1:3:6 with 30 mm Graded stone aggregate and grouting the end at either side of rocky portion using concrete mixture with contractor's own cement, sand ballast, Water and other materials.

2.14.15 Cutting of all types of roads/platform (1 meter X 300 mm)/(300 mm X 300 mm) and refilling after laying of RCC/GI/DWC pipe and restoring them to original condition. This also includes transportation and laying of any no. of DWC/RCC/GI pipes as per requirement. The work shall be done as per the extant practice of WC Railway and instructions of Railway Site Engineer. If GI pipes are used for cable laying on steel girder Culvert/ Bridge, perforated GI pipes to be used.

2.14.16 Supply and fixing of Concrete Cable Marker as per provisions and drawings as given in Signal Engineering Manual **(APPENDIX –II Chapter 15)** for Signalling cables and Indian Railway Telecom Manual for telecom cables. The cable route marker shall be provided at every 50 mtr distance approximately and also a bending /turning point of the cable route, Jointing/Splicing locations. (Station RR to Tower both paths minimum 3 each path- both ends and at least one in middle depending on the length of trench path)

2.14.17 Supply, installation & GPS mapping of RFID based electronic cable/ pipe marker 22.5 Cm dia (+/-0.5%) 1.5 mtr depth range, 10-digithexa decimal ID code 101.4 KHz freq. Make- Stanley/Komplex or equivalent. The cable route marker shall be provided at every 50 mtr distance approximately in ET-MKP section, BNSP-OHAN, KMZ-MAKR, NKJ'A Cabin-MHDA, STA-REWA and KMA-SAGM section and entire Katni complex along each line and also at bending /turning point of the cable route, Jointing/Splicing locations etc. Specifications as per **Annexure-3.**

2.14.18 Supply of 11 no. of RFID marker locators each at PPI, NU, JBP, KTE, STA, MJG, BEHR, BRGW, SGO, DMO and MAKR for 8000 marker record, built in GPS Module, 1.5 m depth range 4*20 digit LCD display for 101.4 KHZ Freq. As per specification attached **(Annexure-3)**. Make- Stanly/Komplex or equivalent. (Station

RR to Tower both paths minimum 3 each path- both ends and at least one in middle depending on the length of trench path)

2.14.19 Two nos. of trenches (UP & DN side) should be done throughout the section for laying 4x48F OFC (2x48F OFC in each side of the track with path diversity in separate permanently lubricated HDPE duct)

2.14.20 Supply of 01 no. GNSS based cable route tracer kit at JBP with Pathfinder High Power Pipe and Cable locating kit (Bluetooth enabled to transfer data to Mobile App) with DA2 GNSS RTK receiver, with RTX performance based on Catalyst Correction service for up to 2cms horizontal / 5cms vertical accuracy & Mobile App for data acquisition of GNSS coordinates of route traced and depth data and digital map generation, including cloud data backup & map output in .kml, AutoCAD, .csv. Pathfinder PLDL receiver with 36 user configurable Active multi frequency options including 200Hz, 512Hz, 797Hz, 815Hz, 8kHz, 33kHz, 65kHz, 82kHz, 200kHz up to 476.2kHz, passive detection @50Hz for power cables, Radio Mode for locating metallic utilities whether energised or not, Live Current measurement, LCD Display with left-right arrow function, Modes: peak, peak with arrow, pin point peak and null modes, Compass function; Live Depth measurement. Supply includes locating Bluetooth enabled Pathfinder PLDL receiver, Transmitter (Max power : 12Watt with high power output >= 130Volts) with Li-ion Rechargeable Batteries for both Transmitter & Receiver, Battery charger, GNSS receiver with pre-configured RTX Catalyst correction service for accuracy as mentioned above(with 3 years license), Dual Bluetooth mobile phone with pre-loaded Mobile App & cloud access for real time map generation (with 5 years license from date of commissioning of the complete project). Make: Stanlay/ Komplex/3M/Rycom or similar for Pathfinder PLDL Cable Route tracer (Warranty: 3 years from date of commissioning of the complete project), DA2: Stanlay/Komplex/Trimble/3M or similar (Warranty: 1 year from date of commissioning of the complete project)

2.14.21 The available existing cable route plan has been uploaded on IREPS along with tender document. Before starting the trenching work in Section, cross trenching shall be done by the contractor at the interval of every 50 meter in station section & at every 100 meter in block section to identify the existing cable in section in order to protect the existing cable in section and yard area from cable cut. Cross trench should be done in such a way to identify all existing cables to prevent any cable cuts.

2.14.22 Manual trenching is preferable in station section. JCB should be used with utmost precautions in station sections for trenching and other related work only after Joint survey of existing cables, Pipe lines etc. and Cross trenching with the approval of Authority engineer.

2.14.23 Trenching from JCB is preferable in block sections. However, JCB to be operated on cable route only after identifying all existing cables through Cross trench and Joint survey. Manual trenching should be done in the area where trenching from JCB is not possible due to site conditions. Work should be done under the supervision of Authority engineer.

2.14.24 Joint survey is to be done before starting the trenching work to identify all existing S&T Cables, Electrical Cables, Pipe lines, Drains etc.

2.14.25 WCR drawing for laying of Signalling, Quad and OFC cable has been uploaded on IREPS along with tender document has to be followed for this work.

2.14.26 Instructions for cable laying, Damages to cables, Joint survey etc. issued vide WCR policy circular no. जबल/एन.एच.क्यू.120/पॉलिसी/टी-1/पार्ट-v दिनांक 10.01.2024 shall be strictly followed.

2.14.27 Micro-tunnelling/trenchless laying shall be carried out at a depth of not less than 1.5 m from natural ground level.

2.14.28 Track crossing, road crossing, platform crossing, trenching in circulating area shall be carried out by micro-tunnelling/trenchless laying to the extent possible.

2.14.29 Micro-tunnelling / trenchless laying shall also be adopted in difficult terrains / marshy areas / water logged areas if it is found advantageous for quick delivery of this Project. Requirement of such micro-tunnelling / trenchless laying not envisaged during survey shall be decided by the Authority Engineer.

2.14.30 Wherever micro-tunnelling / trenchless laying is not feasible for track crossing, road crossing, platform crossing, horizontal boring in accordance with WCR Practice shall be done.

2.14.31 Wherever both micro-tunnelling/trenchless laying and horizontal boring are not feasible for track crossing, road crossing, platform crossing, manual track crossing shall be carried out.

2.15 Survey, Design, Drawing and Documentation:

2.15.1 Design of detailed design scheme as per approved SIPs as provided by West central Railway & RDSO/ IRSEM/ OEM guidelines. Submission of complete drawings and designs of Kavach system at stations, LCs/IBHs, Automatic Signalling Relay Huts, for approval & wiring. Also changes/ addition/ alteration of existing wiring of existing installations such as alteration/ modification/ addition in interlocked LCs/IBHs/relay rooms, data logger, RTU, etc.as will be required to be done during the work. All necessary hardware and software as also design shall be executed under this tender.

2.15.2 Final location survey of cable route, design and preparation of cable route plan, Fiber Termination plan, jointing and taping chart of ITARSI- MANIKPUR, Entire KATNI Complex, BANSAPAHAR – OHAN, SATNA-REWA, KAIMA-SAGMA, KMZ-MAKR, NKJ-‘A’cabin-MHDA section as per code of practice for installation and commissioning of Signalling and Telecom cable "Approved drawing and documents shall be supplied by contractor in 06 hard copies (spiral binding with plastic lamination) along with 2 Pen Drives in Auto CAD of latest version.

2.15.3 This includes (but not limited to) KAVACH TOC, RFID Tag Layout, RFID TIN layout, RFID Tag data, Relay room floor plan, Relay rack detail chart, contact analysis chart, power supply diagram, Fuse particulars, Powe distribution plan for KAVACH, CTR details if any, Location particulars if any, Track bonding plan if any, Wiring diagrams for PI & RRI (for alteration only), Wiring diagrams for ABS huts, IBs/LCs, Panel diagram for station/LCs and VDU diagram (if altered), Stationary and Loco KAVACH interface diagrams, and other manuals as specified in the tender document and as per RDSO

specifications. Note: -After getting approval from Railways all the above diagrams/plans to be done in "Auto CAD" & soft copies submitted. In addition to these diagrams/plans are to be submitted in polyester film tracing along with 6 sets of Ferro prints of the same.

2.15.4 All design drawings shall be submitted in soft as well as hard copy.

2.15.5 Design of modifications, preparation and supply of “AS PLANNED” and “AS LAID” Signalling Circuits and Plans/ Documents for installations as per the standard practices and extent instructions, for the type of Interlocking and Signalling suiting to the yard layout given in the Signalling Plan of the stations/ End Panel/ Cabins/ sections/ huts/LC/IBH as per the scope of the work or added subsequently.

2.15.6 Design, Preparation and supply of AS PLANNED AND AS LAID Outdoor Signalling documents (cable route plan, cable core chart, location box particulars if any, panel particulars if any, fuse particulars, track bonding diagram if any, numbered wiring diagrams, relay index, contact analysis, posting of contacts in wiring diagrams, simulation panel particulars, data logger & RTU particulars, relay rack, rack details, resistor condenser particulars, power equipment wiring, power equipment foot print diagram, etc as per requirement). Supply of 6 sets of final hard copy of the approved circuit diagrams and the documents mentioned above along with contact analysis in A2, A3, and A4sizes as required with 1 set of prints on tracing film and a soft copy on Pen Drive to be supplied. (Arranging rexine cloth bound booklets and binding for large and small sizes of drawings).

2.15.7 Completion document for KAVACH with Relay/ Electronic Interlocking shall be submitted within 60 days from the date of commissioning. Completion documents shall include:

a) Signal Interlocking Plan (Completion copy after site verification)
b) Kavach TOC
c) RFID Tag Layout
d) RFID Tag Data
e) TIN layout & TIN number allocation.
f) Interface circuits.
g) Station application data & Station number allocation.
h) Relay Room Floor Plan & Equipment Rack details
i) Relay rack detail chart,
j) Contact Analysis Chart
k) Data logger particulars
l) Data Logger Validation Particulars
m) Fuse particulars
n) Cable Route Plan
o) Cable corage plan
p) Power distribution Plan, lightening, surge protection & earthing plan for Kavach
q) CTR details if any.
r) Location particulars if any
s) Track Bonding Plan (if altered)
t) Wiring diagrams for PI and RRI (For alteration only)
u) Wiring diagrams for ABS huts, IBH/LCs.

v) Panel Diagram for station and LCs, VDU diagram (If altered)

2.15.8 Supply of completion documents/drawings (six sets for each Location) in A3 size and supply and fixing of laminated maintenance flow chart, , troubleshooting chart, Do's & Don't in A2 size in Relay room and Maintenance room or as per instruction of the Authority / Authority's representative/Authority Engineer for all stations/LC gates/IBH/Auto Signalling Location huts.

2.15.9 GM/PCSTE/EIG sanction papers along with all dispensations (including dispensations to be obtained from Railway Board/CRS) will be prepared & submitted by contractor to railway and railway will submit further to the authority for sanction/dispensation application for RB/CRS/GM/PCSTE/EIG Sanction for commissioning of Kavach work.

2.16 Any other requirements of Signalling and Telecommunication:

2.16.1 Supply of 11 nos. kit for configuring, programming and downloading RFID Tag data.

2.16.2 Supply, Installation and commissioning of 04 nos. kit for configuring, programming and downloading execution and application data for Station KAVACH equipment.

2.16.3 Supply, installation and commissioning of 01 nos. Test Bench for Station KAVACH equipment at JBP Control office.

2.16.4 Supply, installation and commissioning of 01 no. Network Management System for Centralized monitoring of station KAVACH and Loco KAVACH equipment as per as per RDSO/SPN/196/2020, Ver. 4.0 or latest. at JBP Control office. Drawing attached as Annexure-4

2.16.5 All servers, including KAVACH NMS servers, shall be provided in a 1+1 configuration in hot standby mode, with spatial diversity and geographical survivability and a dedicated power supply in redundant manner to prevent total shutdown in the event of a single server failure, fire in one server room, or other similar incidents.

2.16.6 The Agency shall ensure the uninterrupted availability of the NMS portal and the functionality for report extraction on a 24x7 basis. Any fault or malfunction in the NMS reporting system shall be promptly attended to and promptly rectified by the Agency within the shortest possible reasonable time to ensure minimal disruption. The Agency shall take all necessary measures to maintain the reliability and operational efficiency of the NMS portal at all times.

2.16.7 Further, the Agency shall customize NMS reports, SMS alerts, pop-ups on the NMS portal, and alarms to facilitate prompt preventive maintenance and efficient fault diagnosis and rectification of the Kavach system in a user friendly manner. This customization shall cover both station infrastructure and locomotives operating within the ITARSI-MANIKPUR, MAHDEIYA-BINA MALKHEDI-MAHADEOKHERI, Entire KATNI COMPLEX, BINA MALKHEDI-AGASOD, SATNA-REWA, KAIMA-SAGMA, BANSAPAHAR- OHAN section of Jabalpur Division, ensuring interoperability with other approved OEMs. All customizations shall be carried out in strict compliance with the instructions of the Authority Engineer to guarantee seamless and reliable operations.

2.16.8 The hardware requirements for the Network Monitoring System (NMS) are as follows:

(a) Server RAID Architecture- Dell PowerEdge T40 or better with Intel Xeon E-2224G Processor, 32GB RAM, 2TB DATA, 800GB SSD (2X400 GB), DVD-RW, DOS, and a 3-Year Warranty. Two such servers shall be installed, with the NMS data logged onto each server. Online UPS + Battery for atleast 4 Hrs of Backup on full load.

(b) Windows Professional Server 2019 or latest to be installed on both servers.

(c) Shared Firewall to be configured on both servers.

(d) Mechanical Keyboard and Mouse for operational use.

(e) The PC configuration for NMS console shall include an Intel i9 Core processor or superior (13th generation or later), 16 GB DDR-4 RAM, 2 TB SSD storage capacity to accommodate 90 days of data and a Nvidia GeForce RTX 4090 (8GB) or better. The operating system shall be Windows 11 or a higher version.

2.16.9 Supply of 11 nos. A3 printer with scanner (all in one type) for printing NMS fault and exception repots for NMS at JBP Control office and 02 nos. Laser Jet Printer for Office use for printing tag-data, RFID plans etc. make HP LaserJet 1020 or similar.

2.16.10 Supply, Installation and commissioning of 02 Nos. Lab Models of station equipment, loco equipment, trackside components and simulator at JBP Control office.

2.16.11 Setting up of KAVACH FAT setup at Katni (previously ADSTE/P/KTE chamber). Necessary construction/renovation of all rooms including arrangement of un-interrupted power supply, arrangement of electrical fittings and appliances also has to be provided including sufficient capacity power back-up. Drawing attached as Annexure-5

2.16.12 Setting up of KAVACH FAT setup at Jabalpur. Necessary construction of building including arrangement of un-interrupted power supply also has to be provided including sufficient capacity power back-up. Annexure-4.

2.16.12 A Factory Acceptance Test (FAT) Procedure for Stationary KAVACH Application Logic as per RDSO/SPN/196/2020, Version 4.0 and as Approved and issued by RDSO vide letter no. RDSO-SIG0KVCH(GEN)/2/2024 dated 28.01.2025 shall be followed.

2.16.13 Construction of Two kavach rooms of minimum size with provision of additional toilets on the top floor of TRO/TRD office building in the DRM JBP office campus. (Annexure-4).

2.16.14 Display system of minimum size 85 inch (4K resolution) for continuous monitoring of Kavach system shall be installed with redundancy in existing S&T Control room with connection to the NMS in redundant paths or as per instructions of Authority/Authority representative. (Annexure-6).

2.16.15 Supply and fixing of laminated maintenance flow chart, Do's & Don't in A2 size in Relay room and Maintenance room, troubleshooting charts etc on 118 Sqmm thick Kodak photo paper with lamination of various sizes with different lettering in English & Hindi separately in required size as per the instructions of Authority/Authority Engineer for troubleshooting and maintenance to be provided at appropriate locations.

2.16.16 Supply of 10 Nos. MECO electronic earth tester make MECO model no 4680B/higher version or similar for Railway use.

2.16.17 Supply of 22 Nos. Clip On Meter MECO 2700 Model or equivalent with similar features for

Railway use.

2.16.18 Supply of 05 Nos. digital insulation tester: Specification range 50V-1000V DC, Voltage 25V-600V AC/DC, Continuity, Low ohms and storage memory last 50 reading with fuse blown indicator. Make Rishab/ Meco/Fluke for Railway use

2.16.19 Supply of 10 Nos. Hand held Multimeter 4.5, Measurement range: True RMS: 40000 [Model: Fluke 287 or similar] for Railway use.

2.16.20 Supply of 05 Nos. portable Cable fault locator (Metallic Time Domain Reflectometer) suitable in RE/Non-RE Railway territory with all accessories for locating faults such as loop and break in various twisted pair cable such as underground telecom quad cables, signalling cables, telephone jelly filled cables, LAN etc for Railway use. Inspection to be done by RITES.

2.16.21 Supply of 05 Nos. Cable (route) locator - RIDGID make model SR-20 or similar for Railway use. Inspection to be done by RITES/TPI agency.

2.16.22 Supply and Installation of Location Boxes and associated works if required.

2.16.23 Supply of 218 Nos. Reclining Chair for use at various KAVACH locations of Godrej/ Jauri/ Nilkamal/Dechathlon make or similar for Railway use.

2.16.24 Supply of Visitor Chair , size total height 825 mm, depth. 570 mm , seat height 460 mm., under structure canti lever type MS CRCA tube 1.6 mm thick , hot pressed ply wood with steel T-Nuts for rigid fastening single piece integral skin PU arm rest . Quality tapestry . High density PU model cushion . All steel components are epoxy powder coated after seven tank anti corrosion treatment of surface. Make Godrej or better.

2.16.25 Contractor shall ensure that:

a) A section should cover Objective of Project, A System Overview and Scope of Works.

b) A section should cover Project Planning and Project Management requirements which stipules requirement of various management plans such as, but not limited to, Signal Interlocking Plan, Document Management Plan, Design Management Plan, Interface Management Plan, Procurement Plan, Site Management Plan, Quality Assurance Plan, Testing & Commissioning Management Plan, RAMS Management Plan, Training Plan and Defect Liability Management Plan.

c) A section should cover Project Program requirements which stipules requirement of various works program such as Overall Works Program, Design Submission Program, Procurement Program, Installation Program, Testing & Commissioning Program and Training Program. This should also include mechanism of monitoring progress through Progress Reports and Progress Review Meetings.

d) A section should cover Design Requirements which stipules various design criteria and design specification to be followed by Contractor while preparing design under the project. It should also cover list of design & documents to prepared by Contractor. It should also stipulate various stages of design and procedures to be followed for review and approval of design .

e) A section should cover interface requirements for System Design, Installation and Testing & Commissioning.

f) A section should cover technical requirements which stipulates various standards and specification of cables, equipment, material, items & accessories to be followed in project.

g) A section should cover system requirements which stipulates requirements related with overall system architecture.

h) A section should cover requirements which stipules various standards, guidelines, procedures, methods to be followed during supply, storage and laying, construction and installation of cables, equipment, material, items & accessories in the project.

i) A section should cover testing requirements. This should cover various stages of testing such as factory, supply, storage, installation, system acceptance etc. This should cover agency responsible for such testing and procedure to followed during such testing.

j) A section should cover requirements related with RAMS. This should also include requirements of redundancy and spare capacity in the system.

k) A section should cover requirements related with Training for Authority's Personnel.

l) A section should cover requirements related with Spares to supplied to Authority's Personnel.

m) A section should cover requirements related with Operation & Maintenance Documents. These documents include Operation Manual, Technical Manuals, Maintenance Manuals, As Built Drawings etc.

n) A section should cover requirements related with Defect Liability Period.

2.17 BUILDING REQUIREMENTS-Interlocked LC gates/IBH service buildings:

(a) Exhaust fans to be provided with anti-theft arrangement in IPS and battery room.

(b) All electrical fittings to be provided should be energy efficient and ISI/BIS marked

(c) Two steps to be provided around the wall in Battery Room for placing batteries.

(d) Cable duct size (450 mm x 600 mm) with concrete slab cover shall be provided in equipment room.

(e) Earth terminal connected with reinforcement at plinth level should be properly earthed.

(f) Height of the structure from floor level to roof level should be minimum 3 meters.

(g) The level of the building should be kept at least 2 feet above rail level. This level shall be kept in view of highest flood level (HFL) in Absolute/Automatic Signalling Section.

(h) False ceiling is not recommended.

(i) Flooring should be finished with anti-skid Vitrified tiles.

(j) Stair case with railings is also to be constructed (if required as per instructions of Authority / Authority's representative/Authority Engineer) for access into the building from trackside and/or from approach road side.

(k) Supply, erection, testing & commissioning of 100 W LED (Automatic Light Sensor based) street light fittings suitable for 230V AC, 50 Hz comprise a single piece deep drawn aluminium housing IP-65 colour temp 5500-7000K with connection etc. with suitable fixtures and clamps

etc.–Minimum 2 no. at each building and as per instructions of Authority/ Authority's representative/Authority Engineer.

(l) Heat resistant terrace Tiles (300mmX300mmX20mm) with SRI >78, Solar Reflection > 0.70 and initial emittance>0.75 on waterproof and sloped surface of terrace to be provided.

(m) All weather proof thick emulsion paint to be provided on all outer walls.

2.18 BUILDING REQUIREMENTS – RR extensions at stations:

(a) All electrical fittings to be provided should be energy efficient and ISI/BIS marked.

(b) Supply, erection, testing & commissioning of 36 W LED street light fittings suitable for 230V AC, 50 Hz comprise a single piece deep drawn aluminium housing IP-65 colour temp 5500-7000K with connection etc. with suitable fixtures and clamps etc. – Minimum 2 no. at each building and as per instructions of Authority/ Authority's representative/Authority Engineer.

(c) Cable duct size (450 mm x 600 mm) with concrete slab cover shall be provided in equipment room.

(d) Earth terminal connected with reinforcement at plinth level should be properly earthed.

(e) Height of the structure from floor level to roof level should be minimum 3 meters.

(f) The level of the building should be kept at least 2 feet above rail level. This level shall be kept in view of highest flood level (HFL) in Absolute/Automatic Signaling Section.

(g) Flooring should be finished with anti-skid Vitrified tiles.

(h) Stair case with railings is also to be constructed (if required as per instructions of Authority/ Authority's representative/Authority Engineer) for access into the building from trackside and/or from approach road side.

(i) Heat resistant terrace Tiles (300mmX300mmX20mm) with SRI >78, Solar Reflection > 0.70 and initial emittance>0.75 on waterproof and sloped surface of terrace to be provided.

(j) All weather proof thick emulsion paint to be provided on all outer walls.

3.0 Technical Specification of Signalling and Telecom materials:

SN	Description	Minimum Specification with Latest Amendments/ Drawing
1	MSDAC with Dual Detection	RDSO/SPN/176/2013(Ver3.0) or latest Amendment
2	UFSBI for ABS Huts and Stations	IRS Spec. No IRS:S-104/2012 Ver. 0 (Latest Amendments)
3	Signalling 12 core 1.5 Sq. mm Copper Conductor PVC insulated Armoured Unscreened, Under Ground cable.	IRS:S-63/2014(Rev.-4) or latest.
4	Cable Power 2 core 25 Sq. mm Aluminum Conductor PVC insulated Armoured Unscreened, Under Ground	IRS:S-63/2014(Rev.-4 and Amd. 1.0) or latest & IS: 1554 (Part-1) or latest.

	cable.	
5	6 Quad Cable Jelly filled.	IRS: TC 30/05 (Ver.1) with AmendmentNo. 5 or Latest.
6	Reinforced Thermo shrinking Jointing Kit for 4/6 quad jelly filled cable (TSF- 4) for derivation 2T & straight through joints.	IRS:TC-77/2012,(Rev.1) (Amdt.-2 or latest)
7	24/48 fiber Armoured optic fiber cable.	RDSO Spec. No. RDSO/SPN/ TC/110/2020 Revision-0 or latest.
8	Optical Fiber Cable Joint enclosure.	Raychem / 3M or better.
9	FDMS	RDSO/SPN/TC/37/2000 Rev. 3 Amdt 2 or latest Make: RNM/ Tyco/ D-Link or similar.
10	Supply of PIJF telephone cable 20 pair,0.63 mm dia. Copper conductor Armoured.	IRS:TC-41/97
11	SMPS based IPS system suitable forLC Gates with 300 AH VRLA Battery (55+5 Nos. of Cell)	RDSO/SPN/165/2023 (Ver. 4.0) with latest amendment.
12	Colour light signal post tubular steel 140 mm dia, as per IRS 56/81, Length 3. 5m-5.5 m long, as per requirement,	IRS S 6/81, SA 23002 A/M
13	Signal base	RDSO Drg.S2011/M
14	Foundation for Colour Light Main Signal Post in the ratio of 1:3:6 Aggregate not exceeding 3:8 cm.	Drg . No. WCR/S&T/SIG/01,Galvanized Anchor bolts & nuts conforming to IRS Drg. No. SA-116 A/M
15	Four aspect Colour light signal unit non -metallic complete made of FRP/Metallic	RDSO/SPN/194/ 2006 Ver.1, RDSO/SPN/151/1997 & RDSO Drg No. SA-23001 A/M (Adv), or all to latest amendments / SPECIFICATION No. IRS: S 26–64 2020 Ver1.1 for metallic Type.
16	FRP/ Metallic Direction type route indicator.	RDSO/SPN/194/ 2006 or latest, SA 23401-06/ SPECIFICATION No. IRS: S 26–64 2020 Ver.1.1 for metallic Type.
17	FRP/ Metallic Calling-On signal unitcomplete With fixing clamps, terminals etc.	RDSO drawing SA- 24351 (Adv.) Alt- 1 but Without lamp, lamp holder and lens. SPECIFICATION No. IRS: S 26–642020 Ver 1.1 for metallic Type.

18	Fabrication, supply and fixing of 'P', `C', 'A', 'G' etc. retroreflective marker of approved colors, on signals.	RDSO Drg. No. SA–23456
19	Signal aspect LED signal unit, 110 VAC	RDSO/SPN/199/2010 Rev 1.0 or with latest amendment.
20	Apparatus cases Full made of 10 SWG sheets with miniature E Type Locks.	IRS:S 30/64 & RDSO Drg. No. SA 3376 with Latest amendments.
21	Excavation, ramming, Casting Cement Concrete foundation for Full Apparatus cases/ Location boxes in the ratio of 1:3:6 Aggregate not exceeding 3 :8 cm.	Single case as per Drg No. JBP/S&T/C/084, Half case as per Drg No. JBP/S&T/C/085 Galvanized Anchor bolts & nuts (also referred to as foundation bolts) conforming to IRS Drg. No. SA-116 A/M
22	Earth pipe complete	Drawing No. WCR RLY No T2014/1 &Drawing No. WCR RLY No T2014/5
23	PVC insulated multistrand 35 Sq. mm. Cu Cable for connecting earth bus bar to earth electrode.	IS: 694 or latest, RDSO Drawing SDO/ RDSO/ E&B/ 001 or Latest.
24	Earth connection to Location Boxesand Signals With MS flat.	RE drawing no. CORE/ S&T/ ALD/ SK/ 592/ 2008 or latest.
25	Copper Tape 25 x 2 mm for interconnection of Earth electrodes.	RDSO Drawing SDO/RDSO/E&B/001 Or Latest.
26	Cable Termination rack.	As per extant practice on W. C. Rly. Rack arrangement shall be as per sketch SK-727 as per the drawing attached.
27	16/ 0.2 mm size tinned flexible single core indoor wire PVC coated in different color as per technical specifications.	IRS:S-76/89 Amend. No. 2 or with latest amendment/ specification.
28	PVC insulated Rly Signalling Indoor40 core 0.6 mm cables as per/ specification to be used.	IRS (S) 76/89 amendment II or with latest amendment.
29	Relay Rack	As per extant practice on W.C. Rly. Typical part list as per Annexure-9 and Rack arrangement as per Sketch no Sk-727 and Rack plan as approved by Engineer in charge.
30	Disconnect Terminal block for Four conductor with screwless Cage Clamp type/ sliding switch disconnect for eachconductor size up to 2.5 sq. mm. Equivalent to M6 Terminals.	RDSO Specification No. RDSO/SPN/189/ 2004 version 3.0.
31	Power wire (copper, multistrand) 0.85 conductor each dia 0.30 +/- 0.01 with insulation thickness of 1.2 mm nominal conductor resistance 3.30 ohms /	IS 2465/1984 & IS 694/1990 (1x6 Sq.mm), Test Parameters as per IRS (S) 76/89.

	km	
32	Power wire (copper, multistrand)140 conductor each dia 0.30 +/-0.005 with insulation thickness of 1.2 mm nominal conductor assistance 1.815 ohms / km.	IS 2465/1984 & IS 694/1990 (1x10 Sq. mm) and test parameters as per IRS (S) 76/89.
33	Power wire (copper, multistrand).101 Conductors each dia 0.45 +/-0.01 with insulation thickness of 1.20 mm nominal conductor resistance 1.21 Ohms / Km.	IS 2465/1984 & IS 694/1990 (1x16Sq.mm) test Parameters as per IRS(S) 76/89.
34	Fuse Block Made of PBT /Polycarbonate.	IRS:S 75/2006 & RDSO Drg No. SA-23748 Alt-4.
35	Non deteriorating type low voltage cylindrical Head cartridge Electric fuse2A.	Spec No. IRS / S / 78 / 2006 with latest amendments.
36	Concrete cable route marker	SDO/Cable Laying/020.
37	Supply and installation of Earth Leakage Detector comprise of 4 (four) channels: 2 channel 110 VAC and 2 channel 24/60 VDC in all ABS HUTs.	RDSO specification No. RDSO/ SPN /256/ 2002.
38	HDPE Duct	RDSO/SPN/TC/45/2013 Rev2.0.
39	Apparatus cases (Half) made of 10 SWG sheets With miniature E Type Locks.	Drg No JBP/S&T/C/085
40	Electronic interlocking	RDSO/SPN/192/2019 ver. 2.0 or latest

3.1 LIST OF SIGNALLING SPECIFICATIONS (IRS/BRS)

Specification No.	Description
IRS:S-105/2012 (Ver.0)	Block Proving By Axle Counter (BPAC) using UFSBI (For double line and single Line)
IRS:S-104/2012 Ver.0	Universal Fail safe Block Interface.
IRS:S-22/2016 Ver 1.0	Double Line Block Instrument.
RS:S-32/66	Push Button Type Single Line tokenless Block Instrument.
IRS:S-98/2001(Amd.3)	Single Line Tokenless Block Instrument Handle type.
IRS:S-32-66	Push Button TLBI with UFSBI.
IRS:S-68/89	Filter Unit for Use in Conjunction With Block Instrument in 25 KV 50Hz,Ac Traction Areas.
IRS:S-76/89(Amd.3)	PVC Insulated Railway Signalling Indoor Single Core Cable.
IRS:S-76/89(Amd.3)	PVC Insulated Railway Signalling Indoor Multi Core Cable.
IRS:S-63/2014(Rev.4.0)	PVC Insulated Armoured, Unscreened, Underground Railway Signaling Cable.
IRS:S-26/64 DrgNo:SA-23840(Adv.)	Colour light Signal Unit/Housing: Multi Unit Type -Without Side Light & Colour light Signal Unit/ Housing: Shunt Signal-Position Light Type.
IRS:S-66/84Amd.1	Colour light Signal Unit/ Housing: Route Indicator Direction Type 5 Lamps Unit Arms (1 To 6 Way)
IRS:S-49/74(Amd.1)	Electric Point & Lock Detector.
IRS:S-21/2001	Electric Key Transmitter.
IRS:S-24/2002(Amd.-1)	Electric Point Machine (Non-Trailable Type)
IRS:S-37/2022 ver 2.0 (Amd.3)	Motors For Electric Point Machine.
IRS:S-78/2006	Non-Deteriorating Type of Low Voltage Electric Fuses For Railway Signalling.
IRS:S-77/2006(Rev.1)	120/160/200 Way TAG Blocks For Signalling Installations.
IRS:S-75/2006(Rev.2)	ARA Terminal Blocks and Fuse Blocks-Made of PBT/ Polycarbonate.
IRS:S-79/92(Amd.2)	Multi way Isolating Terminal Blocks (Barrier Type) For Signalling Installations.
IRS:S-86/2000(Amd.4)	Battery Charger For Railway S&T Installations.
IRS:S-89/2013Ver.1.0	Track Feed Battery Charger.
IRS:S-93/96 (Amd.1)	Valve Regulated (Sealed) Lead Acid Stationary Battery Charger for Railway S&T Installations.
IRS:S-91/2014Ver1.0	Transformer – Rectifier Set For Railway S&T Installations.

IRS:S-95/96(Amd.1)	SITEL 'Primary Cells' (Dry, Avalanche Type) For Railway S&T Installations.
IRS:S-88/2004	Low Maintenance Lead Acid Stationary Secondary Cells For S&T Installations.
IRS:S-93/96(A) (Amd. 1	Valve Regulated (Sealed) Lead Acid Stationary Battery for Railway S&T Installations.
IRS:S-72/88(Amd.2)	TRANSFORMER 230/ 110 V , 1KVA to 5 KVA
IRS:S–96/2000	DC-DC Converter For Railway S&T Installations
IRS:S-82/92(Amd.2)	Inverter For Railway Signaling Installations For'On-Line applications.
IRS:S-74/89(Amd.6)	Ferro Resonant Type Automatic AC Voltage Regulator For Railway Signalling Installations.
BRS:941ASTS/E/RELAYS/ AC LITLED SIGNAL/09-2002, Amdt.-1	Relays - Universal Plug-in type AC Lamp Proving Relay (M-to-C Contact) for LED Signal Lamp.
BRS:930& BRS:931A	Relays -'Q' Series Neutral Line (ACI & NON-ACI)
BRS:938A,939A,966 & Appendix F2 For 9 Ohm.	Relays– Plugin Type, Track Relay 9 & 4 Ohm (ACI & Non-ACI)
BRS: 930, 931A, 932A, 933A,934A,935A,937A,943,960	Relays–Special Type (Metal to Carbon)
IRS:S-46-74 Amd-1	Relays - Neutral Line (Metal-to Metal Contact) , (ACI &Non-ACI) Relays – Special Type (Metal to Metal) Relay-Metal to Metal 110V AC LED ECR for LED Signal Lamp.
IRS:S-46	Relays–Point Contactor Unit.
IRS:S-31/80(Amd.1)	Relays –3-Position DC Polarized (Metal to Metal)
IRS:S-67/85(Amd-3)	Relay Contacts–SIG– (For 'Q' series plug-in type relays only)
IRS:S-61/2000(Amd-3)	Fail Safe Electronic Time Delay Device forRailway Signalling.
IRS:S-65/83(Amdt3)	Choke Coil for single rail track circuits on 25 KV50 Hz Ac electrified sections.
IRS:S-40/84withAmdt.1	Nylon Insulated Joints.
IRS:S-99/2006(Amdt-3)	Data logger system for Railway S&T Installations.
RDSO/SPN/153/2011Rev. 4.1	LED Signal-Lighting Units for RailwaySignalling.
RDSO/SPN/199/2010Rev1.1	LED Signal Lamps For Main Color Light SignalFor Railway Signalling.
RDSO/SPN/200/2010Rev-2.0	Battery operated LED Based Flashing Tail Lampfor Railway Vehicles.
RDSO/SPN/201/2010Ver.2.0	Fog Pilot Assistance System for Safety (Fog Pass)
RDSO/SPN/189/2004Rev.3.0	Modular Terminal Blocks, Fuse.
RDSO/SPN/165/2023 (Ver.4.0) with latest amendments.	SMPS Based Integrated Power Supply (IPS)

RDSO/SPN/256/2002	Earth Leakage Detector.
RDSO/SPN/197,Ver.1.0	Code of practice for earthing and bonding systemfor Signaling equipments.
RDSO/SPN/173/2002(Amdt-2)	Fail- safe electronic flasher device.
RDSO/SPN/146/2001	Audio Frequency Track Circuit.
RDSO/SPN/177/2012(Ver.3)	Single Section Digital Axle Counter.
RDSO/SPN/177/2012(Ver.3)	High Availability Single Section Digital Axle Counter.
RDSO/SPN/191/2005(Ver.0)	DTMF Based Block Bell and TelephoneEquipment.
RDSO/SPN/176/2013Ver.-3	Multi Section Digital Axle Counter.
RDSO/SPN-168/2005Rev.2	Thermo plastic Poly Urethane Insulators forRailway Signalling.
RDSO/SPN/192/2019 Ver. 2.0	Electronic Interlocking.
RDSO/SPN/196/2020 Ver.-4.0	KAVACH (Train Collision Avoidance System (TCAS)
RDSO/SPN/213/2014Ver.1.0	Advanced Auxiliary Warning System (AAWS)
RDSO/SPN/208/2012(Ver 2.0) With out hand generator.	Electric Lifting Barrier.
RDSO/SPN/217/2021 Ver. 3.0	Automatic Fire Detection & Alarm system for S&T installations.
RDOS/SPN/209/2012 Rev 2.0	Fuse Alarm/ Fuse Auto changeover system for usein Railway Signalling.

**********End of S&T Part**********

Electrical (TRD) specification and special condition

1. Provision of 10 kVA, 25 kV/240 V, single phase step down, oil filled natural air cooled Auxiliary transformer for automatic block signaling huts and 10 kVA, 25 kV/240 V, single phase step down, oil filled natural air cooled Auxiliary transformer for LC gate Service Buildings (Being constructed for conversion of non Interlocked to Interlocked LCs) between ET-KTE section (Double line) section, power Supply will be drawn by provision of AT Supply from existing-OHE network. ATs, Auto Changeover Panel & associated equipments of RDSO approved source shall be provided .Shifting of PTFE neutral sectiondue to provision of KAVACH.
2. **Electrical License:-** For participating in tender for an electrical nature of work, the contractor shall have to possess valid Electrical License of appropriate voltage issued by any State Government under clause 45 of compilation of rule of Indian Electricity rules 1956 or as amended from time to time. Electrifications of 11 KV and above including OHE, "A" class electrical contractor license is essential. (ii) The license can be possessed with one of the partners or in his own name if sole proprietor. Firm should submit a self- attested copy of the electrical contractor license along with the offer; otherwise, the offer will be summarily rejected.

3 The contractor can carry out the work either himself, if he has valid electrical license or through specialist sub-contractor who has a valid electrical license. The Bidder must give undertaking that either he is having minimum requisite experience (valid electrical license) himself or he will be deploying specialist subcontractor. If the contract is awarded to the bidder and he himself does not have requisite experience as above, he is required to enter into legally enforceable agreement with the specialist sub-contractor at least one month prior to scheduled starting of Key activity as per program submitted by him as contractor and agreed by the authority. The agreement must specify the specific role and responsibility of the subcontractor.

4 The electrical work should be carried out under the supervision of Electrical Department. Necessary measurement of works executed shall be entered by Authority Engineer.

5 The bill passing will, however, be done by representative of authority engineer. However, the final payment will be released after satisfactory completion certificate of work executed by officials who has recorded the measurement.

NOTE: - Item no. 1& 2 above are as per JPO WCR/N-HQ/150/Wks/Policy-17/Part VIIdated 08.09.22.

Specification

1.0 DRAWINGS, TECHNICAL DATA AND EXPLANATORY NOTES

All materials used in the work shall be of the best quality and of the class most suited for the purpose specified and procured from the sources approved by RDSO/CORE. All the equipments, materials, fittings and components will be subject to quality control program of the manufacturer, being part of the quality Assurance program of the Contractor. The materials may also be inspected by the Purchaser or his representative either at the manufacturer's works or at the Contractor's depot. All erection work carried out shall be ofbest quality acceptable to the purchaser to be done as per specification and drawings. Thepurchaser's representative shall have the right to be present during all stages of manufacture and contractor shall accord free of charge all reasonable facilities required for inspection and testing. The scope of works and specifications item wise of all schedules aregiven below: -

1.1 : **Survey of site and preparation of design and drawings: -**

The contractor shall have to prepare the cable route plan in consultation of Railway Engineer of every station /LC gate. Full details of ATs, Auto changeover panel, cable crossing, cable trenches, cross sectional details; other features of station shall be clearly shown. The location/station wise drawings shall be got approved from Sr. DEE/TRD/JBP & Dy. CSTE/P/JBP before starting the work. After completion of the work the contractor shall submit four copies of as erected cable route plan duly approved for distribution to Division.

2. (a): **Supply, erection, oil filtration, testing and commissioning of LT supply transformer 10 kVA of 25 kV/230 V:-**

This shall cover supply, erection, testing and commissioning of 10 kVA of 25 kV/230V LT supply transformer complete with terminal connectors as per RDSO specification No. ETI/PSI/15 (8/2003) with latest version, on the mast/ gantry. It shall also cover supply anderection of retro reflective number plate of Rly. approved design. This shall also cover supply of EHV grade insulating oil as per relevant RDSO specification. The work also includes the oil filtration and pre commissioning tests as approved by the Railways. The contractor shall make his own arrangement for oil filtration equipments, as well as power supply required for the same. All necessary tools, equipments, instruments required to carry out oil filtration / checks/tests/ commissioning shall be arranged by the contractor. Note- The replacement/Top up of the transformer oil on account of testing and leakages during the warrantee period shall be done by the contractor at his own cost.

3. Cement concrete foundation in hard and rock soil:

The price shall cover excavation, supply of cement and handling of all materials, and accessories, temporary arrangements for excavation in hard soil and concrete/ masonry drains/walls requiring use of chisel and hammer or requiring blasting , shoring where necessary, casting concrete including form-work where necessary, tamping of the concrete, grouting of mast and finishing the top of concrete foundation or anchor blocks. The price also include dismantling of all connected temporary arrangements, back filling with earthand compacting the same to the required height and width as per drawing to ensure safety of foundation, confining the exposed height of foundation block to within and removal of spoil. The Purchaser's engineer shall be informed in advance where use of chisel and hammer or blasting has been necessary. The contractor shall arrange for supply of explosive and all tools and plants for blasting operations at his own cost. The price shall also include the diversion of drains if found. The price shall include the cost of cement.

The foundation for structures shall be casted after excavation as per IS:456/2000 (or latest version) and Railway Drg. The concrete for foundation shall be nominal mix of grade

M.10 (1:3:6) obtained by mixing cement, coarse aggregate and fine aggregate

and water in accordance with proportions given in table 3 of IS:456/2000 (or latest version). Drawings pertaining to the location of excavation and casting of foundation shall be made availableto the successful tenderer only.

Other details of foundation, grouting and muffing:-

a) Size and grading of aggregates:- The coarse and fine aggregates shall conform to IS: 383/1970 (or latest version). The coarse aggregate for casting of

foundation and for grouting shall be of nominal size 40mm & 20mm respectively. The fine aggregate shall begraded from 20 mm down wards.

b) Cement: - For casting of foundation, grouting and muffing 53 grade ordinary port landcement to IS: 12269/1987 (OR latest version) shall be used.

c) Test:- In judging the acceptability of the materials quality of concrete and the method of work, the contractor will generally observe the provision of the IS:456/2000 (OR latest version) "Indian Standard Code" of practice for plain and reinforced concrete. Thecrushing strength of concrete shall not be less than the limits given below: -

Crushing strength of 15Cm.cubes by works test: -

Sr. No.	Concrete	At 7 days	At 28 days.
01.	M-10	70 kg/cm2	100kg/cm2
02	M-15	100kg/cm2	150kg/cm2

NOTE: -

i) Test specimen shall be taken at the site of work from mixture of concrete ready by pouring in the foundation hole. All tests shall be carried out in accordance with IS: 516/1959 or its latest version. The sample of concrete from which test specimens are made shall be representative of the entire batch.

ii) Age will be reckoned from the day of castings.

iii) Curing of re-informed concrete will be done in accordance to IS:456/2000 or latest(curing period will be 28 days).

4. Cement concrete foundation in other than hard and rock soil:

The price shall cover excavation, supply and handling of all materials and accessories, temporary arrangements for excavation in other than hard and rocky soil. Shoring where necessary, casting concrete including frame work where necessary, tamping of concrete, grouting of masts and finishing the top of concrete foundation or anchor blocks. The price also includes dismantling of all connected temporary arrangements, back filling with earth and compacting the same to the required height and width as per drawing to ensure safety of foundation, confining the exposed height of foundation block to within 10cm., and removal of spoil. NOTE: Nominal reinforcement will be necessary proper ramming in black cotton soil foundations. Such nominally reinforced foundations in black cotton soil will be payable under item 6. The steel for nominal reinforcement will be arranged by the Contractor and the concrete mixture, in such a case shall be as per ISS 456 with latest amendment.

The foundation for structures shall be casted after excavation as per IS:456/2000 (or latestversion) and Railway Drg. The concrete for foundation shall be nominal mix of grade

M.10 (1:3:6) obtained by mixing cement, coarse aggregate and fine aggregate and water in accordance with proportions given in table 3 of IS:456/2000 (or latest version). Drawingspertaining to the location of excavation and casting of foundation shall be made availableto the successful tenderer only.

Other details of foundation, grouting and muffing:-

a) Size and grading of aggregates:- The coarse and fine aggregates shall conform to IS: 383/1970 (or latest version). The coarse aggregate for casting of

foundation and for grouting shall be of nominal size 40mm & 20mm respectively. The fine aggregate shall begraded from 20 mm down wards.

b) Cement: - For casting of foundation, grouting and muffing 53 grade ordinary port landcement to IS: 12269/1987 (OR latest version) shall be used.

c) Test:- In judging the acceptability of the materials quality of concrete and the method of work, the contractor will generally observe the provision of the IS:456/2000 (OR latest version) "Indian Standard Code" of practice for plain and reinforced concrete. Thecrushing strength of concrete shall not be less than the limits given below: -

Crushing strength of 15Cm.cubes by works test: -

Sr. No.	Concrete	At 7 days	At 28 days.
01.	M-10	70 kg/cm2	100kg/cm2
02	M-15	100kg/cm2	150kg/cm2

NOTE: -

I. Test specimen shall be taken at the site of work from mixture of concrete

II. All tests shall be carried out in accordance with IS: 516/1959 or its latest version. The sample of concrete from which test specimens are made shall be representative of the entire batch.

III. Age will be reckoned from the day of castings.

IV. Curing of re-informed concrete will be done in accordance to IS: 456/2000 or latest (curing period will be 28 days).

V. The prices shall be same for any shape or size of concrete blocks. In calculating the individual volume of concrete, fraction of a cubic meter beyond the third decimal shall be rounded off to the next nearest third decimal.

VI. The prices shall apply for concreting of all foundations for mast, gantries, portals anchor blocks for guy rods, and fencing uprights.

VII. For purposes of computation of volume of concrete, the volume of steel work embedded in the foundation block and muff shall be ignored.

VIII. Cost of all concrete will be paid for only, the price shall inclusive of filling of concrete cubes at each 50 cubic meters of foundation & shall be tested from recognized laboratory.

IX. For purposes of computation of volume of concrete, the volume of concrete shall include the volume of sand and bitumen in sand cored foundation. However, for the purpose of computation, of quantity of cement utilized in sand core foundations, the volume of the sand bitumen used in core hole should be deducted from the total volume of the foundation.

X. For purposes of computation of volume of concrete the volume of each muff for all masts shall be taken as 0.02 Cu.m. except for masts with balance weights and for each column of portal, each head span mast, 2 or 3 track cantilever masts, and special fabricated masts for which the volume of muff shall be taken as 0.08 Cu.m. Irrespective of the size and shape of muff, on a flat basis.

XI. The pieces prices under item 6 shall also include the cost of concrete cable trenches and trench covers at the switching stations as well as embedment of drain pipes, where required.

XII. The prices shall also cover the cost of diversion of masonry/earth drain wherever necessary for casting of foundations.

5. Supply of steel structure galvanized including Traction masts, AT masts , fabricated steel other than mast , SPS etc. for AT mounting:-

This shall cover the cost of fabrication, galvanization & supply of different type of galvanized traction masts/main masts, galvanized steel structures for AT mounting mast(AT Mast T150) including SPS and small parts of steel nuts, bolts & washers etc including small steel parts etc. as per assessed requirement or instructions of Engineer at

purchaser(as per Drg. No. ETI/ PSI/037, Mod 'B"). AT mast shall be Hot dip galvanized as per RDSO specification No. ETI/OHE/73(4/25) or latest & mounting arrangement as per RDSO drawing No. ETI/PSI/036 or latest.

For the purpose of payment, the weights of individual traction masts shall be determined on the basis of the payable weights per meter length and per meter weights given in Railway's approved drawing. The price shall cover cost of supply at respective site/ locations, as per RDSO drawing of individual traction mast, dwarf masts, and main masts. For the purpose of payment, the weights of individual traction masts and masts of head span shall be determined for each type on the basis of the payable weights per meter length and per meter weights given in tables of Rlys.(as per respective RDSO drawings forstandard types). For special types, the payable weight per meter length will be decided by the Purchaser at the time of approval of designs. Manual erection of traction masts. (Masts and dwarf masts):- The price shall cover cost of manual erection, alignment and setting before grouting of individual traction mast whether rolled or fabricated.

Note:-

1 For the purpose of payment, the weights of individual traction mast shall be determined for each type on the basis of the payable weights per meter length as given in the Railway's approved drawing. For special types, the payable weight per meter length will be indicated by the Purchaser at the time of approval of designs.

2. The price shall also include the cost of stenciling of location number on masts / portal uprights in the manner as directed by the Purchaser. The price shall also include the straightening of masts / portal uprights bent during transit and cutting of masts / portal uprights to suit the site conditions.

6. Manual erection of steel structure galvanized including Traction masts, AT masts,fabricated steel other than mast, SPS etc. for AT: -

This shall cover cost of erection, alignment and setting before grouting of individual OHE mast. Item also covers stenciling of location number and other parameters on masts / portal uprights in the manner as directed by the Purchaser. The item shall also include the straightening of masts / portal uprights bent during transit and cutting of masts / portal uprights to suit the site conditions.

The item shall erection, alignment and setting as per site requirement by manual/road cranes for which contractor will bear the all expenditures. SPS, DA, Chair, Bkt. will be erected in power block whenever block is granted for which contractor should ready for erection of cantilever assemble by arranging all required resources (i.e materials, skilled manpower, T&P items, road cranes, lighting & generator arrangement even in night working if block grants

during night, Rly. will not make any extra payment for the same. price covers erection of galvanised bolts, nuts, washers, fittings, super mast etc. wherever required for the erection of above items as per approved designs and drawings.

7. Supply, Erection, & commissioning of single phase 25 kV DO fuse unit complete with Pedestal insulator assembly as per RDSO's specification no. ETI/PSI/14 (01/86)Rev.I (Apr. 87) and Drg. No.ETI/PSI/032 or latest:

The price of erection shall cover supply of all components required for erection. This shall cover supply and erection of 25 kV DO fuse switch assembly complete with all mounting accessories and terminal connectors, insulators as required as per RDSO specification No. ETI /PSI /14 (1/86) or latest version. The fuse switch shall be erected on steel channel away from structure as per Drg. No. ETI / PSI /032 with latest modifications. It shall also include the supply and erection of fuse element and link of requisite capacity suitable for 25 rated capacity in kVA, 25 kV/240 Volts LT supply transformer.

8. Supply & Erection of Anti climbing arrangement (device) as per Drg. No.ETI/PSI/037:

The price shall cover supply, erection, & commissioning of all components required for erection of Anti climbing arrangement (device) as per Drg. No.ETI/PSI/037. The price of erection shall cover supply of all components required for erection. It also includes fixingthe same on AT mast including all fasteners.

9. Supply & erection of LV Box assembly with 63 AMP MCB (D/pole) and 63 AMP porcelain cut out as per Drg. No. ETI/PSI/0310:

The price shall cover supply & Erection of all components required for erection of LV Box assembly as per relevant drawing and specification. The price of erection shall cover supply of all components required for erection with neutral link. It also includes fixing thesame on AT mast including all fasteners.

10. Supply & erection of LV Box assembly with 150 AMP MCB (D/pole) and 150 AMP porcelain cut out as per Drg. No. ETI/PSI/0310:

The price shall cover supply & Erection of all components required for erection of LV Box assembly as per relevant drawing and specification. The price of erection shall cover supply of all components required for erection with neutral link.

11. Supply & Erection of Structure Bond (from AT to earth pit, duplicate earthing, and mast to rail & earth pit to rail):

The price shall cover supply of all materials including M.S. flats required to provide structure bond connecting a traction mast or structures to the nearest non-track circuited rail, or earth electrode, including all fastenings at both ends as per RDSO/CORE drawing. The price shall include shaping and drilling of the bond and erection of all materials including the bond. The price shall also include provision of heat shrinkable PVC tube for structure bond under track circuited rail. This would also cover connection or earthing terminals of equipment like L.T. transformers with structures and then to rails if any as per relevant drawing. The X-area of M S bond shall not be less than 240 sq mm.

12. Supply and erection of caution board and danger board:

The price shall cover the cost of supply and erection of caution board and danger board as per relevant RDSO specification/drawings with latest amendments and erection of the same on structures as per requirement of consignee using proper clamps, nut bolts etc. required for erection at specified locations which are not covered in any other item. The locations shall be identified by the Rly Engineer as per latest guidelines of RDSO/Railway Board etc.

13. Provision of Retro Reflective number plate:-

This shall cover the cost of supply of Retro Reflective number plates/boards as per relevant RDSO specification/drawings with latest amendments, and erection of the same on structures as per requirement of railway engineer using proper clamps, nut bolts etc. required for erection at specified locations which are not covered in any other item.

14. Supply and erection of earth electrode, earth pit, earth pit cover as per drawing no. ETI/OHE/P/7020- conventional earthing including charcoal & salt etc. in all typeof soil including rocky:

Supply & erection of earth electrode, digging of earth pit, fitment of earth electrode having length of 3 mtrs. along with nut, Bolt, spring & washers etc. as per RDSO specification & drawing. The price shall cover supply of earth electrode length of 3 mtrs. It also includes supply and filling of alternate layer of charcoal/coke and salt as shown in the drawing. It also includes erection of earth Electrode as per drawing no. ETI/OHE/P/7020 with its latest version. The earth electrode will be connected with the existing MS flat. The price shall include the testing of earth value which should be less than 8.0 ohm and painted on the earth box Contractor has to arrange earth treatment of the soil to achieve earth resistance of less than 8.0 ohm if required. The work will be carried out either by boring method or by digging of pit but the diameter of the pit should not be less than 200 mm. and 3100 mm depth. The earth electrode already included in any other item will not be covered under this item.

15. Supply, fixing, testing and commissioning of automatic change over control and distribution panels (CLS Panel) as per latest RDSO spec. No. TI/ SPC/ PSI/ CLS/ 0020 with A&C slip no. 1 to 4. CORE approved Drg no. ASCOS/ CORE/ 2005/ 01 Rev.02 or latest for 63Amp capacity, 240V,5 0Hz for 10kVA AT & 150 Amps capacity, 25kV/240V,50Hz for 25kVA AT.

The work includes supply, fixing and commissioning of automatic colour light Signalling panel/ automatic colour light change over as per RDSO specification No. TI/SPC/PSI/CLS/0020 with latest A & C slip 1 to 4.

a) The CLS control panel shall be procured from the valid RDSO/CORE approved manufacturers only.
b) CLS control panel shall be provided at the locations as approved by nominated Railway engineer.
c) The power arrangement to the CLS control panel shall be as per the relevant schematic diagrams approved as per Railway Board's L. No. 82/RE/250/1 dated 13-09-2002 or latest.
d) Auxiliary transformers (ATs), local supply and supply from inverter or supply from DG set, as the case may be, will be terminated on the automatic change

overpanel.

e) Proper fixing arrangement on the wall/on a suitable MS angle frame as per the site location and directed by nominated Railway supervisor / representative shall be made. All material required for fixing shall be supplied by contractor.

f) The supply, erection, testing and commissioning of the CLS control panel shall beas per the RDSO's specification.

g) The glands, ferrule, lugs, cable number indicator etc shall be supplied by contractor.

h) The contractor shall arrange skilled manpower, testing equipment's and tools to test and Commission CLS panel. If any part is found defective during testing
/commissioning, same shall be replaced by the contractor free of cost.

i) If any defect is noticed during maintenance period, same shall be attended with replacement of item, if required by contractor without any claim for additional cost.

Note: Transportation of material up to work site with loading/unloading and shifting shallbe done by contractor.

j) Provision of Separate Earthing for CLS panel will be done by contractor. Earthingof the panel and equipment shall be as per IS: 3043 (latest edition).

k) Covering of CLS panel by wooden box or Gypsum/ACP board etc. as instructedby railway engineer.

16. Supply and fixing of medium class GI pipe of size 50 mm dia duly clamped.

a) The item includes supply and fixing of medium class GI pipe of size 50 mm diaduly clamped.

b) The GI pipe of 50 mm. dia. is to be provided for size of cable i.e. 2x150 sq mm,2x70sqmm and 2x25 sq mm.

c) The GI pipe shall be of B-class.

d) The GI pipe shall be fixed with AT mast/Rail pole/wall in vertical position at a length of about 200 cm. above ground level.

e) One end of the GI pipe should be grouted in the ground/muffing and the other endshould be Provided with suitable thimble/PVC bushing in ICDP switches, one each at AT end & other end at CLS control panel end.

f) Each OHE mast/Rail pole/wall and the pipe shall be provided with casting/recasting of concrete muff around each pole of 300 mm. dia. and 300 mm.height from ground level. The muffing shall be suitably white washed.

g) The GI pipe shall be clamped properly with MS flat clamp of size 40x6 mm & wooden cleat, to secure it. The gap between GI pipe and cable shall be sealed properly so that rain water does not go into the pipe. Wooden or PVC gourmets shall also be used at each end of GI pipe to eliminate the risk of cable damage. Transportation of material upto work site with loading/unloading and shifting shall be done by contractor.

17. Supply & fixing of J' type cable route marker made of cast iron as per approvedRailway drawing.

a) The item includes supply and fixing of 'J' type cable route marker made of cast iron as per approved Railway drawing by fixing /grouting along with laying of cables in trenches of all class of soils.

b) The cable route marker shall be provided at every 50 mtr distance

approximately and also a bending /turning point of the cable route. The cable route marker will be J' shape made of MS angel size 25x25x3mm, one meter long with RM plate and shall be available at the site at the time of laying of cable.

c) The cable route marker shall be of approved design by Railway authority before arranging procurement by the contractor. The letters "AT cable" mentioning UP
/DN AT should be engraved on the cable route marker.

d) Transportation of material up to work site with loading/unloading and shifting shall be done by contractor

18. Supply and erection of Hume pipe 150 mm dia with RCC color:

The price shall cover for cost of supply of Hume pipe for laying of cable under Railway track/Road in Hume pipe of not less than 150mm inner dia. The depth of the pipe shall be 1 Mtr. from bottom of sleeper to the top of the pipe. The cable shall be protected at the exit and entry points through suitable grommets. The Cost of supply of Hume pipe covers under this item.

19. Supply and erection of a solid core cut-in-insulator/Suspension insulator/9T feeder insulator with arcing horn arrangement for AT.

This is applicable to the provision of an additional 9T cut-in-insulator on a flat rate basis such as in a head span, cross span or in span wire or an overhead equipment conductor at an insulated overlap, anti-creep not provided for in other items or for suspension of OHE wires or 9T feeder insulator. This shall cover supply of all components required for the cut-in-insulators assembly, including appropriate terminal fittings for the conductor and the 9 Tonne insulator or all components for the suspension assembly. This shall cover erection of all components, including the 9 Tonne insulator [after testing as per RDSO procedure before erection]. The all-other similar insulator not covered in any other item will be paid in this item inclusive of appropriate terminal fittings etc.

20. Supply and erection of copper strip for LV terminal earthing size 25 mm x 3 mm: The price shall cover for Supply, erection & commissioning of copper strip for LV terminal earthing (size 25 x 3 mm).

21. Supply and Erection of Copper jumper with clamping arrangement:

The price shall cover erection & commissioning of all components required for erection of copper jumper size 50 sq. mm & 7 sq. mm copper wire from DO fuse to transformer with clamping arrangement. This shall cover, on a flat rate basis, the supply of jumper wire, all components and fittings required for providing a flexible copper jumper connection, including parallel clamps, bimetallic and aluminum copper ALUC strips, wherever required, and terminal or the clamps at either end, including jumper wire. This shall also cover the erection of the complete jumper assembly including jumper wire. This shall not however, be applicable for jumper connections already included under other items, but shall be applicable for any jumper connections in any combination between feeders, LT transformers, drop out switch, lightning arrestors for over head equipment, isolators and overhead equipment etc. and outgoing bus bars for switching stations and booster stations. Continuity jumper at Boom anchor anti creep will be payable under this item. The supply of all

components and fittings including the catenary wire for providing double catenary contact wire in place of catenary under over line structures as per Drg. No. ETI/OHE/SK/446 and ETI/OHE/SK-529 respectively will also be payable under this item, treating the double catenary as one jumper irrespective of the length. The item shall cover erection & commissioning of all components required for erection of copper jumper size

50 sq. mm & 7 sq. mm copper wire from DO fuse to transformer with clamping arrangement.

22. Supply, connecting, commissioning of cable termination along with lugs, clamps fixtures, glands etc. for 1100 V grade cable (Each set contains piece for both the endsof cable) 2 core 70 sq.mm and 2 core 150 sq.mm:

The price shall also cover supply of Cable Termination of 2 x 70 sq.mm cable and 2x150 sq.mm cable. The terminals of the cable shall be provided with suitable cable lugs and glands as per requirement. Near the cable termination point, amour of the cable shall be thus connected with panel body for proper earthling. Correct size thimbles of approved makes shall be used and crimped. Proper gland should be used for cable holding at entry and exit of cable. Testing and commissioning of different size of cable is included in this item.

23. Supply of 2Cx70 & 2Cx150 sqmm PVC insulated and sheathed aluminium armoured XLPE cable as per RDSO specification & latest IS.

This shall cover the cost of supply of **2Cx70 & 2Cx150** sqmm aluminum conductor PVC insulated Armoured, unscreened, underground railway power cable (Including spare cables for each AT) as per RDSO specification & latest IS.

24. Supply of contact wire PG clamp assembly RI no.-1040-2 as per latest RDSO specification no. ETI/OHE/P/1040-2 Rev. E:

The price shall cover Supply of contact wire PG clamp assembly RI no.-1040-2 as per latest RDSO specification no. ETI/OHE/P/1040-2 Rev. E Item. The price shall cover supply of suspension clamp complete with all accessories and fasteners as per RDSO Drg.No.-RE/33/P/1160 or latest.

25. Normal cable laying in earth:

The price shall cover excavation and supply of all required material for cable trench (separate trench for each cable) of required size and laying testing & commissioning of LT cable of size 2 x 70 sq. mm or 2x150 sq.mm. One no. spare cable also to be laid for each AT. The cable shall generally be laid in accordance to I.S. 1255 1983 or latest (code of practice for installation and maintenance of power cable up to and including 33 kV rating). Cable shall be laid in 310 mm wide and uniformly dug trench at a depth of 1 Mtr. as indicated in relevant drawing. The depth of sand below and above the cable shall be 80 mm respectively. The cable after laying and after covering by sand shall be protected by one layer of brick size 19 cm x 9 cm x 9 cm of grading class 2 as per IS-2212-91 transversely. After placing the bricks, the screened earth should be refilled properly up tothe ground surface and properly leveled.

26. Under track cable laying:

The price shall cover for laying of cable including cost of supply & erection of Hume pipe under Railway track/Road in Hume pipe of not less than 150mm inner dia. The depth of the pipe shall be 1 Mtr. from bottom of sleeper to the top of the pipe. The cable shall be protected at the exit and entry points through suitable grommets. The Cost of supply & erection of Hume pipe covers under this item.

Note 1 : Tentative cable route plan will be given by the concerned depot in charge for taking up the work of cable laying. However, contractor shall supply 4 sets of as erected drawings for cable laying and route plan.

Note 2 : Should be laying of the cable involves road crossing under the ground, the permission from the state Govt./other relevant authorities, the same shall be arranged by the contractor at his own cost and efforts. Delay on this account will be treated on contractor's account.

Note 3: Cable shall be laid in single piece without having any joints. Loop of at least 2 mtrs. at both the ends shall be provided to facilitate maintenance in future.

Note 4: All fitting or accessories which is not specifically mentioned in the specification but is essential for proper functioning of the system shall be provided by the contractor without any extra charge.

27. Laying cable in air/wall/pole along with fixture.

The contractor shall have to lay cable open in **air/wall/pole** as per decided by the site Engineer (i.e. wall/Ceiling). Cable should be properly terminated with standard size of lug. The cable along the wall should be provided with suitable size of Cable tray, M.S. clamps, Reg Bolts / J bolts shall be provided for supporting the cable. The distance between two supports not more than 0.50 meters. Breaking of wall to make holes for the contractor shall do cable entry in the building shall be restored to original levels to the satisfactions of the railway. Cable entry in the wall shall be adequately sealed.

28. Laying, testing & commissioning of HT/LT XLPE cable in the existing trench, DWC pipe, GI pipe.

This item covers laying of LT 1100 volt 2 core cable size upto size 300 sqmm, armoured cable in the existing trench, HDPE pipe, GI pipe etc. as per the quantities mentioned in the schedule. Spare AT cable along with main cable is to be laid for each AT.

i) Before laying the cable the trench/pipe should be thoroughly checked for sharp ballast, stone etc.so that the insulation of the cable may not be damaged. Two lengths of the cables shall be laid for each crossing. Out of the two cables one will be connected to overhead line and other shall be kept as stand by. All the cables shall be suitably and separately clamped on the DP structure/Pole with MS flat clamps, nuts, bolts etc.

ii) Before and after laying of the cable, the IR value should be checked and all the instruments for testing shall be arranged by the contractor.

iii) While laying the cable care should be taken that no tree roots come on way of the cable, as it may damage the insulation.

iv) Armoring of the cable should be earthed at ends.

v) Cable crossing on the Road/Rly. Track should be at right angle. The pipe shall be laid in a slope for easy drain out of the water and joints between the pipe should be water proof.

29. 42kV kV, 10 kA Metal Oxide Gapless Type Lightning Arrestor with Insulating Base and Surge Monitor 40 sqmm copper cable as Per RDSO Specification No.TI/SPC/PSI/MOGTLA/0101 (02/2015) or latest.

The price shall cover the supply of 42 kV, 10 kA Metal Oxide Gapless Type Lightning Arrestor with Insulating Base ,Surge Monitor along with 40 sqmm copper cable for surge monitor as Per RDSO Specification No. TI/SPC/PSI/MOGTLA/0101 (02/2015)or latest.

30. Erection of 42 KV LA. With surge monitor and disconnector assembly.

The price shall cover the erection of 42 kV LA with surge monitor with cable terminationetc. and disconnector assembly, as per railway requirements.

31. Disconnector assembly suitable for lightening arrestor of 25kV side of tractionsystem as per RDSO spec no. TI/SPC/PSI/MOGTLA/0101(02/2015) or latest.

The price shall cover supply of Disconnector assembly suitable for lightening arrestor of25kV side of traction system as per RDSO spec no. TI/ SPC/ PSI/ MOGTLA/ 0101(02/2015) or latest.

32. Supply of Annealed Stranded Copper Jumper wire (50 Sqmm) (19/1.80 mm)asper RDSO Specn. No.ETI/OHE/3(2/94) with A and C Slip No.1

The price shall cover the supply of Annealed Stranded Copper Jumper wire (50 Sqmm) (19/1.80mm) as per RDSO Specn. No. ETI/OHE/3(2/94) with A and C Slip No.1or latest.

33. Supply & laying of HDPE pipe of 75-450 mm dia or suitable size as per requirement, wall thickness 3mm.

The work involves laying of HDPE pipe as per specification. Supply & fixing/laying of HDPE pipe in trench/under floor/road/railway track etc. or as per site requirement. The diameter of HDPE shall be **75-450 mm dia** or suitable size as per requirement and wall thickness shall be **3mm**. It involves laying of cable in HDPE pipe. It shall be possible to withdraw the cables for repair or replacement without disturbing the Railway work. The pipes shall be laid with a gradient to facilitate drainage of water and it shall be at right angle to the track. Make & relevant IS as reference list attached.

34: Excavation of trench in all kinds of soil & making nitch in rocky area for 500 mmwide 1000 mm deep.

This item covers excavation of trenches in all types of soil and having width of trench of50 cm for laying cable. The depth of trench is increase 1 to 1.2 M in case of cable above

1.1 KV as per site requirements. Adequate precaution should be taken not to damage any existing cable, pipe or other such installation in the proposed route during excavation. The bottom on trench shall be level and free from stones, bricks bats etc. The trench shall be provided with a layer of clean dry sand cushion of not less than 10cm in depth. After laying of HPDE/GI pipe, the excavated Earth should be filled back duly ramming for consolidation throughout the trench. The contractor shall repair the damaged surface, floor, path way, channels, platform or any other structure to it's normal position after laying thecable.

35. Drilling of horizontal bore below track by pushing method by suitable means forlaying of HDPE/GI/RCC pipe of various sizes.

The item covers drilling of Horizontal bore by pushing method or any suitable means acceptable to Railways in all types of soil/rock for laying of HDPE/GI/RCC pipe from 75mm to 450 mm as required by pushing method in presence of Railway representative taking all necessary safety precautions related track and movement of trains. Horizontal boring will be done at minimum 1.5 Mtr. Below from ground level at railway track portionbut in case, where bank height of track is high then boring should be such that outer side and under track HDPE pipes are in same alignment. All work will be done in presence of Railway representative without disturbing the Railway track taking all necessary safety precautions related track and movements of trains. Since the bore is to be made at different locations as per crossings tracks, all the transportation, loading & unloading of equipments required for boring shall be done by the contractor at his own cost. If any damage occurred to Railway property while boring, the contractual agencies shall attend the damage on the top priority as per the Railways instruction and the damage charges as fixed by the Railways shall be binding on the contractor.

36: Excavation of Cable trench by cutting/breaking of platform concrete pucca floor300 mm deep & 300mm. wide and refilling the cut portion with normal soil and refinishing the said portion of platform with 1:2:4 cement concrete mixture 150 mmdeep and 300 mm. width after laying of cable and clear the platform. Restoring to its original position. All material shall be supplied by the contractor.

The work involves excavation of cable trench by cutting /breaking of station platform concrete pucca floor 300mm deep and 300 mm wide and refilling cut portion with the normal soil and finishing the said portion of platform with 1:2:4 cement concrete mixture 150mm deep and 300mm wide after laying of cable in the pipe. The contractor shall repairthe damaged surface, floor, path way, channels, platform or any other structure to it's normal position after laying the cable. All the material including concreting material shall be supplied by the contractor.

37: Supply, installation, testing and commissioning of 63A/150A 2P-"C" type MCB oras required as per RDSO specification.

a) The work involves supply, fixing and commissioning of rain proof sheet steel enclosure distribution box, dust and weather proof with front opening, outdoor type, with 63A/150A MCB with back up fuse.
b) The distribution box shall be of reputed make as approved by RDSO specification. Ifany brand (s) is approved by WCR, same shall be procured.
c) The box should be fixed at location as per direction of Railway Engineer.
d) Required clamps, bolts, nuts etc for fixing of board shall be supplied by contractor andcost of these items is included into it.
e) MCB- 2 Pole, 63/150 amps Breaking capacity-25 kV, C series as incomer similar tocat no. SH201M-C 63/150 of ABB make or similar.
f) MCB- 2 Pole, 63/150 amps Breaking capacity-10 kV, C series as incomer similar tocat no. SH201M-C 63/150 of ABB make or similar.

38: Supply of DWC HPDE pipe of 120- 450 mm dia along with all required material for joining the pipes. The items covers supply of 120-450 mm ID, Double walled Corrugated (DWC) HPDE pipe of reputed manufacturer confirming to Railway specification. The contractor shall have to submit manufacture test certificate and should be as per latest Railway specification with anti-rodent, antioxidant and non-flammable properties. It also includes the supply of all required material for joining the pipes.

39: Laying of DWC HPDE pipe of 120-450 mm dia in the trench.

The work includes the laying of pipe in the trench with a gradient to facilitate drainage ofwater and should be at right angle to the track. It also includes the supply of all material &their erection for making smooth joints and water tight for the pipe.

Note:

Material Reconciliation shall be done by Contractor as directed by Railway representative and suitable stacking and submission of removed equipment/item shall be done as per directions of Railway Representative. No additional payment shall be done to the contractor for this item.

40: Supply and erection of structure bond: -

This shall cover supply of all materials including mild steel flat 40x6mm required to provide a structure bond connecting a traction mast or structures to the nearest non-track circuited rail, or earth electrode, including all fastenings at both ends as per RDSO/CORE drawing. This shall include shaping and drilling of the bond and erection of all materials including the bond. The M S bond shall be painted one coat of red oxide and two coat of bitumen paint. This shall also include provision of heat shrinkable PVC tube for structure bond under track circuited rail. This would also cover connections or earthing terminals ofequipments like L.T. transformers with structures and then to Rails as per relevantdrawing. The X-area of M S bond shell not be less than 240 sq mm.

41: Supply and erection of caution board, unwired board, engine stop board, Sigmaboard etc. and other similar board:-

This shall cover the supply of unwired board, Engine stop board, power block working limit board, caution board, Sigma board in specified numbers confirming to latest RDSO specification/ drawing and erection of the same on structures as per site requirement of purchaser using proper clamps, nut bolts etc required for erection at specified locations which are not covered in any other item. The locations shall be identified by the Rly Engineer as per latest guidelines of RDSO/Railway Board etc.

42:- **Supply of steel structure galvanized including Traction masts, main masts , fabricated steel other than mast, SPS etc. for OHE:-**

This shall cover the cost of fabrication, galvanization & supply of different type of galvanized traction masts/main masts, including small steel parts etc. as per assessed requirement or instructions of Engineer at purchaser.

43: Manual erection of steel structure galvanized including Traction masts, main masts, fabricated steel other than mast, SPS etc. for OHE: -

This shall cover cost of erection, alignment and setting before grouting of individual OHEmast.

44.Supply and erection of Guy rod assembly: -

This shall cover supply and erection of guy rod assembly (including anchor loop for anchor block) of various lengths for traction masts, feeder line towers or portals or other supports complete with modified/latest mast guy rod fittings, guy rod with adjustments etc. as per RDSO specifications and parts to be grouted in the anchor block.

45.Supply and erection of all aluminum 25 KV feeder wire: -

This shall cover supply and erection of 25 KV feeder conductors (along or across tracks) made of single all aluminum bare, hard drawn conductors (19/3.99 mm, coss section- 234sqmm) as per relevant RDSO and small parts steels works, complete with bolts, nuts etc, if any.

Supply and erection of material for termination of single overhead equipment conductor ora terminating wire: -

This shall cover supply & erection of all material necessary for the termination of single conductor of overhead equipment or feeder wire or terminating wire on a traction mast or structure, including appropriate mast anchor fittings, clevis assembly, adjuster, anchor double straps, ending clamp for the catenary or contact wire or terminating wire and fittings including 9 Tonne insulator assembly. This shall cover erection of all materials including the 9 Tonne insulator [after testing as per RDSO procedure before erection] assembly and terminating wire, if any.

46: Supply and erection of solid core cut-in-insulator/Suspension insulator/9T feeder insulator for OHE modification: -

This is applicable to the provision of an additional 9 Tonne cut-in-insulator on a flat rate basis such as in a head span, cross span or in span wire or an overhead equipment conductor at an insulated overlap, anti-creep not provided

for in other items or for suspension of OHE wires or 9T feeder insulator. This shall cover supply of all components required for the cut-in-insulators assembly, including appropriate terminal fittings for the conductor and the 9 Tonne insulator or all components for the suspension assembly. This shall cover erection of all components, including the 9 Tonne insulator [after testing as per RDSO procedure before erection]. This shall also be applicable as an adjustment price for non-provision of insulators under items 8(b)(i) to 8(b)(ii). The all other similar insulator not covered in any other item will be paid in this item inclusive of appropriate terminal fittings etc

47:-**Supply, Shifting/Erection of complete PTFE short neutral section assembly (phase break) as per relevant latest RDSO specification:-**

This shall cover shifting/erection and adjustment of complete PTFE short neutral section assembly with all components and accessories required for formation of neutral section as per relevant latest RDSO specification. All the necessary tools & plants required for the erection work will be supplied by the contractor at his own cost. All OHE modification work required for shifting of short neutral section infringing with signals will be as per standard guideline of ACTM & will be done by Contractor.

48: Supply and erection of copper jumper: -

This shall cover, on a flat rate basis, the supply of jumper wire, all components and fittings required for providing a flexible copper jumper connection, including parallel clamps, bimetallic and aluminum copper ALUC strips, wherever required, and terminal or the clamps at either end, including jumper wire.

This shall also cover the erection of the complete jumper assembly including jumper wire. Continuity jumper at Boom anchor anti creep will be payable under this item. Anti-theft jumper (a set of three jumpers) as per drawing No. ETI/OHE/G/05107 for connecting out-of-turn OHE with the in running OHE at insulated/ Un-insulated over-lap locations and also considered necessary will be payable under this item. The supply of all components and fittings including the catenary wire for providing double catenary contact wire in place of catenary under over line structures as per Drg. No. ETI/ OHE/SK/446 and ETI/OHE/SK-529 respectively will also be payable under this item, treating the double catenary as one jumper irrespective of the length.

49: Provision of Splicing and extension of OHE: -

This shall cover splicing of termination of overhead equipment for extension and consequent adjustment of the effected equipment. The dismantled equipment (excluding portion embedded in concrete) shall be returned to the purchaser's Engineer. The cost of dismantling of overhead equipment would be paid for item no. 12 for the whole length of the anchoring span irrespective of the physical position of the splices. The extended overhead equipment shall be deemed as starting from the center line of the structure preceding the old terminating structure.

50.Shifting of IOL of OHE :- As per ACTM minimum distance between centre line of IOL of OHE & Stop signal should be 120 m. If there is infringement of IOL of OHE with signal, then all OHE modification work involve with shifting of IOL will be done by contractor. The shifting will involve cement concrete

foundation, supply and erection of galvanized mast & SPS, suplly and erection of cantilever assembly, supply and erection of OHE with complete fittings, supply & erection ofcontact & catenary wire as required, supply & erection of guy rod assembly, supply and erection of ATD &dismantling of existing TRD assets etc.

ELECTRICAL(G)

Electrification of the all new service buildings (station buildings/ LC gate/IBH/ABS Huts.

SPECIFICATION

FOR EARTHING

1. A 300 mm x 300 mm x 300 mm (inside dimension) concrete box (wall thickness min. 50mm) with smooth cement plaster finish shall be provided on the top of pit. A concrete lid of 50 mm thick, with pulling hooks, painted black shall be provided to cover the earth pit. PVC sleeve of appropriate size shall be provided in concrete wall to take out earthing connections.
2. The masonry work shall be white washed inside and outside.
3. Care shall be taken regarding level of the floor surrounding the earth so that the connector is not too deep in the masonry or projecting out of it.
4. On backside of the cover, date of test and average resistance value shall also bewritten with yellow paint on black background with date.
5. The earthing shall be carried out as per IS 3043-1966 or revised. The earthing shouldbe complete in all respect like connection, inter-connection etc.
6. Two separate and distant earth connection shall be provided for all metal parts, structures and equipments.
7. The earthing strip / wire laid in ground shall be buried 500 mm deep.
8. The buried earth strips / wire shall be applied with one bitumen coat. The earth connection strips of the main earth buried under ground shall be covered with dry sand 50 mm around.
9. The earth connection strips of the main earth buried under ground shall be covered with dry sand 50mm around.
10. Pipe electrode shall be provided and their dimension shall confirm to drawings as per the relevant IS.
11. No. of earth electrode shall be so decided that combined earth resistance of earth bus shall not exceed more than 2 ohms for plate electrodes.
12. The distance between 2 earth electrodes shall not be less than twice the length of electrodes.
13. The size of the earthing conductor from earthing pit to the other end shall be of 6 SWG GI wire.
14. Pipe electrode shall be provided and their dimension shall conform to RDSO drawings no. ET/OHE/P/7020-MOD-B or latest & Plate electrode shall conform to drawing No. Sr.DEE/G/BPL/64/2002/113 or latest.

FOR CABLING as per relevant IS/ specifications

Whenever and wherever clamps & glands (brass cable glands) are required then they shall be shaped to accommodate the 'cable' and should be painted with two

coats of red oxide and two coats of paint matching with general decor / surrounding surface.

Cable laying in trench:
This involves Excavation of 1000 mm deep trench in soil/hard murrum/tar road/below Railway track then the bottom of the trench should be leveled, freed from stones / sharp edges of rocks. Then lay a bed of 75mm thick fine sand at bottom of the trench. After this the cable shall be laid and then both sides are to be covered with 'B' grade bricks, thereafter sand to be filled on the cable by 75 mm thick layer followed with final covering top side by'B' grade bricks. The rest of the trench to be refilled by sheaved earth.

Cable laying in trench in rock:
This involves Excavation of 750 mm deep trench in rock. Then the bottom of the trench should be leveled, freed from sharp edges of rocks. Then lay a bed of 75mm thick fine sand at bottom of the trench. After this the cable shall be laid and then both sides are to be covered with 'B' grade bricks, thereafter sand to be filled on the cable by 75mm thick layerfollowed with final covering top side by 'B' grade bricks. The rest of the trench to be refilled by sheaved earth.

Cable laying in loop form in each end:
This involves laying of cable in trench at the end of trench on sand bed of 75 mm and coveringby sand and bricks; all as provided in case of cable laying in trench.

Supply of 150mm dia. RCC pipe with collar and laying after excavation of 1000 mm deeptrench.

Cable laying inside 150mm dia. RCC pipe on road/track crossing and reforming original surface ofthe road/track.

This involves laying of cable in the RCC pipe already laid. Then filling of trench by sheaved earth.Then reforming of surface of this trench to match with the original surrounding surface.

Erection involves the Cable laying on wall/pole, fixing using MS flat [25x6mm.] clamps, nuts, bolts,screws or nails as per site requirement etc.

Supply of pipe, as per schedule, ISI marked pipe for cable support on wall/pole/road.

Erection involves fixing of the pipe on wall/pole with MS flat [25x6 mm.] clamps, fixtures, bushing,nuts, bolts, grommet on each end of pipe & supply of these materials (MS flat [25x6 mm.] clamps, fixtures, bushing, nuts, bolts, Gromet etc.)

Supply portion under this item shall mean that cost of glands (brass cable glands), termination. Erection involves connecting, commissioning of cable with nuts, bolts, on both end of cables &supply of these materials nuts, bolts etc.)

Cable route marker: Supply & providing cable route markers marked with 'L.T. / H.T. cable' as required at every turning points/road crossings and at 20 Mtr. distance. Erection involves foundationof cement concrete with 1:3:6

FOR WIRING :

Scope: Technical data covers the general technical requirements of the various components ininternal electrical installation works and wiring / rewiring system

1) This system shall be done in PVC casing and capping (wire ways). The casing shall have a square or rectangular body. The caping shall slide–in-type with double grooving. All surfaces shall have smooth finish inside and outside.

2) PVC casing and capping shall be of good quality PVC free from defects like deformation, unevenness, blisters, cavities, ivory colour, only to be clamped supported, fixed at every 400 mm distance. Precision/Presto Plast / Modi/ V-Plast MAKE casing, capping is to be used.The sizes of casing and capping for the various sizes of wires and maximum number of 1100 V grade PVC insulated, stranded copper conductor cables conforming to IS-694-1990 or latest, that can be carried in one casing and capping are as under:

Nominal cross sectional area of conductor in sq.mm	10/15 mm x 10 mm	20 mm x 10 mm	25 mm x 10 mm	30 mm x10 mm	40 mm x 20 mm	50 mm x 20 mm
1.5	3	5	6	8	12	18
2.5	2	4	5	6	9	15
4.0	2	3	4	5	8	12
6.0	--	2	3	4	6	9
10	--	1	2	3	5	8

3) The thickness of the casing and capping shall be approx.1.2 mm +/- 0.1 mm. The casing shallbe fixed by means of suitable head screws to approved type of asbestos or fibre fixing plugs at intervals not exceeding 40 cms for all sizes. On either side of the joints, the distance of the fixingarrangement shall not exceed 15 cms. from the joint. Screw head shall be counter sunk within the center of the casing. Alternatively, round headed screws may be used. The wire-ways in straight runs should be in single pieces so as to avoid joints. Joints in capping shall not overlap therein casing. Joints arising out of bends shall be done using standard accessories like elbows, tees, 3 way/ 4 way junction etc. casing to harmonies with decor.

(II) (1) Conductors of wiring wires shall be of PVC insulated, multi stranded copper conductors (Colour code of RYB may be used for 3 phase wiring) of following sizes:

a) For light / fan /5A plug /call bell point wiring, from switch board: 1.5 sqmm

b) From SDB to switch board for light /fan/ 5A plug:2.5 sqmm

c) From SDB to separate 5A switch board:2.5 sqmm

d) From SDB to separate 15A socket point wiring: 4.0 sqmm

e) From SDB to 20A metal clad socket separate circuit (AC): 4.0 sqmm

f) For Sub-mains (Meter to SDB): 6.0 sq.mm

(III) **Wiring accessories**:

(1) Control switches (single pole switches) carrying current capacity 6A for Light & Fan, shall be Piano type and the switch shall be 'ON' when the knob is down. Combined switch-cum-socket shall not be permitted. The power (15A/16A) outlet shall be controlled by MCBs. Control switch shall be placed only in the live conductor of the circuit.

2) Socket outlet: Socket outlet shall be of Piano type as also their control switches. These shall be rated either for 5A/6A or 15A/16A. Combined 5A/15A or 6A/16A circuits only where specified.Sockets for the power outlets of rating above 1 KW shall be of Industrial type with associated plug top and controlling MCB. Outlet box for socket outlets (both for 15A/16A and 5A/6A) points in residential buildings shall be of size 175 mm x 100 mm. Unless and otherwise specified, the control switches for the 5A/6A and 15A/16A socket outlets shall be kept along with the socket outlets.

(IV) Ceiling rose: Only the flexible cord shall be connected to a ceiling rose to fan, FT fitting etc.

(V) Lamp holders: Lamp holders shall be type as required. The holder shall be rigid withsufficient threading for fixing.

(VI) Conformity to IE Act, IE Rules and tenders: All electrical works shall be carried out in accordance with the provision of Indian Electricity Act 1910 or latest and Indian Electricity Rules 1956 or latest, or amended up to date. The work shall also conform to relevant Indian Standard Codes of Practice (COP).

(VII) General requirement of components:

All components in various installations shall be of appropriate ratings of voltage, current and frequency.

All conductors, switches and accessories shall be of such size as to be capable of carrying the maximum current which will normally flow through them without their respective ratings being exceeded.

All components shall conform to relevant Indian Standard Specification(ISI/BIS Mark). Similar parts, say all switches, lamp holders, distributors, fuse boards, switchgear, ceiling roses, brackets,pendants, fans and all other fittings of the same type shall be inter-changeable in each installation.

(VIII) Passing through walls or floors: When wiring cables are to pass through a wall, these shallbe taken through a protection (steel/PVC) pipe or casing/capping with ends neatly bushed.

(IX) **Joints in wiring**: No bare conductor in phase and/or neutral or twisted joints in phase neutraland/or protection conductors in wiring shall be permitted. No joints shall be in the through runs of cables. Termination of multi-stranded conductors shall be using suitable crimping type thimbles.

(X) Rating of outlets:

Ceiling fans, exhaust fans, all light lamps and fittings etc. shall be rated according to their capacity. 5A/6A & 15/16A socket point shall be rated at 100W and 1000W respectively.

(XI) **Capacity of circuits**:

1) Lighting circuit shall not have more than a total of 6 Nos light/ fan and socket outlets.

2) Power circuits shall be designed with only one outlet per circuits. The circuit shall be designed based on the load where not specified. These loads shall be taken as 1 kW per outlet.
3) Load more than 1 KW shall be controlled by an isolator or miniature circuit breaker (MCB).

(XII) **System of distribution**:

Main Distribution Board shall be controlled by circuit breaker or linked switch with fuse. Each outgoing circuit shall be controlled by a switch with fuse/circuit breaker.

Branch Distribution Board shall be controlled by a linked switch fuse or a circuit breaker. Each outgoing circuit shall be provided with a fuse/ a circuit breaker on the phase of live conductor. The earthed neutral conductors shall be connected to a common link and be capable of being disconnected individually for testing purpose. The DB shall be fixed on suitable support/ fixture or walls and shall be accessible for replacement of MCBs / Fuses. The DBs shall be weather proof type, if exposed to weather or damp situation.

(XIII) **Exhaust fan**:
Exhaust fans shall be erected at the place indicated by Engineer-in-charge, for fixing an exhaust fan, a circular hole shall be provided in the wall to suit the size of the frame, which shall be fixed by means of rag bolts embedded in the wall. The hole shall be neatly plastered to the original finishing of the wall. The exhaust fan shall be connected to exhaust fan point. Wiring of exhaust fan point should be done using 1.5 sq.mm copper wire.

(XIV) **Earth continuity**:
A protective (earth continuity) conductor shall be drawn inside the casing & capping for earthing of all metallic boxes of the installation as well as for connection to the earth pin of the outlets. The earth continuity wire shall be PVC insulated copper conductor wire suitable as per size of main wire confirming to relevant IS and IE rule.

Location for earth electrodes: Normally an earth electrode shall not be located closer than 1.5 M from any building. The earthing arrangement shall be done as per drawing of 3043-1966 or revised.

(XV) Wiring plan should be got approved by Electrical engineer prior to start of the work.

(XVI) The control board shall be of wood with sun-mica top.

(XVII) The maximum number of wires to be run inside the metal conduit pipe shall be as under:

S.No.	Size of wire	16 mm (1.2mm thick)	19 / 20 mm (1.5 mm thick)	25 mm (2 mm Thick)	40 mm (2 mm thick)	32 mm (2 mm thick)
1.	1.5 sq.mm	2 nos.	5 nos.	8 nos.	--	12 nos.
2.	4.0 sq.mm	2 nos.	3 nos.	7 nos.	--	10 nos.
3.	6.0 sq.mm	--	2 nos.	5 nos.	--	08 nos.
4.	10 sq.mm	--	--	3 nos.	6 nos.	04 nos.

(XVIII) Concealed conduit wiring system:

This system of wiring shall comply with all the requirement described above under 'surface Conduit System' and in addition, confirm to the requirements described under:

The conduit shall be fixed in position by means of M.S. hooks not more than 60 cm. apart by making a chase in the wall. The conduit shall be fixed so that its top is 6mm below the surface of wall. The chase shall be of ample dimension to permit the conduit to be fixed properly and shall bemade neatly in the wall. The chase shall be filled up neatly after erection of conduit.

The outlet boxes shall be same as for surface conduit system and shall be mounted flush with thewall/ceiling.

WIRING IN P.V.C. CONDUITS: The P.V.C. conduits shall be of approved make and brand, (I.S.I./BIS) marked of heavy duty minimum 1.6 mm thick. The couplers, inspection boxes long neck, solid bends shall also be of heavy duty P.V.C.

The system of wiring shall comply with all the requirement described above in rigid steel conduitsystem and in addition confirm to the requirement described here under.

The earth continuity wire of 2.5 sq mm, shall be PVC insulated in Green colour copper wire andshall be carried inside the conduit of suitable size.

LAYING OF CONDUIT IN SLAB : conduit pipe shall be laid in slab or beam along with reinforcement before concreting .The conduit pipe shall be laid over the bottom reinforcement theslab of beam unless required otherwise, such that the open face of the outlet box in flush with thesurface of the slab or beam .The conduit pipe shall be fastened securely to the nearest reinforcement with 16 gauge steel wire .The outlet box shall be at least 63 mm to 73 mm deep, check nut should be provided to prevent entry of cement concrete in conduit pipe during the concreting .The outlet box shall be filled with clay or hessian cloth so that the concrete does not fill in it. All bends shall be made by bending the conduit pipe. To facilitate drawing of wire in the conduit, 16 SWG fish steel wire shall be provided in the conduit during its erection.

The out let boxes shall be same as for surface conduit system and shall be mounted flush with theceiling.

12.0 METERING

Incoming feeder panel shall be provided with voltmeter with voltmeter selector switch andammeter with ammeter selector switch.

13.0 INDICATING LAMPS:

Indicating lamps for 3 phases, R, Y, B for indicating whether the bus bars are live or not, shouldbe provided.

14.0 CABLES: Engraved PVC cables shall be provided on all the incoming and outgoing feeder compartments. The exact legend to be engraved will be furnished with the order.

15.0 MCBs:
'L' series MCBs or equivalent shall be used only for normal lighting circuits.

'G' series MCBs or equivalent shall invariably be used for meter loads and all power circuits.

FOR CEILING FAN:

Governing Specification IS : 374 or latest

Size / Type / Performance : As per IS 374 latest

Fan Size :1400

Type of Fan /Type of the Motor : DC / Brushless DC (BLDC) Minimum Air delivery and service value: As per clause 8.1 of IS: 374 latestBEE Star Rating : 5 Star

Air delivery at test voltage (m3/min) 270

Power consumption (Maximum) 35

Power factor : 0.99

Rated speed (rev/min): 290

Number of blades: 3

Type of bearing : Double Ball Bearing

Blade Material : Aluminium

Accessories in the scope of supply : Nut, Bolt, Clamp, Remote Warranty (in year) : Minimum 1

FOR SUPPLY OF 380 MM SWEEP EXHAUST FAN:

Supply of 380 mm sweep all Metal body construction industrial type heavy duty exhaust fan, propeller type, single phase, 1400 RPM complete with all standard accessories with minimum warranty of one year or more as per the manufacturer as per approved list.The erection of the exhaust fans are to be done by making proper opening in the wall appropriate to the size of the exhaust fan and its fixing arrangement by using required fasteners, their grouting and then connection is to be given from ceiling rose to this fan using cable of requisite size. It also includes the plastering of the surrounding wall and wall finish shall be maintained to the surrounding one.

(A) Special Conditions of contract for Electrical Part :

1. The Electrical part of schedule shall be read in conjunction with the explanatory notes and Technical specification.
2. The Electrical Supervisor for the works shall be nominated by Sr.DEE(G)JBP. The measurement of electrical work will be done by the nominated Electrical supervisor only.
3. The Electrical work shall be carried out under the Supervision of the Electrical department. Necessary measurement of Electrical works executed shall be Electrical Supervisor and test checked done by officer nominated by Sr.DEE (G) JBP.
4. No Electrical fitting/wires/cables/machine/equipment will be allowed to be fixed till it is approved by authorized engineer (of/or) Sr. Divisional Electrical Engineer (General), Jabalpur.
5. LED luminaries have five year warranty/guaranty delay in replacement on defective beyond 10 days Penalty of Rs 5 per day per fitting will be charge as deduction from

SD

6. Electrical Licence Condition: As per CEE/JBP's office letter no WCR/L/10/Tender policy/61394 dtd: 23.07.2015 which stated that "The contractor will ensure to carry out electrical work either by himself if he has a valid electrical license or through any sub- contractor who has a valid electrical license. The contractor will submit a cerified copy of electrical license or will submit an affidavit at the tender stage that he will deploy electrical sub- contractor with the valid electrical license. The above will be submitted before execution of electrical work."

7. The tenderer shall visit the site before filling of tender forms, so as to have a clear idea of location, infringements and other topography of location in respect of quantum of work involved and then only he shall quote. It shall be presumed that participants in this tenderhave seen the site before quoting their offer

8. The identity card should be issued to the contract labourers nominated to work in the railway premises by the contractor, indicating Contract No, Name of the person, place of work etc. If identity card is not issued to contract labourers, labours will not be permitted to work in the Railway premises. The list of the labour should be submitted to this office for records.

9. If not specified elsewhere in this tender booklet, then manufacturer's test certificate, proof of manufacture by approved manufacturer /brand, proof of placement of order by the contractor on approved manufacturer, and certificate of conformity of product to relevant IS specification of manufacturer shall be supplied by the contractor in original for the items if considered necessary by the Engineer for EIG sanction.

10. The site plan for all the stations will be made available to the successful tenderer at the time of execution of the work.

11. After visiting the site before quoting in tender any other material; if considered necessary; by the contractor for successful completion of work, which is not included in the tender schedule, may be quoted separately with full details and justification for consideration of the purchaser. Later, on award of work to successful tenderer, no dispute shall be entertained by Railway, if nothing is quoted as per this point.

12. Successful tenderer shall ensure supply of all items as per relevant IS, if Railway Specification is not provided and shall show/ bring his own IS as and when demanded by Railway representative. If Railway specification contains reference to IS specifications,then also, above shall apply.

13. GUARANTEE:

(a) The contractor shall guarantee satisfactory working of the installations erected by him for a period of 12 (Twelve) months except LED items from the date of commissioning. **For LED fittings etc., the guarantee period will be 5 years from the date of commissioning. Till then the complete SD (Security Deposit) pertaining to Electrical (G) portion of the work will be kept with Railways.**

(b) During the period of guarantee, the contractor shall be liable for the replacement at site of any parts which may be found defective , whether arising from faulty design, materials, workmanship or negligence in any manner on the part of the contractor provided always that such defective parts as are not repairable at site are promptly returned to the contractor if so required by him at his (contractor's) own expenses. The lamp, chokes/ballast are to be maintained by the contractor for one year within guarantee period.

(c) The repaired or renewed parts shall be delivered and erected on site free of charge to the purchaser. During the period of guarantee the contractor shall keep available an experienced engineer and necessary equipment to attend to any defects.

14. Inspection:

All the erection and installation work shall be subject to inspection by the purchaser time to time during execution to ensure that the work is done in accordance with technical data, drawings and is of the best quality suitable for the purpose. All the defects / discrepancies, if any, pointed out during inspection should be attended by the contractorimmediately.

1. As soon as the erection of the installations in each location is ready for inspection, testing & commissioning, the contractor shall advise to Sr.DEE(G),JBP. or his representative.
2. After completion, the following tests shall be carried out before putting the installation into service.
3. Insulation resistance, Earth continuity and its resistance & various other if required for EIG. On completion, a certificate in a prescribed form shall be furnished by the contractor with countersignature by the "licensed supervisor" of the contractor.

Civil work Requirements:

1. Boring, providing and installing cast-in-situ single under reamed piles with bulb dia of 2.5 timesthe pile dia of any length in M 35 grade to carry a safe working load not less than specified including cost of boring with bentonite solution.

2. Providing and laying in position M 20 Grade concrete for reinforced concrete structural elements but excluding cost of centering, shuttering, reinforcement and Admixtures in recommendedproportion (as per IS:9103) to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer in charge.

3. Foundations, footings, bases of columns, raft foundation of washable aprons, Pile caps, Footingsof FOB etc.

4. Supplying Reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete.

5. Earth work in excavation as per approved drawings and dumping at embankment site or spoil heap, within railway land, including 50m lead and 1.5m lift, the lead to be measured from the Centre of gravity of excavation to Centre of gravity of spoil heap; the lift to be measured from natural ground level and paid for in layers of 1.5m each including incidental work, as per specifications.

6. Providing and applying plaster of Paris putty of 2mm average thickness over plastered surface toprepare the surface even and smooth complete.

7. Steel work welded in built up sections/ framed work including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer using structural steel etc. as required.

8. Providing and fixing fly proof galvanized M.S. wire gauge to windows and clerestory windows using galvanized M.S. wire gauge with average width of aperture 1.4mm in both directions with wire of dia 0.63mm.

9. Finishing walls with Acrylic Smooth exterior paint with Silicone additives of required shade onnew work (Two or more coats applied @ 1.67ltr/10 sqm over and including one coat of water proofing cement paint applied @ 2.20 kg/10sqm.

10. Finishing walls with Acrylic Smooth Interior paint of required shade on new work (Two or more coats applied @ 1.67 ltr/10 sqm over and including base coat of water proofing cement paintapplied @ 2.20 kg/10sqm.

11. Providing and laying APP (Atactic Polypropylene polymer) modified prefabricated seven-layer 3mm thick water proofing membrane, reinforced with non-woven polyester matt over a coat of bitumen primer for bitumen membrane @ 0.25 Kg/sqm. by the same membrane.

12. Providing and fixing float glass panes with putty and nails including removal of old broken panes wherever required.

13. Providing and fixing 10mm thick heavy-duty acid and/or alkali resistant factory made tiles conforming to Group V-RD series of approved make and colour using acid and/or alkali resisting mortar bedding and joints filled with acid and/or alkali resisting.

14. Painting with synthetic enamel paint of approved brand and manufacture to give an even shade.

15. Steel work in built up tubular trusses including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer, welded and bolted including special shaped washers etc. complete.

16. Providing and laying water bound macadam with specified stone aggregate, stone screening and binding material including screening, sorting, spreading to template and consolidation with power road roller of 8 to 10 Tonne capacity etc. complete.

17. Earthwork in filling in embankment, guide bunds, around buried type abutments, bridge gaps, trolley refuges, rain bunds, if provided, platforms etc. with earth excavated from outside railway boundary entirely arranged by the contractor at his own cost as per RDSO's latest guidelinesand specifications and special condition of contract including all leads, royalty, lifts, ascents, descents, crossing of nallahs or any other obstructions. The rates shall include all dressing of bank to final profile, demarcation and setting out of profile, site clearance, removing of shrubs, roots of vegetations growth, heavy grass, benching of existing slope of old bank, all handling/re- handling, taxes, octroi and royalty etc. as a complete job. Cut trees shall be property of railways and to be deposited in the railway go down unless specified otherwise in the Special Conditions ofContract.

18. Providing and fixing to IS: 2202 Part-1 marked flush door shutter decorative type, core of block board construction with frame of 1st class hard wood and well-matched teak 3ply veneeringwith vertical grains or cross bands and face veneers on both faces.

19. Providing and fixing M.S. fan clamp of 16mm dia M.S. bar bent to shape with hooked ends in R.C.C. slabs during laying including painting the exposed portion of loop, all as per standard designcomplete.

20. Providing and fixing wooden planks in floors, shelves, lofts, decking of bridges, etc.,

with Kail, venteak, pillamarudhu or locally available comparable species of good country wood.

21. Providing and fixing 25mm thick cup board shutters, with prelaminated flat pressed 3 layer particle board conforming to IS 12823 -Grade I, having one side decorative lamination of approved shade and other side balancing lamination including second class.

For approval of structural drawing:

1. Proof checking of design and drawing from any NIT/ IIT/Government Engineering Collegewith approved building plan and elevation is required.
2. Recommended bearing capacity of soil strata is required.
3. Steel shuttering and scaffoldings shall be utilized for both safety and workmanship. Proper design and drawing for shuttering and scaffoldings shall be prepared along with the structural drawings and got approved by Authority/Authority's representative before execution of work. Minutes of Meeting vide letter no. 04/01-2025/Rly.Bd dt. 13.01.2025 shall be strictly followed.
4. All unwanted materials and construction debris should be removed from the worksites on daily basis.

Special Conditions for Civil/Track Part of Work:

1. The SSE/Works and SSE/PW for the works shall be nominated by DRM/Works/JBP. The measurement of Civil work will be done by nominated Supervisor only.
2. The Civil/Track work shall be carried out under the supervision of the Engineering Department. Necessary measurement of Civil/Track works executed shall be done by Nominated Supervisor and test check by officer nominated by DRM/Works/JBP.
3. The Contractor shall be responsible for the correct setting out of all works in relation to original points, lines and levels of reference at his cost. The Contractor shall execute the work true to alignment, grade, levels and dimensions as shown in the drawing and as directed by the Engineer's representative and check these at frequent intervals. The Contractor shall provide all facilities like labour and instruments and shall cooperate with the Engineer's representative for checking of all alignment, grades, levels and dimensions. If, at any time, during the progress of the works any error appear or arise in any part of the work, the Contractor, on being required so to do by the Engineer's representative shall, at his own cost rectify such errors, to the satisfaction of the Engineer's representative. Such checking shall not absolve the Contractor of his own responsibility of maintaining accuracy in the work.
4. The Contractor shall carefully protect and preserve all bench marks, sight rails, pegs and other things used in setting out the work. he contractor shall also provide, fix and be responsible for the maintenance of all stakes, templates profiles, levels marks, points etc. must take all necessary precautions to prevent these being removed, altered or disturbed and will be held responsible for the consequences of such removal, alterations or disturbances should the same take place and fortheir efficient reinstatement.
5. The contractor shall make his own arrangements for water supply. Wherever it is convenient to theRailway Administration, the water from piped supply may be made

available to the contractor, provided the contractor shall arranged at his own expenses to effect the connection and lay addition pipes lines and accessories to the site of work and that the contractor shall not be entitled to any compensation for interruption or failure of the water supply. The contractor have to pay for such water supply or for supply from Railway well or tube wells at a rate of one percent on the amount of all items or work appearing in the bills payable to the contractor in respect of which work such water has been used by the contractor and such charges shall be deducted from sums due or payable by the railway to the contractor from time to time. Connections to labour camps will not be permitted.

6. The contractor shall make his own arrangements for the operation of mechanical equipment's required for the execution of work and / or for the purpose of lighting for working during day / night time. Wherever, it is convenient to the Railway Administration, the electric supply may be made available to the contractor provided the contractor shall arrange at his own expense to effect the connections and lay additional wiring provide meter and other accessories on the site. Such work of lying wiring etc. shall be done under supervision of a qualified staff and a certificate shall be required to be submitted to the effect that the work of wiring has been done as per rules or the work shall have to be got done through Railway Organization and the charges for the same shall have to be borne by the contractor as per extent rules.

7. The contractor shall not be entitled to any compensation for interruption or failure of the electric supply The contractor will have to pay for such electric supply from Railway at a rate agreed to between contractor and Railway Administration and such charges shall be deducted from the sums due or payable by the Railway to the contractor from time to time.

8. Water available locally in the wells cracks or nallahs may be blackish water at some locations. It should be noted that no sea or blackish water shall be used in the all classes of masonery reinforced and mass concrete work. In addition, water used for above work shall be free from earthy, vegetable or organic matter oils, acids and alkaline substances in solutions or in suspension and impurities and shall be fit for drinking.

9. The rates for all items of the schedule shall be inclusive of all arrangements for crossing an obstruction to be crossed in the course of the work over land or across water and the cost of providing and maintenance of approach / and / or service roads that may be necessary for bringing and removing the plants , machinery and material to and from the site of work including rent for use and / or compensation for damage if any to intervening private land traversed by such approach / service roads, and including cost of acquisition of land, if required for the purpose. The contractor will be permitted to make use of available service roads of the railway free of cost. Railway reserves the right to make use of the contractors service road without paying any charges to him.

10. The tenderer should note that the rates quoted shall embrace all operations necessary for the satisfactory completion of the work to finish and shall include all charged for handling, transport, lead, lift, labour, housing, sanitation, water supply materials fuel, tools, and plants electric power, workshop facilities, machinery security, lighting etc. and all other expenses of every kinds.

11. The contractors shall at all times, adopt such safe methods of working as will ensure safety of structures equipment and labour. Safety rules that should be adhered to are given as guidelines in Appendix 'A'. If at any time, the Railway finds the safety arrangements inadequate or unsafe, the contractor shall take immediate corrective action as directed by the Rly's representative at site. Any directions in the matter

shall in no way absolve the contractor of his sole responsibility to adopt safe working methods. The contractor is responsible for providing skilled personnel and adequate expert supervision so as to ensure complete safety.

12. The Contractor shall not carry out any work between sun-set and sun-rise without the previous permission of the Engineer. However, if the Engineer is satisfied that the work is not likely to becompleted in time except by resorting to night work, he may order the same without confirming any right on the Contractor for claiming any extra payment for the same.
13. The contractor shall give to the Municipality, Police and other authorities all notices that may be required by the law and obtain all requisite licences for temporary obstruction. Enclosures and payall fees, taxes, and charges which may be leviable on account of his own operation in executing the contract. He should make good any damage to adjoining premises whether public or private and provide and maintain any light etc. required in night.
14. Figures and dimensions on drawings shall supersede measurements by scale, and drawings to a large scale shall take precedence over those to a smaller scale.
15. No quarters will be provided by the railway for accommodation of the contractor or any of his staff employed on the work. The contractor may be allowed to erect any labour camps for housing the labour at or near the site work on available railway land. The contractor shall at his own cost make all necessary and adequate arrangements for the importation, feeding and preservation of thehygiene of his staff. The contractor shall permit inspection at all times, of all sanitary arrangements made by him by the engineer or his assistant or the medical staff of the Railway. If the contractor fails to make adequate medical and sanitary arrangements these will be provided bythe railway and the cost thereof, will be recovered from the contractor.
16. The contractor shall maintain in a readily accessible place first aid appliance including an adequate supply of sterilized dressing and sterilized cotton wool. The appliances shall be placed under the charge of responsible person who shall be readily available during working hours.
17. The contractor shall take all precautions against damages from accidents, floods or tides. No compensation will be allowed to the contractor for his tools, plants, materials, machines and other equipment lost or damaged by any cause whatsoever. The contractor shall be liable to make goodthe damages to any structure or part of a structure, plant or material of every description belonging to the Railway administration, lost or damaged by any cause during the course of contractor's work. The Railway administration will not be liable to pay to the contractor any charges for rectification or repairs to any damage which may have occurred from any cause whatsoever, to any part of the new structures during construction. No claims in this regard will be arbitral.
18. The contractor shall at all times be responsible for any damages or trespass committed by his agents and workmen in carrying out the work, unless such trespass is authorized by the Engineer
19. In the procurement, transport, storage issue and use of explosives the contractor shall abide by the specification and provisions incorporated in the IS Specification No. 4081 – 1967 and IS Specification No. 4756 – 1968 as amended from time to time. He shall also abide by all the rulesand regulations provided In the Indian Explosives Act 1984 amended from time to time and suchother acts and rules as may be enacted laid from time to time by the Government for such works.
20. Prior to carrying out any blasting the contractor shall obtain the concurrence of the engineers and shall be at all times bound to carry out his instructions regarding

provision of blanketing the type number size and placing and firing of charges. Where the blasting is to be carried out closed to running line, the engineer may restrict the sixes and number of shots to be fired at a time so that adjoining tracks and works are not adversely affected and so that the rock beyond the desired profile of the cutting etc. is not cracked or disturbed. Blasting in close proximity to track structures and power lines will be carried out only under traffic power blocks. For works near telephone or telegraph wires, the contractor must advise the engineer in good time, so that he can satisfy himself that safe working methods are being adopted. The contractor will only fire charges at the time notified to him by the engineer and will observe all precautions considered necessary as ordered by the engineer. The contractor will have no claim for damages or loss due to any delay established or claimed to have occurred to the progress of many part of the work as a result of obeying such instructions of the engineer or taking such safety precautions as to the ngineer mayorder to be taken from time to time.

21. The traffic and power blocks required for carrying out the blasting will be settled in advance and the contractor will be advised of the availability of blocks atleast 6 hours in advance. If however, the block could not be made available due to any reason whatsoever, the contractor will have noclaim for any loss.

22. Tenderers should note that their vehicles and equipment's can be drafted by the Railway Administration in case of accidents / natural calamities involving human lives"

23. No inflammable materials, such as petroleum oil, etc. within the meaning of the Indian Petroleum Act and Indian Explosives Act shall be stored at site or adjacent land until the approval of the Railway and necessary licence under the Act has been obtained bythe Contractor. All due precautions as required under the Act shall be taken by the contractor.

24. The contractor/s shall at his / their cost carry out all anti-larval works as per the Bye-lawsof the local authorities concerned or as may be directly by the engineer during the execution of the work under this contracts. If the contractor fails to carry out such work the railway may carry out the same and recover the cost, the fare from the contractor/s in the same wayas other Railway amount are recoverable.

25. Period of completion – The railway expects that a resourceful and experienced contractor should be able to complete the work in all respects within (As per milestones) after contractis awarded.

26. <u>SAFETY RULES:-</u>

1. Suitable scaffolds should be provided for workmen for all works that cannot safely be done from the ground or from solid construction except such short period work as can be done safely from ladders. When a ladder is used an extra labourer shall be engaged for holding the ladder and if the ladder is used for carrying materials as will, suitable foot-holds and hand holds shall be provided on the ladder and the ladder shall be given an inclination not steeper than ¼ to (1/4 horizontal to one vertical).

2. Scaffolding or staging more than 3.5 metres above the ground or floor swung or suspended from an overhead support or erected with stationary support shall have a guard rail properly attached bolted, braced and otherwise secured at least 1 meter high above the floor or platform of such scaffolding or staging and extending along the entire length thereof with only such opening as may be necessary for the delivery of materials. Such scaffolding or staging shall be so fastened as to prevent it from swaging from the building or structure.

3. Working platform, gangway and stairways should be so constructed that they should not sag unduly or unequally and where the height of the platform or the gangway orthe stairway is more than 3.5 meters above ground level or floor level they should be closely boarded should have adequate width and should be suitably fastened as described in the para above.

4. Safe means of access shall be provided to all working platforms and other working places. Every ladder shall be securely fixed. No portable single ladder shall be over 10 metres in length while the width between side rails in swung ladder shall in no casebe less than 300 mm for ladder upto and including 3.5 metres in length. For longer ladders this width should be increased by at least 20 mm. For each additional metre of length. Uniform steps spacing shall not exceed 300 mm ./ Adequate precautions shallbe taken to prevent danger from electrical equipment. No materials on any of the sides ofwork shall be so stacked or placed as to cause danger for inconvenience to any persons or the public. The contractor shall provide all necessary fencing and light to protect the public f rom accident, and shall be bound to bear the expenses of defence of every suit, action or other proceedings at law that may brought by any persons for injury sustained owing to neglect of the above precautions and to pay any damages and cost which may be awarded in any such suit action or proceedings to any such persons or which may with the consent of the contractor be paid to compromise any claim by any such person.

5. Demolition before any demolition work is commenced and also during the process of the work:-

(a) All roads and open areas adjacent to the work site shall either be closed or suitableprotected.

(b) No electric cable or apparatus which is liable to be a source of danger over a cable or apparatus used by the operator shall remain electrically charged.

(c) All practical steps shall be taken to prevent danger to persons employed from risk of fire or explosion of flooding. No floor, roof or other part of the building shall be so overloaded with debris or materials as to render it unsafe.

6. All necessary personal safety equipment as considered adequate by the Engineer in charge should be kept available for the use of the persons employed on the site and maintained in a condition suitable for immediate use and the contractor should take adequate steps to ensure proper use of equipment by these concerned.

(a) Workers employed on mixing asphaltic materials, cement and live mortar shall be provided with protective goggles.

(b) Those engaged in white washing and mixing or attaching of cement bags or any materials which is injurious to the eyes shall be provided with protective goggles.

(c) Those engaged in welding works shall be provided with welder's protective eye sight lids.

(d) Stone breakers shall be provided with protective goggles and protective clothing and seated at sufficiently safe intervals.

7. In case the contractors have to ply vehicles for the purpose connected with the contract adjacent to Railway track the Railway Administration will be at liberty to post an experienced staff as flagman for guidance of the movements such vehicles so as to prevent accidents and the contractor will bear wages including all etc. of the staff posted as flagman for the period of Contract for such periods during which such staff is posted for the purposes. The Rly Administration will be sole judge in the absolute discretion, ofthe fact that it is necessary to post any staff, that which of

the staff will be suitable for the purpose, that what should be the wages and other allowance payable by the contractor for staff posted for purpose. The Rly Administration will have a right without prejudice to other remedies to deduct the wages etc. of such staff from the bills of the contractor in respect of this contractor from any moneys or the contractor whatsoever available with the Railway Administration. The contractor will be liable for any over payments under Workman Compensation Act on account of any injury sustained to Railway servant during that period.

8. When the work is done near any place where there is risk of drowning, all necessary equipment should be provided and kept ready for use and all necessary steps taken for prompt rescue of any persons in danger and adequate provision should be made for prompt first aid treatment of all injuries likely to be sustained during the course of the work.

9. Use of hoisting machines and tackle including their attachment anchorage and supports shall conform the following standards or conditions.

(a) (i) These shall be of good mechanical construction, sound materials and adequate strength and free from patent defect and shall be kept in good repair and in good working order.

(ii) Every rope used in hoisting or lowering materials or as a means of suspension shall be of durable quality and adequate strength and free from patent defects.

(b) Every Crane driver or hoisting appliances operator shall be properly qualified an no person under the age of 21 years shall be incharge of any hoisting machine including anyscaffolding.

(c) In case of every hoisting machine and of every cabin ring, shackle, swivel and pulley block used in hoisting or as means of suspension safe working load shall be ascertained by adequate means. Every hoisting machine and all gear referred to above shall be plainly marked with in the safe working load.

In case of hoisting machine having a variable safe working load, each safe working load of the conditions under which it is applicable shall be clearly indicated. No part of any machinery or any gear referred to above in this paragraph shall be loaded beyond the safe working load except for the purpose of testing.

(d) In case of departmental machine the safe working load shall be notified by the Electrical Engineer in charge. As regards contractor's machines, the contractor shall notify safe working load of the machine to the Engineer in charge whenever he brings any machinery to site of work, get it verified by the Electrical Engineer concerned.

10. Motors, gearing transmission electric wiring and of the dangerous part of hoisting appliances should be provided with efficient safe guards, hoisting appliances should be provided with such means will as reduce to the minimum the risk of accidental descent of the load, adequate precautions should be taken to reduce to the minimum the risk of any part of a suspended load becoming accidentally displaced. When workers are employed on electrical installations which are already energised insulating mats, wearing apparel, such as gloves, sleeves and both as may be necessary should be provided. The workers should not wear any rings, watches and carry keys or other materials which are goods conductors of electricity.

11. All scaffolds, ladders and other safety devices mentioned or described herein shall be maintained in safe condition and no scaffold ladder or equipment shall be altered

or removed while it is in use. Adequate washing facilities should be provided at or near places of work.

12. These safety provisions should be brought to the notice of all concerned display on a notice board at a prominent place at the work spot. The persons responsible for compliance of the safety code shall be named herein by the contractor.

13. To ensure effective endorsement of the Rules and Regulations relating to safety precautions, the arrangements made by the contractor shall be opened to inspection by Labour Officer / Engineer in charge of the department or their representative.

14. Notwithstanding the above clause from (1) to (12) there is nothing in these except the contract or the operation of the any other act of rules in force in the Republic of India.

27. Special Condition Regarding cement and steel to be provided by the contractor.

1. Cement and steel for use in the work should be procured by the contractor from the main producers/their authorised dealers/authorised stock yards should conform to latest IS Specifications.
I.CRS, TMT-415 or 500 STEEL BAR CONFORMING TO IS 1786-1985.

2. Cement bags preferably in paper bags to packing should bear the following information in legible markings :-

i) Manufactures's name.
ii) Registered trade mark of manufactures, if any.
iii) Weight of each bag in Kgs or no. of bags/tonne.
iv) Date of manufacture, generally marked as week of the year/year of manufacture e.g. 30/93 which means 30th week of 1993.
v) Type of Cement.

3. To ensure quality control, test certificate from the manufacturer should be produced by thecontractors which should conform to the relevant latest specifications.

4. Railways may also take samples during the course of work and get the cement andsteel tested to ascertain their conformity to specifications.

5. The Sampling should be as per IS Specifications.
6. Tests on the samples will be carried out in the field should be as given below.

Tests on cement to be as per IS 4031, same of the tests which may be carried out are :-

i) Comprassive strength.
ii) Initial and final setting time.
iii) Consistency.
iv) Soundness.
v) Test on steel samples will be carried out as per IS Specifications.

Note :- Test Certificates for cement and steel shall be produced by the contractor. (Senior Divisional Engineer (Co-rd)'s Office Note No. JBP/W/RATE/T.14 DATED 18.10.2004)

"All the material required for execution of the work shall be from reputed manufactures/brands conforming to standard Railway specification/IS specifications and

duly approved by engineering incharge or his representative. Offer of any other quality shall be summarily rejected "

Debris :-All debris from the work site will be disposed by the contractor at his own cost.

Note:

All works will be executed as per latest IR Signal Engineering Manual Telecom Manual, RDSO Guidelines, West central Railway practices and above given specifications and drawings. If no such guidelines are available or if there are any deviations then the prior approval of the Authority Engineer will be mandatory before installation or execution of works.

Items where RDSO approved sources are available should be procured from RDSO approved sources and should be inspected by RDSO as per the Inspection Policy of RDSO. Critical itemsshall be inspected by RDSO asper RB's L/No. 74/RS(G)/379/2 Pt. Dated 04/03/91 & 18/06/91.For items other than critical items RB's L/No. 2000-RS (G)/379/2 dated06/09/2017to befollowed.

Inspection certificates from the RDSO/ RITES to be submitted to authority before supply & Installation.

Items with specifications not mentioned or any discrepancy/deviation in specification of any items should be supplied and installed only after approval of the Authority's Engineer.

SECTION – II: MINIMUM SCOPE OF WORK

1.0 This project is for Provision of KAVACH in the entire sections of JBP division described in Section-I. The overview of the project requirements has also been furnished in the previous section.

1.1 The work is to be executed as per provisions of the Indian Railway Signal Engineering Manual (IRSEM) with latest correction slips, Specifications of the systems & latest guidelines issued by Railway Board & RDSO, approved Signalling Plans and WCR's guidelines (if any).

1.2 **Quantified Scope of work for KAVACH:**

SN	Description of work	Detailed scope of work of KAVACH (Train Collision Avoidance System) along with CAB signalling								
		Details of block section		On Board Loco KAVACH Equipment, Antenna, Tacho meter etc.	Stationary/LC/IBS KAVACH equipments				section	Block section
		From (KM)	To (KM)		Wayside station	Junction station	IBS KAVACH/RIU	LC KAVACH/ RIU		
1	Survey, design, supply, installation, testing, manuals for new technology equipment installed for each place, supply of completion drawings, and commissioning of KAVACH (Train Collision Avoidance system)	ITARSI-MANIKPUR, Mahdeiya -BINA MALKHEDI-MAHADEOKHERI, Entire KATNI Complex, BINA MALKHEDI-AGASOD, SATNA-REWA, KAIMA- SAGMA, BANSAPAHAR – OHAN		32	97 stations through S-Kavach	11 Junction stations through S-Kavach	46 IBS KAVACH	06 LC KAVACH + 55 through RIU)	**Third Line** section NMWP-GEA, BNU-ANA, PHA-MAKR) **Double line** between ET-MKP, GEA-BNU, ANA-PHA, KTE-BEHR, JOBA-GNDI, STA-HNM, TZR-REWA) **Single Line** (HNM-TZR, BEHR-JOBA)	Complete Absolute Block section except Automatic Block section in Baghora-MAKR
2	Inventory for KAVACH: 2.1 NMS along with accessories 2.2 KMS for communication between Stationary KAVACH & OB KAVACH: KMS server configuration/ integration in existing KMS server for KAVACH 2.3 Simulator/Lab Model for Station equipment, Loco equipment, trackside components-------02 2.4 Test Bench for Station KAVACH--------01 Test Bench for Loco KAVACH--------02 2.5 Measuring Equipment for Station ----------05 2.6 Tool Kit for Configuration for RFID Tags. Toolkit should be complete in all respects of both hardware and software, such that any alteration or configuration can be done by Railway Personnel ...11 2.7 e-learning Manuals for Station & Onboard....05 set 2.8 Aerial Videography (UAV-Drone) Record .....10 set 2.9 Drawing & Documentation..... 06 set per site(station/LC/IBS								Supply of spares Quantity with unit • 10% spares with minimum of 1 nos shall be provided at card/module level for each type of card/module for each LC/IBH/STN KAVACH/On Board KAVACH, RIU units etc • 20 % spares for RFID tags and Relays • Spares shall be provided at Signal Depot at JBP, Katni, Satna, Damoh for works of S&T Project JBP unit. These spares are in addition to fully wired and equipped KAVACH provided at Stations/LC gates/IBS/ LOCOs and spares as specified vide RDSO specifications.	

	KAVACH& each RIU) 2.10 Training to Railway officials .. as mentioned in document. 2.11 Application Safety Case .. 01 set . 2.12 Interfacing material of all sorts.. 01 lump sum 2.13 Lightening & surge protection arrangement... At every KAVACH location (Station, LC & IBS) 2.14 Setup of FAT facility for KAVACH system design testing at Katni and Jabalpur. 2.15 PC console along with hardware for entering PSR Data 2.16 Provision of all documents & Drawings for WPC & SACFA clearance. 2.17 Provision of all documents related to Wildlife/Forest Clearance Note: 1.Any other work or supply which is required for successful commissioning of KAVACH shall be provided free of cost by the Contractor.		
3	Integrated testing and commissioning	Complete section –All stations, LCs, IBH, RIU & Loco KAVACH	

Note: As work of third line is in progress in KMZ-BINA section and is expected to complete before execution of Kavach works, hence, estimated cost of project includes the requirements of 3rd line between KMZ-BINA. Similarly, estimated cost of project included complete system requirements as per Double line between NKJ-Mahdeiya and STA-REWA section where work of Double line is in progress. Addional amount on this account is not payable.

NOTE: These requirements are only indicative & may change as per actual survey and design of KAVACH system.

SECTION – III: GENERAL REQUIREMENTS

3.1 All associated materials and works for completion not limited to items in the above table as required for execution of the Signalling/Kavach works to suit 25 KV has to be provided by the Contractor.

3.2 All these requirements are only indicative & may change as per actual design of Indian Railway Automatic Train Protection system.

3.3 The work shall be carried out according to the drawings approved by the Railway and shall conform to the provisions of the "Indian Railways Signal Engineering Manual" with latest correction slips and "Indian Railways Schedule of Dimensions" as modified from time to time unless deviation, if any, are specifically approved by the Authority Engineer. The contractor shall be solely responsible for proper execution of the work as per the said deviation and specifications.

3.4 No work on a working installation, e.g. signal, track circuit etc. should be undertaken without permission and presence of authorized representative of the Authority Engineer.

3.5 All materials and equipment to be supplied and used in execution of the work should conform to IRS/IS with latest amendments wherever applicable.

3.6 All drawings/specifications shall be read with latest alterations.

3.7 All the test reports shall be signed by the contractor's Engineer.

3.8 The Contractor shall transport all the released materials to railway depots nominated by the Authority's Engineer.

3.9 All the materials required for execution and successful completion of Kavach work shall be supplied and installed by the contractor unless specified otherwise and specifically mentioned.

3.10 On completion of above works, testing and commissioning of entire system in totality shall be carried out by the Contractor.

3.11 Painting color scheme of newly installed signal posts and fittings, apparatus cases etc. shall be as per provisions of IRSEM.

3.12 Double locking arrangement is to be provided at each ABS hut RR, LC/IBH service building RR and RR extensions at stations.

3.13 E-type lock is to be provided at steel door (Door D1 in the drawing (Annexure-1C) of ABS hut.

******

SCHEDULE - C
(See Clause 2.1)

PROJECT FACILITIES

1.0 SITE FACILITIES FOR THE EMPLOYER AND THE ENGINEER

1.1 GENERAL

1.1.0 The Contractor shall provide for the use of the Employer/Engineer office accommodation, equipment, communication & drawing facilities throughout the course of the work and for such period of time during the defects liability period as the employer & Engineer may require, The details of the accommodation & the other facilities are detailed below:

1.1.1 All the facilities under this clause will continue to be maintained by the Contractor free of cost till the defect liability period is over. There after the Contractor shall dismantle the building and take away all the materials, office furniture, & equipment etc which will be the property of the Contractor.

1.2 SITE OFFICES

1.2.1 Accommodation for the Employer/Engineer shall consist of Eight offices (one main office at Jabalpur and Seven site offices one each at Narsinghpur, Katni, Satna, Sagour, Damoh, Beohari and Bargawan or as decided by the authority) to be constructed by the Contractor at a place in the Section with approval of railway authority. Main Office at Jabalpur and site office at Narsinghpur to be provided within 30 days from date of issue of LOA. Site office at Katni and Satna to be provide within 15 days of commissioning of Kavach in Itarsi-Katni section or within 15 days of commencing of work for Katni-Manikpur section whichever is earlier. Site office at Saugor & Damoh to be provide within 15 days of commissioning of Kavach in Katni-Manikpur and Satna-Rewa section or within 15 days of commencing of work for KMZ-MAKR section whichever is earlier. Site office at Beohari and Bargawa to be provide within 15 days of commissioning of Kavach in KMZ- MAKR section or within 15 days of commencing of work for KTE-SGRL section whichever is earlier.In case of delay within the specified period in schedule-I, the Contractor shall pay Damages to the Authority as per the clause 10.3.2.

1.2.2 The site office should remain open for 24 hours a day and 7 days a week i.e. round the clock till the defect liability period is over.

1.2.3 The minimum area requirement for main office:

Office will be provided with the following rooms: SITE OFFICE for Engineer/Employer to be constructed by Contractor	**Area required (Sq. m)**
Site officer of Railway/ Project Manager/	16
Site officer of Railway /Resident Engineer	16
Conference Room	20
Office staff / Computer/Drawing Office of PMC.	16
Pantry area	10
Toilets (02 Nos-Minimum)	5 each
Total Area in Sq m.	88

1.2.4 The minimum area requirement for site offices:

Office will be provided with the following rooms: SITE OFFICE for Engineer/Employer to be constructed by Contractor	**Area required (Sq. m)**
Site officer of Railway/ Project Manager/	16
Site officer of Railway /Resident Engineer	16
Office staff / Computer/Drawing Office of PMC.	16
Pantry area	10
Toilets (02 Nos-Minimum)	5 each
Total Area in Sq m.	68

1.2.5 Materials used for the construction of the offices shall be new and of good quality.

Materials shall be chosen such that the buildings when erected shall give good ventilation, heat and sound insulation. Alternate hiring accommodation in commercial complex can also be made with approval of railway authority. Hired accommodation in commercial complex is acceptable but of the given specifications or better, meeting minimum area requirement.

1.2.6 All buildings shall be supplied with continuous (24 hour) running potable cold water to the wash rooms. The toilets may use raw water for flushing. The Contractor shall also arrange for the constant and hygienic disposal of all effluent, sewage and rubbish from the buildings.

1.2.7 All buildings shall be supplied with electricity, AC 240 Voltage 50 Hz that shall be distributed to each room in accordance with the Regulations. Lighting and electrical power points shall be provided in each room. The disposition and location of light and power points will be as directed by the Engineer. 24 hours power supply is to be arranged by contractor to meet full power load. Fans and coolers etc will be provided as decided by the engineer. Rooms for officers of railway / PMC manager, Resident Engineer, Conference room shall be provided with Air conditioners with appropriate capacity. Each office shall have arrangement of water purifier for drinking water.

1.2.8 Fire fighting equipments shall be provided in accordance with the local recommendations.

1.3 FURNITURE AND OTHER OFFICE EQUIPMENT

1.3.0 The Contractor shall supply and maintain the following new furniture and equipment to the Main office and site office at the time as specificed in clause c (2.1) above until the defect liability period is over:

1.3.1 The following items to be provided at each office. However, the conference table and chairs to be provided only at main office.

Description of Item	**Nos.**
Conference table (3000 mm x 1200 mm)	1 (Main office only)
Conference chairs	12 (Main office only)
Glass-fronted lockable bookcase	2
1500 mm x 900 mm double pedestal desk	2
1200 mm x 900 mm single pedestal desks	3
Swivel office chair with armrests	2
Swivel office chair without armrests	3
Typist chair	2

Visitors chair	2
4-drawer filing cabinet	1
1500 mm x 900 mm tables	3
Steel lockable cupboard 6ft high with internal shelves	1
Heavy Duty Paper Shredders	1
First aid kits for up to 30 persons	1
Safety helmets	15
Safety harness	15
Day-glow waistcoat	15
5L kettles	1
2L kettles	2
Potable water dispenser with hot/cold Taps	1
Cups and plates	20
Fire extinguisher	(As required confirming to the stipulations of Local authorities)
Silent DG set of minimum power of 10 KVA	1

Note: In case of failure to provide the equipments within the specified period in schedule-I, the Contractor shall pay Damages to the Authority as per the clause 10.3.2.

1.4 OFFICE MAINTENANCE

1.4.1 The contractor is required to maintain the offices throughout the contract period and provide the following, but not limited to:

a) Pay all electricity charges.

b) Pay all water charges.

c) Carry out necessary repairs to office and equipment as and when required.

d) Day - to - Day cleaning and maintenance and watch & ward etc

1.4.2 The contractor shall provide within time as specificed in clause c(2.1) above following personnel in the main office and site office as required for watch and ward of the site office.

Watchmen / Security (in shift duty till the defect Liability period is over)

Note: In case of delay beyond the specified period in schedule-I, the Contractor shall pay Damages to the Authority as per the clause 10.3.2.

1.4.3 **EQUIPMENT FOR USE OF THE ENGINEER AT MAIN OFFICE AND SITE OFFICE:**

The Contractor shall provide new equipment and software as listed below and maintain them for the exclusive use of the Employer and the Engineer. The Contractor shall provide and maintain the following equipment for the use of the Engineer and the Employer within time as specificed in clause c(2.1) above until the defect liability period is over. The equipmemts to be provided at main office and site offices shall be in serviceable condition till defect libility period and any extensions thereof governed by EPC contract. On completion of defect liability period, the equipment shall be property of the Contractor. These items have to be provided at each office.

Per office equipment requirement are as follows:

(a)	Desktop Computer three nos.	With minimum specification of Intel Core i7, 3.4 GHz, 3 MB Cache, 16 GB DDR4 RAM, 500 GB SSD, DVD Writer, 23.8" FHD LED monitor or better, 10/100 LAN Card, Modem Card Operating System - Windows 11 Professional or higher preloaded with media and documentation and certificate of authenticity and Microsoft Security Essentials preloaded antivirus software or better. All S/W should be licenced only.
(b)	Laptop rugged – two Nos.	With minimum specification of Intel Core i7, 8GB DDR4 RAM, 500 GB SSD, 14" color display, 2xUSB-3.0, HDMI port-1, standard keyboard and mouse Weight - not more than 2.5 kg, Battery backup - minimum 4 hrs Operating System - Windows 11 or higher preloaded with media and documentation and certificate of authenticity and Microsoft Security Essentials preloaded antivirus software. All S/W should be

		licenced only. A laptop bag and Adapter/Battery charger shall also be provided with the laptop.
(c)	Printers cum scanner – 2 nos. (A4 size without scanner– 1 No. and A3 size with scanner – 1 No.)	The A4 size printer shall be all in one laser and Printer, A3 size printer shall be Colour Office jet with a print speed of up to 8 pages at 800 dpi or More. A3/A4 Papers of minimum 80 GSM for Printing of reports/design documents etc. also to be provided.
(d)	Television-1 no	4K HD LED TV of 55 inch display size.
(e)	Application software (Authentic licensed versions only)	(i) Microsoft office 2021 or latest release. (ii) AUTOCAD 3D 2015 or latest (iii) M S Project/ Sure Track. (iv) PDF Converter/Professional
(f)	Xerox Machine- 1 No. for paper prints capable of reduction and copying A3 & A4 size paper with automatic document feeder capability and sorter. (Canon IR 2020 or similar/ better)	
(g)	UPS system with sufficient power backup (with minimum backup time of 30 minute) to meet the sufficient power load in case of power disruption.	
(h)	Surge Protection Devices (one for each computer and printer as given above)	
(i)	Power supply for the systems is to be AC 240 volts, 50 Hz from normal building wiring circuit mains, power regulator, stabilizer or transformer should be supplied by the Contractor for the computer systems such that the systems can function efficiently.	
(j)	300 MBPS internet connection with wifi facility so that multiple devices can be connected.	

Note: In case of failure to provide the equipment including original software & internet connectivity within specified period in schedule-I, the Contractor shall pay Damages to the Authority as per the clause 10.3.2.

1.5 Civil works, signalling and telecom

a) Project network with project monitoring software like licenced MS project along with closed user telecom group, fax and e-mail facilities and mobile communication network for project monitoring. All minidiagrams are to be provided within 1 month of date of issued of LOA

b) Civil work will also include Service Building, Construction of Masonry Huts at Automatic Huts Location, relay room extensions at stations, S&T service buildings LCs/IBHs. Electric supply installation in constructed structure, Breaking of RCC concrete in Relay Room / Panel Room for drawing cables etc & repairing after laying of cables.

Railway electrification

a) Danger and caution boards
b) Protective screens
c) Earthing arrangement for structures

2.0 Contractor's Project Organisation

The content given below is for guidance only. It can be modified as per requirement of Authority.

2.1 The Contractor is fully responsible for ensuring quality of construction, supervision of the works being executed by him. He has to deploy adequate number of personnel from his side in order to complete the work within the completion period and also to maintain the infrastructure created under this work till defect liability period. Please refer para 3.4 of Article-3. However, the Contractor(s) shall employ following minimum number of Technical personnel during the execution of the allotted work as per table below. This list is indicative and not exhaustive. Additional manpower as required from time to time to be deployed as per progress for ensuring supervision, quality control etc. Apart from the key personnel mentioned below, the Agency has to engage required number of skilled and un-skilled workers to complete the work within the stipulated time and to meet the targets of the project.

S.No	Title of Position	Nos	Minimum Experience in relevant field (in years)	[Scale check]	Minimum Qualification
1	Project Head	1	15		B. Tech (Civil Engg.)
2	PMs for Civil, S&T, Electrical	5	10	3 for S&T and 1 each for Civil & Electrical	B.Tech/ diploma in relevant field.
3	Safety Consultant	1	10		Science/Engineering Graduate. Refer para 10.2.11 under Article-10

S.No	Title of Position	Nos	Minimum Experience in relevant field (in years)	[Scale check]	Minimum Qualification
4(a)	Quality Assurance Engineer/Civil	1	10	For entire project.	B.Tech/ diploma in relevant field.
4(b)	Quality Assurance Engineer/S&T	1	10	For entire project.	B.Tech/ diploma in relevant field.
4(c)	Quality Assurance Engineer/Electrical	1	10	For entire project.	B.Tech/ diploma in relevant field.
5(a)	Site Engineer (Civil)	2	5	As per no. of active work sites.	B.Tech/ diploma in relevant field.
5(b)	Site Engineer (S&T)	5	5	As per no. of active work sites.	B.Tech/ diploma in relevant field.
5(c)	Site Engineer (Electrical OHE)	1	3/5	As per no. of active work sites.	3 Yrs for B. Tech & 5 Yrs for Diploma in relevant Field
5(d)	Site Engineer (Electrical PSI)	0	3/5		
5 (e)	Site Engineer (Electrical GS)	0	3/5		
6	Asst. Site Engineer	0	2		Diploma in relevant field.
7	Computer Operator with knowledge of Software like Trimble Tilos or equivalent, AutoCAD, Microsoft Office, etc	2	5		Graduate
8	Design Engineer (S&T)	3	2	For entire project.	Diploma/B.Tech in relevant field.

{NOTE: Data in column 3 above shall be filled for personnel at Serial no: 2, 4, 5 & 6 as per the scale check and length of the project being tendered for. If S&T/Electrical works are not included, requirement of respective site engineers and quality assurance engineer to be omitted.}

NOTE: It is expected that incumbent at Sr. no. 5(c) can look after the duties of incumbents defined for Sr. no. 5(d) & 5 (e). However, contractor can deploy incumbents separately for Sr. no. 5(c), 5(d) & 5 (e) as per requirement of the project execution.

3.2 The Personnel shall be deployed throughout the Contract period during the execution of work. However, the deployment schedule of these Engineers shall be as per the plan submitted by the Contractor and approved by Authority Engineer. Deployment of these personnel will not absolve the Contractor from his responsibility of proper supervision of work.

3.3 Sufficient number of personnel to assist the personnel at S. No.-3,4,5 shall be deployed fulfilling the requirement of Article 11 of the EPC document

3.4 In case the Contractor(s) fails to employ the Contractor's personnel aforesaid above, he shall be liable to pay an amount given below for the default period:

(i) Rs. 200,000/- per head per month for Sr.No. 1
(ii) Rs. 100,000/- per head per month for Sr.No. 2 ,3 & 4
(iii) Rs. 50,000/- per head per month for Sr.No. 5 & 6
(iv) Rs. 40,000/- per head per month for Sr.No.7 & 8

3.5 The Contractor shall submit the copy of Bio-data and Degree/ Diploma certificate of the above technical staff employed by him for the scrutiny by Authority Engineer and the same will be approved by Authority Engineer and shall be available during the currency of work execution for record purpose. Authority Engineer reserves the right to scrutinise the records of the Contractor to ascertain as to whether the qualified staff has been actually employed by him and is paid for.

3.6 The contractor's technical personnel should work in cohesion with Authority Engineer's personnel.

The agency shall provide adequate personnel to facilitate the PMS engineers in collecting samples, in conducting various quality control tests, in carrying out survey works, in checking measurements, facilitating site inspections, etc. as required.

SCHEDULE - D

(See Clause 2.1)

SPECIFICATIONS AND STANDARDS

1 Construction

The Contractor shall comply with the Specifications and Standards set forth in Annex-I of this Schedule-D for construction of the Railway Project. The time limit for the review and clearances by the Authority for design and drawings submitted by the Contractor shall be as indicated in Annexure-II.

2 Design Standards

The Railway Project including Project Facilities shall conform to design requirements set out in the following documents:

[Indian Railways Permanent Way Manual, Indian Railway Bridge Manual, Indian Railway Schedule of Dimensions & relevant IRS Specifications referred in the Manual, Indian Railway Signalling Engineering Manual, Indian Railway Telecom Manual, & relevant IRS/RDSO Specifications referred in the Manual, AC Traction Manual, Rules for Opening Railways]

[Note: Specify the relevant Manual, Specifications and Standards]

3 Latest Version

Latest version of the Manuals, Specifications and Standards including the amendments notified/published by the Base Month shall be considered applicable.

4 Terms used in Manuals

The terms [‘Inspector’, ‘AEE’, ‘DE’] used in the Manuals shall be deemed to be substituted by the term “**Authority Engineer**”; to the extent it is consistent with the provisions of the Agreement.

5 Absence of specific provision

In the absence of any specific provision on any particular issue in the aforesaid Manuals, Specifications, or Standards, the following standards shall apply in order of priority

[Bureau of Indian Standards (BIS)

Euro Codes or British Standards or American Standards

Any other specifications/standards proposed by the Contractor and reviewed by the Authority Engineer.]

6 Alternative Specifications and Standards

6.1 The requirements specified in the Manuals are the minimum. The Contractor shall, however, be free to adopt international practices, alternative specifications, materials and standards to bring in innovation in the design and construction provided they are better or comparable with the standards prescribed in the Manuals. The specifications and techniques which are not included in the Indian Railway Manuals/ RDSO specifications shall be supported with authentic specifications and standards specified in paragraph 5 above. Such a proposal shall be submitted by the Contractor to the Authority Engineer. In case, the Authority Engineer is of the opinion that the proposal submitted by the Contractor is not in conformity with any of the international standards or codes, then he shall record his reasons and convey the same to the Contractor for compliance.

6.2 In case, the Contractor is offering an alternative product which is not as per the designs/specifications stipulated in this Agreement, but the same is already in the use with satisfactory performance in one or more major world Railway(s) for more than 5(five) years for the same or higher design speed/rating (as applicable for project line), such product can be permitted to be used by the Authority Engineer in accordance with the Cross Approval policy of the Railway Board as existing at the time of offering of such product. The products covered for the purpose of this clause shall be as per the list provided in the policy.

Annex - I

(Schedule-D)

Specifications and Standards for Construction[19]

1 Specifications and Standards

All Materials, works and construction operations shall conform to the following manuals:

1.1 For civil works:

(a) Indian Railways Permanent Way Manual

(b) Indian Railway Bridge Manual

(c) Indian Railway Schedule of Dimensions

(d) The relevant IRS Specifications referred to in the above documents listed at (i), (ii) and (iii)

(e) Specifications of Works of concerned zonal railway

(f) In case of any contradiction in the various codal provisions, the order of precedence shall be as follows:-

aa) Provisions of this Annex I.

bb) IRS Codal provisions

cc) IRC Codal provisions

dd) IS (BIS) Codal provisions

1.2 For signalling and telecommunication works:

(a) Indian Railway Signal Engineering Manual for signalling; and

(b) Indian Railway Telecom Manual for telecommunication works.

(c) Latest IRS / RDSO specifications.

(d) RDSO specification RDSO/SPN/196/2020 Version 4.0 or latest.

(e) Advisory Note SIGOTCAS (TAN)/01/2021 version 2.0, dated 18.10.2021 or latest.

(f) If RDSO approved vendor is available for a material, then all materials to be procured from RDSO approved firms with RDSO specification irrespective of value of item.

(g) List of WCR /RDSO/Railway Board drawing are attached separately. If any drawing is not available, they can be obtained from Dy CSTE/Project office, Jabalpur.

(h) In case of any contradiction in the various codal provisions, the order of precedence shall be as follows:-

---

[19] Deleted

aa) Provisions of this Annex I.

bb) IRS Codal provisions

cc) IRC Codal provisions

dd) IS (BIS) Codal provisions.

(i) Inspection of material

(a) The Electrical Signaling materials, to be supplied by the Tenderer as per RDSO's / Specification /Drawing appearing in the critical list contained in Railway board L. No. RDSO's letter No. 99/RS (IC)/165/SRC Pt 1. Dated 06.03.2012 or latest will have to be procured from RDSO firms only and will be supplied duly inspected by RDSO irrespective of value. This list of critical signaling items is given below:

i. All types of signalling relays;
ii. Block instruments;
iii. Axle counter equipments;
iv. Signal machines;
v. Point machines;
vi. Colour light signal transformers
vii. Electrical signal lamps;
viii. Voltage stabilisers and other power supply equipment.
ix. Electric signal reversers;
x. Signal roundels and lenses;
xi. Electric lever lock and circuit controller.
xii. Circuit controller;
xiii. Electric key transmitter;
xiv. Fuses, Fuse Block & Terminal blocks (PBT Type);
xv. Electric Point and lock detector

(b) Electrical Signaling materials, other than those included in the critical list mentioned above, to be supplied by the Tenderer and as per RDSO's/ specifications/ drawings will have to be procured from RDSO approved firms only and will be supplied duly inspected by RDSO if the value of the items is more than 5.0 Lakh and by Consignee if the value of the item is less than 5.0 lakh. However, the electrical signaling materials as per RDSO specification/drawing contained in' Railway Board letter No. L. No. RDSO's letter No. 99/RS (IC)/165/SRC Pt 1. Dated 06.03.2012, shall have to be inspected at officers level only irrespective of value of item, in case of consignee inspection, if inspection of such item is not undertaken by RDSO & RITES.

(c) All mechanical signaling items are to be procured from valid recommended list of firms for manufacture and supply of mechanical signaling items issued by RDSO, Inspection of such Mechanical Signaling items is to carried out by RITES.

(d) For Signaling items, where IS specification are stipulated the inspection shall be carried out by RITES, when the value of the item as per Schedule is more than 5 lakh and by Consignee when value of the items as per schedule is less than 5 lakh.

(e) All other signaling items and items of general nature for which RDSO/IS specification is not stipulated shall be inspected by RITES if value is more than Rs. 5 lakh, except those items covered under para (f) below and shall be inspected by consignee if value is less than Rs.5 lakh.

(f) Signaling items, Panel which are layout and station specific and which are manufactured and supplied only after the schematic Panel Diagram is approved by Headquarter Design Office and where functionality, specific to the yard layout, are to be checked by consignee, shall be inspected by RDSO/RITES/Consignee irrespective of value.

(g) (i) In case of deviation from the above, in inspection clause for scheduled signaling items is considered necessary, approval of Head Quarters (Open line/Construction) shall be obtained, giving full justification by the field unit.

(ii) (a) Whenever equipments/materials as per IS specification in schedule are inspected by Authorized Representatives of the Railways/ Consignee, the tender will be required to furnish manufacturer's Guarantee Certificate along with test certificate in addition to his own warranty certificate.

(b) For equipments/materials as per IS specification, if the consignee after verifying all the documentary evidence, visual inspection, measurement of dimension /key electrical parameters as per applicable and any other checks as per facility available with him, is not fully satisfied and if he considers necessary, he can direct the samples to be tested with approval of Authority Engineer as per the specifications given in the schedule in a laboratory. The laboratory will be approved by Engineer in charge and shall be a BIS approved laboratory.

(c) All expense towards test charge shall normally be borne by Railways. However, if the samples are found inferior when compared to stipulated specification / drawing, the test charges will be borne by the contractor.

(iii) All other equipment/ material, where neither RDSO/IS specification are stipulated, and which are to be supplied with consignee inspection shall be procured from manufacturers of repute / their authorized dealers. In such cases, if the Tenderer is not able to furnish manufacturer guarantee certificate and test certificate for e.g. for items being procured through open market, the Tenderer shall furnish his guarantee & warranty for these items.

(iv) The Railway shall have full power to reject any material that it may consider be defective or inferior in quality, workmanship or otherwise not in accordance with the specification and the Railway's decision will be final, even though they might have been inspected by RDSO/RITES. The Tenderer shall remove forthwith any such material rejected and replace them promptly at his own cost. Inspection Charges of RDSO and RITES will be borne by the Railways.

(v) For telecom items, the following guidelines issued by Board vide their L.No. 2006/ Tele/TC /I dt.17.04.2006 shall be adhered to:

(a) All the materials with TEC/BSNL specification and procured from TEC/BSNL approved firms (approved for bulk supply and not as interface approval) shall also be inspected by RDSO provided the cost of the material is more than Rs 5 lakh.

(b) All the materials with TEC/BSNL specification and procured from sources not approved TEC/BSNL (including firms having only interface approval) shall also be inspected by RDSO provided the cost of the material is over 5 lakhs. However, in such cases RDSO shall carry out prototype approval before taking up regular inspection.

(c) Sophisticated telecom items as an exception can also be taken up for inspection by RDSO as per Railway's specification. The approval acceptance test format shall have to be supplied by Railways duly approved by the competent authority.

(d) RDSO shall not inspect Test Measuring equipments, Electronic exchanges/ intercom auto telephones and spare parts of all telecom equipments. The same may be inspected by Railway's representative as nominated by Zonal Railways.

(vi) A separate contract wise register must be maintained where record of consignee inspection carried out like visual check, measurement of dimensions / key electrical parameters wherever applicable and any other checks as per facilities available, should be entered by the consignee, for consignee inspected items.

(h) List of specifications

SN	Description	RDSO Specification No.
1	**Station /Loco/IBS/LC gate KAVACH Equipments**	RDSO/SPN/196/2020 Version 4.0 or latest.
2	**Cables & OFC Backbone for KAVACH**	OFC- RDSO/SPN/TC/110/2020 Revision - 0. QUAD-IRS:TC 30/2005 Amdt. 5
3	Maintenance Free Earth	RDSO Spec: RDSO/SPN/197 Version 1.0
4	24/48F Armored OFC cable	RDSO Specification No. RDSO/SPN/TC/110/2020 Rev-0.0 or latest.
5	HDPE duct	RDSO/SPN/TC/45/2013 revision 2.0 or latest.
6	Power cable 2C x 25 sq. mm	IRS. S.63/2014 Rev 4.0 and IS.1554 part I (Rev 4.0) or latest.
7	6 Quad cable	IRS:TC 30-2005 Ver 1. with amdt. 5 or latest
8	48F OFC Joint enclosure	TEC/GR/TX/OJC-002/03/APR-2010
9	FDMS	RDSO/SPN/TC/37/2020 Rev.4 or latest
10	IP MPLS	RDSO TAN No STT/TAN/IP-MPLS/2020 or latest
11	48 V SMPS charger	RDSO/SPN/TL/23/99 (ver.4) with latest amendments
12	200 AH MF VRLA battery	RDSO specn. S-93-96(A) with latest amendments
13	24V Battery charger	RDSO/SPN/IL/23/2008 or latest amendment.
14	Mini OTDR	TEC/GR/TX/OTD -002/04/AUG 2019 with latest amendments.
15	Power meter	TEC GR No. G/OPM/01/03 Feb 2005
16	Splicing Machine	G/OSM/ 01/02 May 99 or latest amendment.
17	OFC Tool kit	TEC Specification No. GR/OFT-01/03 APR 2006 with latest amendments
18	LAN Extender	RDSO/SPN/TC/82/2020/Rev. 2.0 or latest amendments.
19	Thermo shrinkable jointing kit	IRS TC. 77/2012 Rev. 3.0 or latest
20	Optical dual laser source	TEC GR No. GR/SLS-01/03 Feb-2005 Type -C (Duel wavelength) or latest.
21	Media convertor	RDSO/SPN/TC/103/2013 Rev. 1.0 or latest amendment.
22	RFID Marker	SM1500, SML 1014 model or similar-Telephone- based Electronic Cable marker 22.5 cm dia, 1.5m depth range, 10 Digits Hexadecimal 1D Code, 101.4KHz Frequency.
	RFID Marker Locator	SML model or similar, 8000 marker records, Built in GPS module, 1.5m Depth Range 4 x 20 Digit LCD displyCable marker Locator, , specification attached as annexure-3.
23	**Relays & wiring**	
24	QN1,	BRS: 930, IRS S34 & IRS: S 23
25	QNN1	BRS 960, along with IRS-S23,S-34 (as applicable).
26	QNNA1	BRS 960, along with IRS-S23,S-34 and IRS-S60 (as applicable).
27	QNA1	BRS 931A, IRS-S60, IRS-S34 and IRS-S23 (as applicable).
28	flexible wire 16/0.2 mm dia	RDSO spec. Nos. IRS S: 76/89 with latest amendments
29	indoor cable 1x60x0.6 mm dia	RDSO specification IRS:S: 76/89 with latest amendments.
30	terminal block 6 Way	IRS S 75/2006 Rev. 2.0 & IRS S 23 with amendment 2 or latest.
31	terminal block 1 Way PBT 60mm	IRS S 75/2006 Rev. 2.0 & IRS S 23 with amendment 2 or latest.
32	Supply of WAGO	RDSO spec 189/2004 Ver. 3.0 or latest.
33	Supply of cartridge fuse block made of PBT	IRS-S75/2006 Rev. 2.0 with latest amendments

34	Non-deteriorating type low voltage cartridge	IRS-S78/92 with latest amendments.
35	phenolic laminated sheet	as per specification IS:2036 of 1974 or latest
36	Supply and installation of Maintenance free earth	(as per RDSO recommended sources)
37	35 mm² Multi-strand single core PVC insulated copper cable	as per IS: 694 for connecting Main earth electrode to MEEB
38	flexible cable single core multistrand copper conductors, 1x10 mm²	IRS:S: 76/89 with latest amendments.
39	FDMS	RDSO spec No. RDSO/SPN/TC/37/2020 Rev. 4.0 or latest
40	MS-C' channel of size 100mmX50mmX1200mm	.IS-1239(part-1) : 2004 Rev.6.0 or latest
41	Supply & Laying of GI Pipes inner diamter 100 mm,	.IS-1239(part-1) : 2004 Rev.6.0 or latest
42	Supply of DWC pipe of 120 mm outer dia/103	as per British standard No. BSEN50086-1 and BSEN 50086-2-4 and BIS draft specification DOC No. ETD 14(5071) and ETD 14(5072)
43	12Cx1.5 SQMM signalling cable	IRS-63/2014,Rev-4

(i) List of approved drawings

Sr. No.	Description of Drawing	Drawing No.
1	Cable Laying on Metallic/Girder Bridges	As per drawing enclosed in RDSO document no. RDSO/ SIG/2010 Ver 1.1 dated 04.02.2014 (RDSO guidelines on signalling cable laying)
2	Road Crossings	
3	Cable Laying on Culverts with High Flood Level	
4	Laying of Signalling Cable in Chase in Rocky Surface	
5	Track Crossing	
6	Cable Trench 300*1200mm	
7	Location Box Earthing Arrangement	W.C. Rly. Drg. No. T 2014/5
8	Main Signal Earthing Arrangement	W.C. Rly. Drg. No. T 2014/1
9	Foundation for Apparatus Case (Half Case)	Drg. No. JBP/S&T/C/085)
10	Foundation for Apparatus Case (Single Case)	Drg. No. JBP/S&T/C/084)

11	Fire Detection & Alarm System to be provided at KAVACH station /LC/IBS buildings	W.C. Rly. Drg. No. T 2015/1/A dtd 10.03.2021
12	Based on RDSO's "Typical installation of earth for S&T installation"	RDSO's Drg. No. SDO/RDSO/E&B/001 (Sheet No. 1 of 1) Date 19.09.08
13	FRP based Track Lead Junction Box	JBP/S&T/C/106/II (Based on C. Rly. DRG. No. RST/C160(i)
14	FRP based Track Lead Junction Box	JBP/S&T/C/106/I (Based on C. Rly. DRG. No. RST/C160(i)
15	Relay Room Test Panel (not to scale)	DRG. No. S&T/JBP/2015/006
16	Typical arrangement of equipment in Relay Room for (EI/PI) at 3/4 line way side station	WCR DRG. No. S&T EQPT. BLDG. 2013/Pt. 1/4 (Ref: WCR DRG. No. S&T EQPT. BLDG. 2013)
17	Fencing for KAVACH Tower	RDSO/TC/Tower/L/40/180/T/6.5
18	40 meter Tower General arrangement drwaing	2021-PACS-SPIRE 407RH-001 RDSO/TC/Tower/L/40/180/T/6.5
19	40M elevation of tower and connection details	2021-PACS-SPIRE 407RH-001 RDSO/TC/Tower/L/40/180/T/6.5
20	40M Tower ladder details	2021-PACS-SPIRE 407RH-001 RDSO/TC/Tower/L/40/180/T/6.5
21	40M cast in part details & WPF details	2021-PACS-SPIRE 407RH-001 RDSO/TC/Tower/L/40/180/T/6.5
22	40M tower erection drg. Of antenna arrangement & AVL details	2021-PACS-SPIRE 407RH-001 RDSO/TC/Tower/L/40/180/T/6.5
23	Foundation details and bar bending details for 40M GBT (100KPA- water table)	2021-PACS-SPIRE 407RH-40M-100KPA-GBT-WT_FDN-001 RDSO/TC/Tower/L/40/100/F/WT
24	Foundation details and bar bending details for 40M GBT (100KPA- No water table)	2021-PACS-SPIRE 407RH-40M-100KPA-GBT-NWT_FDN-001 RDSO/TC/Tower/L/40/100/F/NWT
25	Signalling Cable Laying (Track Crossing)	As per drawing enclosed in RDSO document no. RDSO/ SIG/2010 Ver 1.1 dated 04.02.2014 (RDSO guidelines on signalling cable laying)
26	Signalling Cable Laying (Cable Trench)	As per drawing enclosed in RDSO document no. RDSO/ SIG/2010 Ver 1.1 dated 04.02.2014 (RDSO guidelines on signalling cable laying)
27	Mild Steel Channel for Trough Fixing	S&T/RE/78/2/76
28	Arrangement of RCC Pipe Trunking under Metal Roads	SK/SC/CN/WEST/13/87
29	Earthing Arrangement for S&T Circuits	G/SG/09/2002

30	G.I. Pipes on Culverts	SK/SC/CN/WEST/12/87
31	Cable for Troughing on Girder Bridges	SK/SC/CN/WEST/76/86
32	Foundation for Signal Cable Marker	SK/12/10
33	Rule made of pipe for Measuring Trench Depth	As per drawing enclosed in RDSO document no. RDSO/ SIG/2010 Ver 1.1 dated 04.02.2014 (RDSO guidelines on signalling cable laying)
34	Miethod of Unrolling Cable	
35	Concrete Cable Marker	
36	CI Cable Marker	
37	CI Cable Marker & Concreting	
38	Arrangement of Jumper Cable	
39	Brick Masonary Channel for Arch Bridge	
40	Cable Laying on Arch Bridges	
41	Cable Trough for Metallic Brides	
42	Cable Laying on Culverts with Low Flood Level	
43	Laying of Cables in Rocky Area	
44	RCC Duct 500 MM	
45	RCC Duct 500 MM	
46	RCC Duct 300 MM	
47	Laying of Signalling Cable & Telecom/Power Cable in same Trench	
48	Position of Trenches for Cable Laying	
49	Typical Main Cable Distribution Plan for Double Line (4 Line) P.I. Station	
50	supply and Installation of Franklin Rod based lightening protection arrangement	Drg No. BPL/S&T/Tele/2008/02
51	OFC chamber drawing	SK/DRM (S&T)/JBP/OFC/010&011

NOTE:

(1) Kavach being a new technology , Contractor/OEM will coordinate with RDSO to resolve all technical issues pertaining to Kavach during implementation of the project or after commissioning during Defect Liability period, the same need to be rectified by the Contractor with the approval of RDSO.

(2) Under mentioned specifications/ Check list/ guidelines regarding KAVACH, Towers, RFID etc are available at RDSO website i.e., 10.100.2.19/signal/policy/Indian Railway Automatic Train Protection System (IRATP).htm

1.3 For electrification works:

(a) Indian Railways Manual AC Traction, Volume-II Part-I and Volume-II Part-II.

(b) Manual of Standards & Specification for Railway Electrification

(c) Indian Railways Standards of Dimension

2 Deviations from the Specifications and Standards

NIL

*****

Annex - II

(Schedule-D)

(See Clause 10.2.7(c))

List of Drawings by the Authority as per RDSO letter no. RDSO-SIG0KAVACH(GEN) /1/2020, dt. 20/11/2020.

Design Inputs

S.No	For each station	Responsibility	Remarks
1	Station number allocation	Railway & OEM	Follow RDSO TAN
2	Maximum number of trains that can be accomodated simultaneously in a station section (Distant to LSS under the control of the station)	Railway	As per extent guidelines of RDSO
3	Central location of Railway in Kilometer	Railway	Stations chainage mentioned in the table for existing signalling infrastructure
4	Communication Mandatory Zone (direction wise)	Railway	Continuous radio coverage is planned with overlapping radio coverage between adjacent towers as indicated in summary of preliminary RSSI survey attached.
5	Stationary KAVACH wise Frequency pair allocation (Pair1 and Pair2 shall be alternative)	Railway	F0- 441.8 MHz, Pair1: F1/F2- 456.8 MHz/416.8 MHz, Pair2: F3/F4--466.8 MHz/426.8 MHz
6	TIN number allocation (Track Identification Numbers)	Railway & OEM	As per RDSO TAN no. SIGOTCAS (TAN)/01/2021 version 2.0, dated 18.10.2021 or latest
7	RFID Tag number allocation	Railway & OEM	As per RDSO TAN no. SIGOTCAS (TAN)/01/2021 version 2.0, dated 18.10.2021 or latest
8	SIP (Including Stations,LC gates and IBS etc.,)	Railway	SIP of all Stations, LCs & IBH is attached.
9	Table Of Control (TOC) or Selection Table	Railway	ST/LT is available & may be collected from Railway (Dy CSTE /Project/Jabalpur office), if required.
10	Gradient Data	Railway	Provided in SIP of all stations and attached for block sections.
11	Turnout Speed	Railway	May be derived from SIPs/ESPS

	Restriction Details		
12	PSR information	Railway	Attached
13	Latest Working Time Table	Railway	Will be provided on demand
14	Whether LC Gate warning Tags to be provided (Yes/No)	Railway	Yes
15	Whether Auto Whistling feature is to be provided (Yes/No)	Railway	Yes
16	Whistling pattern shall be configurable and shall be decided by purchaser Railway in case pattern other than continuous whistling is required	Railway	As per extant guidelines
17	Frequency slot allocation	Railway & OEM	To be decided based on RSSI report.
18	Drone Survey data	OEM	
19	GSM SIM Card1 Details	Railway	Reliance Jio (As decided by Autority/Authority Engineeer)
20	GSM SIM Card2 Details	Railway	BSNL or suitable provider. (As decided by Autority/Authority Engineeer)
21	Relay Contact Analysis data	Railway	1. Four Front contacts per function. 2. New relays to be picked up where spare contacts not available. 3. All the relay, fuses & wiring material etc. to be purchased & inspected by RDSO irrespective of the cost.
22	Relay Rack Charts	Railway	Will be made available on demand
23	Whether new Relay Rack is to be erected or not	Railway	Yes
24	Whether Circuit to be submitted as per British/Siemens Practice	Railway	As per station details attached
25	Cable Route Plan	Railway	Indicate the proposed path in two diversified paths from Relay room to 1. Tower location. 2. RIU locations (for connecting RIUs).

			3. ASM Room (for installing SM-OCIP (single path)). 4. Power Room (To tap 110V DC Supply from IPS). 5. Roof top (for installing GSM and GPS Antennas) 6. Tentative /draft cable route plan for item No. 1 to 5 shall be prepared by contractor & its approval will be given by railway within 15 days. 7. Tentative/draft cable route plan for provision of 48 fibre OFC in entire stretch (ET-MKP, Entire Katni Complex, BNSP-OHAN, SATNA-REWA, KAIMA-SAGMA, KMZ-MAKR, NKJ-'A'Cabin-MHDA section) will be put up for approval to Railway. However, available cable route plans of existing OFC, existing quad & signalling cable will be provided by Railway to contractor.
26	Floor plan of S&T Equipment Room indicating proposed location of Stationary KAVACH	Railway & OEM	For new and existing building, Floor plan of S&T equipments will be submitted by Contractor and approved by Railways.
27	Location of RIUs	Railway	Attached
28	Floor plan of mid-section/End Cabin huts, if RIU is to be installed in huts	Railway	For new and existing building, Floor plan of S&T equipments will be submitted by Contractor and approved by Railways.
29	Number of RIUs for which Location boxes are to be supplied	Railway	Nil
30	Number of RIUs for which Power supply 230V AC is provided	Railway	All
31	Proposed Location of Tower (Latitude and Longitude)	Railway	Provided in summary of preliminary RSSI survey, however, actual location may be decided after detailed RSSI.
32	Design of Stationary KAVACH tower and foundation	Railway	Purchaser Railway shall decide: 1. Type of Tower - Lattice type 2. Drawings and Standards for 40 meter tower are attached on RDSO website links: http://10.100.2.19/signal/policy/IRATP/Tower.htm http://10.100.2.19/signal/policy/IRATP/Standards.htm 3. Approved Designs for Towers & Foundations are available on RDSO website for soil bearing capacity of 100 KPA. If these designs are not fit for the purpose then Designing, design adequacy certificate and design report of Tower and/or Foundations will be mandated

			& verified by third party(CPRI or any IITs) and will be approved by Railway Authority.
33	WPC or/and SACFA Clearance Procedure	Railway	WPC and SACFA clearance: The frequency of the operation for KAVACH is already finalised by Railway Board. In order to avoid complications at later stages, the application for WPC & SACFA shall be filed in the name of Railway so that the license remains with Railways. The Contractor shall prepare all the required documents for obtaining WPC clearance and SACFA clearance for use of towers and radios. Payment of various charges and fees towards WPC License, Royalty, Additional Royalty, SACFA, etc. shall be made by Railways **only for Non-Dealer Possession Licence or End User Licence**. The application for WPC license and SACFA clearance will be filed at Wireless Planning Commission, Ministry of Telecommunication, New Delhi.
34	Location of Stationary KAVACH Test Benches	Railway	Jabalpur

Design Outputs

	For each station	Responsibility	Relevant I/ps	Rly Approval
1	RFID Tag Layout	OEM	SIP, TOC, Drone data, Tag&TIN Ids	Required
2	RFID Tag data	OEM	RFID Tag Layout	Required
3	Interface circuits	OEM	SIP, Contact analysis	Required
4	KAVACH Table Of Control (TOC)	OEM	SIP, Tag layout, TOC (Rly)	Required
5	Station Application Data	OEM	TOC(KAVACH), Tag Layout	Required
6	Floor Plans	OEM	Detailed Site Survey	Required
7	Drone Data	OEM	Drone Survey	Permission to conduct survey to be obtained.
8	Stationary and Loco KAVACH timeslots and frequency channel pairs	OEM	Maximum trains, Frequency allocation	Required

Design Input

SN	For each station	Responsibility	Remarks
1	Loco Type	Railway	Will be provided
2	Loco ID	Railway	Will be provided
3	Loco Shed	Railway	Will be provided
4	Type of Brake System	Railway	IRAB, CCB, E70
5	Loco Wheel dia	Railway	1016-1092mm
6	GSM SIM Card1 Details	Railway	Reliance Jio

7	GSM SIM Card2 Details	Railway	BSNL or any other suitable service provider
8	Axles for providing pulse generators	Railway	As per RDSO's fitment diagram
9	Fitment diagrams	Railway	Attached
10	Interface details for auto-whistling	Railway	As per RDSO's drawings
11	Interface details for Traction cut-off	Railway	As per RDSO's drawings
12	Responsible Authorities in Shed	Railway	Sr. DEE/TRS
13	Location of Loco KAVACH Test Benches	Railway	Will be provided

Design Outputs

	For each NMS	**Responsibility**	**Remark**
1	No of Stn KAVACH unit in one E-1 Ring	Railway/OEM	It shall be limited to 5-7
2	Proposed connectivity of stationary KAVACH at mid section where E-1 is not available	Railway/OEM	To be planned with dark fibre in block section to the nearest station.
3	PC Configuration	OEM	For connecting 150 4-Line stations following PC configuration is recommended 1.12 CPU CORES 2.12 GB RAM 3.1 TB storage for 90 days of Data 4.Windows 10 or higher version
4	Static IP address of NMS	Railway	Will be provided
5	Internet bandwidth of 25 MBPS	Railway	Assuming 4 live consoles & 2 report generators working in parallel
6	Whether furniture for NMS is to be provided(Yes/No)	Yes (By Contractor)	Yes
7	Floor plan for S&T Control office indicating proposed location of NMS	Railway/OEM	To be prepared by Contractor and to be approved by Railway
8	VDU Quantity , Size & Resolution	Railway/OEM	Qty- 2, size & resolution shall be suitable for the purpose and as approved by Authority Engineer.
9	UPS backup for NMS	Railway	Recommended 2-3 Hrs

Time Schedule for Review of Drawings by the Authority:

S. No.	Item	Preparation	Authority's Review with time limit	Review by Open Line/ RDSO
1.	Station number allocation	Railway & OEM	Dy CSTE/30 Days	30 Days
2.	TIN number allocation (Track Identification Numbers)	Railway & OEM	Dy CSTE/30 Days	30 Days
3.	RFID Tag number allocation	Railway & OEM	Dy CSTE/30 Days	30 Days
4.	Drone Survey data	Contractor	Dy CSTE/30 Days	30 Days
5.	WPC or/and SACFA Clearance	OEM/Railway	Dy CSTE/30 Days	30 Days
6.	RFID Tag Layout	OEM	Dy CSTE/30 Days	30 Days
7.	RFID Tag data	OEM	Dy CSTE/30 Days	30 Days
8.	Interface circuits	OEM	Dy CSTE/30 Days	30 Days
9.	KAVACH Table of Control (TOC)	OEM	Dy CSTE/30 Days	30 Days
10.	Station Application Data	OEM	Dy CSTE/30 Days	30 Days
11.	Floor Plans	OEM	Dy CSTE/30 Days	30 Days
12.	Drone Data	OEM	Dy CSTE/30 Days	30 Days
13.	Stationary and Loco KAVACH timeslots and frequency channel pairs	OEM	Dy CSTE/30 Days	30 Days

Time Schedule for Review of Drawings by the Authority for OFC backbone:-

S.No.	Item	Preparation	Authority's Review with time limit	Review by Open Line/ RDSO
48 Fibre OFC backbone				
1.	Cable Route Diagram.	Contractor	Dy CSTE/30 Days	30 Days
2.	OTDR Report	Contractor	Dy CSTE/30 Days	30 Days
3.	OFC Room and Battery room flow Chart.	Contractor	Dy CSTE/30 Days	30 Days
4.	OFC Termination Chart	Contractor	Dy CSTE/30 Days	30 Days
5.	Battery Health Report	Contractor	Dy CSTE/30 Days	30 Days
6.	Cable Marker position in	Contractor	Dy CSTE/30 Days	30 Days

	Cable Route Diagram			
7.	OFC Splicing detail with Km	Contractor	Dy CSTE/30 Days	30 Days
8.	E1 detail of STM/IP-MPLS and STM/IP-MPLS connectivity Diagram	Contractor	Dy CSTE/30 Days	30 Days
9.	Earthing (Ring Earth detail)	Contractor	Dy CSTE/30 Days	30 Days

Note:

(i) Approval of all drawing / design shall be done by Authority's Engineer within 60 days of submission by the Contractor.

(ii) Design input shall be generally be provided within 30 Days to contractor by the Authority after receipt of request from the contractor.

(iii) All other drawings/designs which are not mentioned herein will fall under the review of Authority's Engineer and the time limit thereof will be as per the terms and conditions mentioned in the Contract Document.

*****

SCHEDULE - E

(See Clause 3.1.6(a))

APPLICABLE PERMITS

1 Applicable Permits

1.1 The Contractor shall obtain, as required under Applicable Laws, the following Applicable Permits:

(a) Permission of the State Government for extraction of boulders from quarry;

(b) Permission of Village Panchayats and Pollution Control Board for installation of crushers;

(c) Licence for use of explosives;

(d) Permission of the State Government for drawing water from river/reservoir;

(e) Licence from inspector of factories or other competent Authority for setting up batching plant;

(f) Clearance of Pollution Control Board for setting up batching plant;

(g) Clearance of Village Panchayats and Pollution Control Board for setting up asphalt plant;

(h) Permission of Village Panchayats and State Government for borrow earth; and

(i) Any other permits or clearances required under Applicable Laws.

1.2 Applicable Permits, as required, relating to environmental protection and conservation shall have been or shall be procured by the Authority in accordance with the provisions of this Agreement.

—

SCHEDULE - F

(See Clauses 7.1.1, 7.5.3 and 17.2)

FORM OF BANK GUARANTEE

Annex-I
(See Clause 7.1.1)
Performance Security/ Maintenance Security

[The General Manager],

……..**,** ……..**[**Railway],

……

WHEREAS:

(A) ……(insert name and address of the contractor) (hereinafter called the "**Contractor**") and Chief Signal & Telecommunication Engineer/Wks, West Central Railway, Jabalpur (hereinafter called the"**Authority**") have entered into an agreement (hereinafter called the "**Agreement**") for the execution of Survey, design, supply, installation, testing and commissioning of trackside KAVACH (Indian Railway Automatic Train Protection System) equipments at stations/LC Gates/IBS locations including OFC works. erection of towers and associated Civil/Track/Electrical works required for KAVACH in ITARSI-MANIKPUR, MAHDEIYA-BINA MALKHERI-MAHADEOKHERI, Entire KATNI COMPLEX, BINA MALKHERI-AGASOD, SATNA-REWA, KAIMA-SAGMA, BANSAPAHAR-OHAN of Jabalpur Division of West Central Railway on Engineering, Procurement and Construction (the "**EPC**") basis, subject to and in accordance with the provisions of the Agreement

(B) The Agreement requires the Contractor to furnish a Performance Security/Maintenance Security for due and faithful performance of its obligations, under and in accordance with the Agreement, during the {Construction Period/ Defects Liability Period } (as defined in the Agreement) in a sum of Rs….. cr. (Rupees ……..….. crore) (the "**Guarantee Amount**").

(C) We, …….. through our branch at ……. (the "**Bank**") have agreed to furnish this bank guarantee (*hereinafter called the* **"Guarantee**") by way of Performance Security.

NOW, THEREFORE, the Bank hereby, unconditionally and irrevocably, guarantees and affirms as follows:

1. The Bank hereby unconditionally and irrevocably guarantees the dueand faithful performance of the Contractor's obligations during the {Construction Period/ Defects Liability Period/Maintenance period under and in accordance with the Agreement, and agrees and undertakes to pay to the [mention Finance of Authority], upon its mere first written demand, and without any demur, reservation, recourse, contest or protest, and without any reference to the Contractor, such sum or sums up to an aggregate sum of the Guarantee Amount as the Authority shall claim, without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.

2. A letter from the Authority, under the hand of an officer not below the rank of [***in the ***]Railway, that the Contractor has committed default in the due and faithful performance

of all or any of its obligations under and in accordance with the Agreement shall be conclusive, final and binding on the Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Agreement and its decision that the Contractor is in default shall be final and binding on the Bank, notwithstanding any differences between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any reason whatsoever.

3. In order to give effect to this Guarantee, the Authority shall be entitled to act as if the Bank were the principal debtor and any change in the constitution of the Contractor and/or the Bank, whether by their absorption with any other body or corporation or otherwise, shall not in any way or manner affect the liability or obligation of the Bank under this Guarantee.

4. It shall not be necessary, and the Bank hereby waives any necessity, for the Authority to proceed against the Contractor before presenting to the Bank its demand under this Guarantee.

5. The Authority shall have the liberty, without affecting in any manner the liability of the Bank under this Guarantee, to vary at any time, the terms and conditions of the Agreement or to extend the time or period for the compliance with, fulfilment and/ or performance of all or any of the obligations of the Contractor contained in the Agreement or to postpone for any time, and from time to time, any of the rights and powers exercisable by the Authority against the Contractor, and either to enforce or forbear from enforcing any of the terms and conditions contained in the Agreement and/or the securities available to the Authority, and the Bank shall not be released from its liability and obligation under these presents by any exercise by the Authority of the liberty with reference to the matters aforesaid or by reason of time being given to the Contractor or any other forbearance, indulgence, act or omission on the part of the Authority or of any other matter or thing whatsoever which under any law relating to sureties and guarantors would but for this provision have the effect of releasing the Bank from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any such law.

6. This Guarantee is in addition to and not in substitution of any other guarantee or security now or which may hereafter be held by the Authority in respect of or relating to the Agreement or for the fulfilment, compliance and/or performance of all or any of the obligations of the Contractor under the Agreement.

7. Notwithstanding anything contained hereinbefore, the liability of the Bank under this Guarantee is restricted to the Guarantee Amount and this Guarantee will remain in force for the period specified in paragraph 8 below and unless a demand or claim in writing is made by the Authority on the Bank under this Guarantee all rights of the Authority under this Guarantee shall be forfeited and the Bank shall be relieved from its liabilities hereunder.

8. The Guarantee shall cease to be in force and effect on ****[$]. Unless a demand or claim under this Guarantee is made in writing before expiry of the Guarantee, the Bank shall be discharged from its liabilities hereunder.

9. The Bank undertakes not to revoke this Guarantee during its currency, except with the previous express consent of the Authority in writing, and declares and warrants that it has the

---

[$] Insert date being 2 (two) years from the date of issuance of this Guarantee (in accordance with Clause 7.2 or clause no. 7.6.4 of the Agreement).

power to issue this Guarantee and the undersigned has full powers to do so on behalf of the Bank.

10. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred branch, which shall be deemed to have been duly authorised to receive such notice and to effect payment thereof forthwith, and if sent by post it shall be deemed to have been given at the time when it ought to have been delivered in due course of post and in proving such notice, when given by post, it shall be sufficient to prove that the envelope containing the notice was posted and a certificate signed by an officer of the Authority that the envelope was so posted shall be conclusive.

11. This Guarantee shall come into force with immediate effect and shall remain in force and effect for up to the date specified in paragraph 8 above or until it is released earlier by the Authority pursuant to the provisions of the Agreement.

Signed and sealed this ……. day of …….., 20…… at ……..

SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by:

(Signature)

(Name)

(Designation)

(Code Number)

(Address)

NOTES:

(i) The bank guarantee should contain the name, designation and code number of the officer(s) signing the guarantee.

(ii) The address, telephone number and other details of the head office of the Bank as well as of issuing branch should be mentioned on the covering letter of issuing branch.

SCHEDULE - F

(See Clauses 7.1.1, 7.5.3 and 17.2)

FORM OF INSURANCE SURETY BOND

Annex-I**A**
(See Clause 7.1.1)
Performance Security

Name of the issuer of surety bond:

President of India,

Acting through……..,

…….

Railway.

Date:……
……..

Surety Bond No: …… Issue Date:……

Amount of Bond:…… Expiry Date:…….

WHEREAS, In consideration of the President of India acting through ……*(Designation & address of contract signing authority)*,……Railway,……, (hereinafter called "The Railway") having accepted the bid of M/S *XXXXX* hereinafter called the contractor, for the work of *XXX*" under invitation for bids No *XXXX* Dated *XXXXX*, Vide Letter of Acceptance No.

AND

WHEREAS, the contractor is required to furnish Performance Security for the sum of **Rs. *XXXX* (Rupees *XXXX* Only)**, in the form of Surety Bond, being a condition precedent to the signing of the contract agreement

SBNo: Date:

WHEREAS, we, _____, *(Name of insurance company)* hereinafter called the Surety, acting through [*Designation(s) of the authorised person of the Surety*], have, at the request of the **M/s. *XXXX*** contractor, agreed to give Bond for performance security/ additional performance security as hereinafter contained:

1. KNOW ALL MEN by these present that I/We the undersigned [*Insert name(s) of authorized representatives of the Surety*], being fully authorized to sign and incur obligations for and on behalf of the Surety, confirm that the Surety, hereby, unconditionally and irrevocably Bond to pay the Railway the full amount in the sum of ***XXXX*** **(Rupees *XXXX* Only)** as above stated.
2. The Surety undertakes to immediately pay on presentation of demand by the Railway any amount up to and including aforementioned full amount without any demur, reservation or recourse. Any such demand made by the Railway on the Surety shall be final, conclusive and binding, absolute and unequivocal notwithstanding any disputes raised/pending before any Court, Tribunal, Arbitration or any Authority or any threatened litigation by the Bidder or Bank.
3. On payment of any amount less than aforementioned full amount, as per demand of the Railway, the Bond shall remain valid for the balance amount i.e. the aforementioned full amount less the payment made to the Railway.
4. The Surety shall pay the amount as demanded immediately on presentation of the demand by Railway without any reference to the contractor and without the Railway being required to show grounds or give reasons for its demand or the amount demanded.
5. The Surety Bond shall be unconditional and irrevocable.
6. The Bond hereinbefore shall not be affected by any change in the constitution of the Surety or in the constitution of the Contractor.
7. The Surety agrees that no change, addition, modifications to the terms of the Contract Agreement or to any documents, which have been or may be made between the Railway and the Contractor, will in any way release us from the liability under this Bond; and the Surety, hereby, waives any requirement for notice of any such change, addition or modification to the Surety.
8. This Bond is valid and effective from the date of its issue, which is *[insert date of issue]*. The Bond and our obligations under it will expire on ***XXXX*** *(Expiry Date)*. All demands for payment under the Bond must be received by us on or before that date.
9. The Surety agrees that the Railways right to demand payment of aforementioned full amount in one instance or demand payments in parts totalling up to the aforementioned full amount in several instances will be valid until either the aforementioned full amount is paid to the Railway or the Bond is released by Railway before the Expiry date.
10. The Surety agrees that its obligation to pay any amount demanded by the Railway before the expiry of this Bond will continue until the amount demanded has been paid in full.
11. The expressions Surety and Railway hereinbefore used shall include their respective successors, administrators and assigns.

SBNo: Date:

12. The Surety hereby undertakes not to revoke the Bond during its currency, except with the previous consent in writing of the Railway. This Bond is subject to the Uniform Rules for Demand Bonds, ICCPublicationNo.758.

13. We, the Surety Insurer, further agree that the Authority shall be the sole judge to decide as to whether the Bidder is in default of due and faithful fulfilment and compliance with the terms and conditions contained in the Bidding Documents including, Inter alia, the failure of the Bidder to keep its Bid open during the Bid validity period set forth in the said Documents, and the decision of the Authority that the Bidder is in default as aforesaid shall be final and binding on us, notwithstanding any differences between the Authority and the Bidder or any dispute pending before any Court, Tribunal, Arbitrator or any other Authority.

14. The Bond shall be in addition to and without prejudice to any other security Bond (s) of the contractor in favour of the Railway available with the Railway. The Surety, under this Bond, shall be deemed as Principal Debtor of the Railway.

Notwithstanding anything to the contrary contained in these presents,

a. Our liability under this Surety Bond shall not exceed ***XXXX*** **(Rupees *XXXXX* Only)**

b. This Surety Bond shall be valid up ***XXXX*** *(being the date of expiry)*;

c. Unless the bank is served a written claim or demand on or before ***XXXX*** all rights under this Bond shall be forfeited and the Surety shall be relieved and discharged from all liabilities under this Bond irrespective of whether or not the original Surety bond is returned to the Surety

Dated the day of 2024

15. The Insurance Surety Bond shall be verified by sending mail to [customer.care@sbigeneral.in]

Place…….

Bank's Seal and authorized signature(s)
[Name in Block letters] ……
[Designation with Code No.]……

[P/Attorney] No.

Witness

1.

2.

* * * * *

Note: All italicized texts are for guidance on how to prepare this Insurance Surety Bond and shall be deleted from the final document.

Annex – II
(Schedule - F)
(See Clause 7.5.3)

Form of Guarantee for Withdrawal of Retention Money

[General Manager,***

***Railway,

……..]

WHEREAS:

(A) [insert name and address of the contractor] (hereinafter called the "**Contractor**") has executed an agreement (hereinafter called the "**Agreement**") with Chief Signal & Telecommunication Engineer/Wks, West Central Railway, Jabalpur, (hereinafter called the"**Authority**") have entered into an agreement (hereinafter called the "**Agreement**") for the execution of Survey, design, supply, installation, testing and commissioning of trackside KAVACH (Indian Railway Automatic Train Protection System) equipments at stations/LC Gates/IBS locations including OFC works. erection of towers and associated Civil/Track/Electrical works required for KAVACH in ITARSI-MANIKPUR, MAHDEIYA-BINA MALKHERI-MAHADEOKHERI, Entire KATNI COMPLEX, BINA MALKHERI-AGASOD, SATNA-REWA, KAIMA-SAGMA, BANSAPAHAR-OHAN of Jabalpur Division of West Central Railway zone on Engineering, Procurement and Construction (the "**EPC**") basis, subject to and in accordance with the provisions of the Agreement.

(B) In accordance with Clause 7.5.3 of the Agreement, the Contractor may withdraw the retention money (hereinafter called the "**Retention Money**") after furnishing to the Authority a bank guarantee for an amount equal to the proposed withdrawal.

(C) We, …….. through our branch at ……. (the "**Bank**") have agreed to furnish this bank guarantee (hereinafter called the "**Guarantee**") for the amount of Rs. …… cr. (Rupees……crore) (the "**Guarantee Amount**").

NOW, THEREFORE, the Bank hereby unconditionally and irrevocably guarantees and affirms as follows:

1. The Bank hereby unconditionally and irrevocably undertakes to pay to the Authority, upon its mere first written demand, and without any demur, reservation, recourse, contest or protest, and without any reference to the Contractor, such sum or sums up to an aggregate sum of the Guarantee Amount as the Authority shall claim, without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.

2. A letter from the Authority, under the hand of an officer not below the rank of JAG, that the Contractor has committed default in the due and faithful performance of all or any of its obligations for under and in accordance with the Agreement shall be conclusive, final and binding on the Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Agreement and its decision that the Contractor is in default shall be final, and binding on the Bank, notwithstanding any differences between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any reason whatsoever.

3. In order to give effect to this Guarantee, the Authority shall be entitled to act as if the Bank were the principal debtor and any change in the constitution of the Contractor and/or the Bank, whether by their absorption with any other body or corporation or otherwise, shall not in any way or manner affect the liability or obligation of the Bank under this Guarantee.

4. It shall not be necessary, and the Bank hereby waives any necessity, for the Authority to proceed against the Contractor before presenting to the Bank its demand under this Guarantee.

5. The Authority shall have the liberty, without affecting in any manner the liability of the Bank under this Guarantee, to vary at any time, the terms and conditions of the Retention Money and any of the rights and powers exercisable by the Authority against the Contractor, and either to enforce or forbear from enforcing any of the terms and conditions contained in the Agreement and/or the securities available to the Authority, and the Bank shall not be released from its liability and obligation under these presents by any exercise by the Authority of the liberty with reference to the matters aforesaid or by reason of time being given to the Contractor or any other forbearance, indulgence, act or omission on the part of the Authority or of any other matter or thing whatsoever which under any law relating to sureties and guarantors would but for this provision have the effect of releasing the Bank from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any such law.

6. This Guarantee is in addition to and not in substitution of any other guarantee or security now or which may hereafter be held by the Authority in respect of or relating to the Retention Money.

7. Notwithstanding anything contained hereinbefore, the liability of the Bank under this Guarantee is restricted to the Guarantee Amount and this Guarantee will remain in force for the period specified in paragraph 8 below and unless a demand or claim in writing is made by the Authority on the Bank under this Guarantee all rights of the Authority under this Guarantee shall be forfeited and the Bank shall be relieved from its liabilities hereunder.

8. The Guarantee shall cease to be in force and effect 15 (fifteen) days after the date of the Completion Certificate specified in Clause 12.4 of the Agreement.

9. The Bank undertakes not to revoke this Guarantee during its currency, except with the previous express consent of the Authority in writing, and declares and warrants that it has the power to issue this Guarantee and the undersigned has full powers to do so on behalf of the Bank.

10. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred branch, which shall be deemed to have been duly authorised to receive such notice and to effect payment thereof forthwith, and if sent by post it shall be deemed to have been given at the time when it ought to have been delivered in due course of post and in proving such notice, when given by post, it shall be sufficient to prove that the envelope containing the notice was posted and a certificate signed by an officer of the Authority that the envelope was so posted shall be conclusive.

11. This Guarantee shall come into force with immediate effect and shall remain in force and effect up to the date specified in paragraph 8 above or until it is released earlier by the Authority pursuant to the provisions of the Agreement.

Signed and sealed this ……. day of …….., 20…… at ……..

SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by:

(Signature)

(Name)

(Designation)

(Code Number)

(Address)

NOTES:

(i) The bank guarantee should contain the name, designation and code number of the officer(s) signing the guarantee.

(ii) The address, telephone number and other details of the head office of the Bank as well as of issuing branch should be mentioned on the covering letter of issuing branch.

Annex – III
(Schedule - F)
(See Clause 17.2)

Form of Guarantee for Advance Payment

[***],

West Central Railway,

JABALPUR – 482001.

WHEREAS:

(A) [name and address of the contractor] (hereinafter called the "**Contractor**") has executed an agreement (hereinafter called the "**Agreement**") with the Chief Signal & Telecommunication Engineer/Wks, West Central Railway, Jabalpur (hereinafter called the"**Authority**") have entered into an agreement (hereinafter called the "**Agreement**") for the execution of Survey, design, supply, installation, testing and commissioning of trackside KAVACH (Indian Railway Automatic Train Protection System) equipments at stations/LC Gates/IBS locations including OFC works. erection of towers and associated Civil/Track/Electrical works required for KAVACH in ITARSI-MANIKPUR, MAHDEIYA-BINA MALKHERI-MAHADEOKHERI, Entire KATNI COMPLEX, BINA MALKHERI-AGASOD, SATNA-REWA, KAIMA-SAGMA, BANSAPAHAR-OHAN of Jabalpur Division of West Central Railway zone on Engineering, Procurement and Construction (the "**EPC**") basis, subject to and in accordance with the provisions of the Agreement.

(B) In accordance with Clause 17.2 of the Agreement, the Authority shall make to the Contractor advance payment (herein after called "**Advance Payment**") equal to 10% (ten per cent) of the Contract Price; and that the Advance Payment shall be made in two installments subject to the Contractor furnishing an irrevocable and unconditional guarantee by a Bank for an amount equivalent to 110% (one hundred and ten percent) of such installment to remain effective till the complete and full repayment of the installment of the Advance Payment as security for compliance with its obligations in accordance with the Agreement. The amount of {first/second} installment of the Advance Payment is Rs. ……cr. (Rupees ……crore) and the amount of this Guarantee is Rs. …… cr. (Rupees …… crore)(the **"Guarantee Amount")[$].**

[$]The Guarantee Amount should be equivalent to 110% of the value of the applicable installment.

(C) We, …….. through our branch at ……. (the "**Bank**") have agreed to furnish this bank guarantee (hereinafter called the **"Guarantee**") for the Guarantee Amount.

NOW, THEREFORE, the Bank hereby, unconditionally and irrevocably, guarantees and affirms as follows:

1. The Bank hereby unconditionally and irrevocably guarantees the due and faithful repayment on time of the aforesaid instalment of the Advance Payment under and in accordance with the Agreement, and agrees and undertakes to pay to the Authority, upon its mere first written demand, and without any demur, reservation, recourse, contest or protest, and without any reference to the Contractor, such sum or sums up to an aggregate sum of the Guarantee Amount as the Authority shall claim, without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.

2. A letter from the Authority, under the hand of an officer not below the rank of JAG, that the Contractor has committed default in the due and faithful performance of all or any of its obligations for the repayment of the instalment of the Advance Payment under and in accordance with the Agreement shall be conclusive, final and binding on the Bank. The Bank further agrees that the Authority shall be the sole judge as to whether the Contractor is in default in due and faithful performance of its obligations during and under the Agreement and its decision that the Contractor is in default shall be final and binding on the Bank, notwithstanding any differences between the Authority and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any reason whatsoever.

3. In order to give effect to this Guarantee, the Authority shall be entitled to act as if the Bank were the principal debtor and any change in the constitution of the Contractor and/or the Bank, whether by their absorption with any other body or corporation or otherwise, shall not in any way or manner affect the liability or obligation of the Bank under this Guarantee.

4. It shall not be necessary, and the Bank hereby waives any necessity, for the Authority to proceed against the Contractor before presenting to the Bank its demand under this Guarantee.

5. The Authority shall have the liberty, without affecting in any manner the liability of the Bank under this Guarantee, to vary at any time, the terms and conditions of the Advance Payment or to extend the time or period of its repayment or to postpone for any time, and from time to time, any of the rights and powers exercisable by the Authority against the Contractor, and either to enforce or forbear from enforcing any of the terms and conditions contained in the Agreement and/or the securities available to the Authority, and the Bank shall not be released from its liability and obligation under these presents by any exercise by the Authority of the liberty with reference to the matters aforesaid or by reason of time being given to the Contractor or

any other forbearance, indulgence, act or omission on the part of the Authority or of any other matter or thing whatsoever which under any law relating to sureties and guarantors would but for this provision have the effect of releasing the Bank from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any such law.

6. This Guarantee is in addition to and not in substitution of any other guarantee or security now or which may hereafter be held by the Authority in respect of or relating to the Advance Payment.

7. Notwithstanding anything contained hereinbefore, the liability of the Bank under this Guarantee is restricted to the Guarantee Amount and this Guarantee will remain in force for the period specified in paragraph 8 below and unless a demand or claim in writing is made by the Authority on the Bank under this Guarantee all rights of the Authority under this Guarantee shall be forfeited and the Bank shall be relieved from its liabilities hereunder.

8. The Guarantee shall cease to be in force and effect on ****.[$] Unless a demand or claim under this Guarantee is made in writing on or before the aforesaid date, the Bank shall be discharged from its liabilities hereunder.

9. The Bank undertakes not to revoke this Guarantee during its currency, except with the previous express consent of the Authority in writing, and declares and warrants that it has the power to issue this Guarantee and the undersigned has full powers to do so on behalf of the Bank.

10. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred branch, which shall be deemed to have been duly authorised to receive such notice and to effect payment thereof forthwith, and if sent by post it shall be deemed to have been given at the time when it ought to have been delivered in due course of post and in proving such notice, when given by post, it shall be sufficient to prove that the envelope containing the notice was posted and a certificate signed by an officer of the Authority that the envelope was so posted shall be conclusive.

11. The Bank hereby confirms that it is on the SFMS (Structured Financial Mes saging System) and shall invariably send the advice of this Bank Guarantee to the following bank details –

IFSC CODE	SBIN000RAIL
IFSC TYPE	BRANCH
BANK NAME	STATE BANK OF INDIA
BRANCH NAME	RAIL

[$] Insert a date being 90 (ninety) days after the end of one year from the date of payment of the Advance payment to the Contractor (in accordance with Clause 17.2 of the Agreement).

CITY NAME	NAVI MUMBAI
ADDRESS	SECTOR-11, CBD BELAPUR, NAVI MUMBAI
DISTRICT	NAVI MUMBAI
STATE	MAHARASHTRA
BG ENABLED	YES

12. This Guarantee shall come into force with immediate effect and shall remain in force and effect up to the date specified in paragraph 8 above or until it is released earlier by the Authority pursuant to the provisions of the Agreement.

Signed and sealed this ……. day of …….. 20…… at ……..

SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by:
(Signature)

(Name)
(Designation)
(Code Number)
(Address)

NOTES:

(i) The bank guarantee should contain the name, designation and code number of the officer(s) signing the guarantee.

(ii) The address, telephone number and other details of the head office of the Bank as well as of issuing branch should be mentioned on the covering letter of issuing branch.

SCHEDULE - G

(See Clauses10.1.4 and 17.3)

Contract Price Weightages[(For Lump sum value of this agreement)]

1.0 The Contract Price for this Agreement is **Rs.** 385,71,21,552.30/- **(Rs.** 371,25,45,071/- **(Schedule-G)** + 14,45,76,481.30/- **(Schedule G1C Cost).** It is assigned for different components of the Railway Project as follows:

S.No	WORK	% Weightage of Contact price
1	Signalling & Telecomm Works	94.77
2	Civil works	3.76
3	Electrical Gen works	0.30
4	Electrical TRD works	1.17
	Total project value	100.00

For maintenance works of KAVACH system consisting of Wayside Station and Locomotive works#

#Wayside Station & Trackside [KAVACH] Equipments £ (For Defect Liability Period) per annum	0.97 % of the Contract Price say "A"
#Wayside Station & Trackside [KAVACH] Equipments £ (After Defect Liability Period) per annum	5.32 % of the Contract Price say "B"

the percentage given above is for the purpose of Maintenance Obligation only as per utilized in Article 15A.

£ This does not include Towers, OFC System and Signaling System other than KAVACH System.

Note – Contract price does not include the cost of maintenance during the maintenance period including DLP i.e. the cost after commissioning of the complete project and issuance of the completion certificate.

1.1 Proportions of the Contract Price for different stages of Construction of the Railway Project shall be as specified below:

Item	Weightage in % to the Contract Price	Stage for Payment	Percentage weightage	Payment Procedure
2.1 Provision of KAVACH in complete section including singaling and Telecommun ication work	94.77	2.1.1 Survey, design and supply of various drawings and documents for KAVACH system including RSSI and Aerial survey.	0.14	2.1.1 90% Payment shall be made on completion of Survey and Design works for KAVACH system after approval and submission of all drawings, schemes etc. on pro rata basis after work completion in atleast one block section with respect to required work in total km of route length
		2.1.2 Supply, installation and testing of Stationary/IBH/LC KAVACH system including Vital Computer, Supply & Installation of RFID Tags of KAVACH, Installation of Connected LC's, programming Kit etc. Relay / CT Racks, Antennas, RIU programming Kit etc.	30.13	2.1.2 90% Payment shall be made on completion of work on pro rata basis for each block section for track side equipments. Payment against supplies under these items shall be made for quantities as per the approved layout, on receipt of material at contractor depot and production of inspection certificates and other documents and against BG of equivalent amount.
		2.1.2 a (Loco kavach)	6.27	90% Payment shall be made on completion of work on pro rata basis for each Locomotive for On-board equipments. Payment against supplies under these items shall be made for quantities as per the approved layout, on receipt of material at contractor depot and production of inspection certificates and other documents and against BG of equivalent amount.

Item	Weightage in % to the Contract Price	Stage for Payment	Percentage weightage	Payment Procedure
		2.1.3 Supply installation, testing and commissioning of Network Management system (NMS) for KAVACH	0.32	2.1.3 90% Payment shall be made on completion of the entire work Payment against supplies under these items shall be made for quantities as per the approved layout, on receipt of material at contractor depot and production of inspection certificates and other documents and against BG of equivalent amount.
		2.1.4 Supply installation and testing of Test Bench and setup of Labs for KAVACH including supply of various manuals, tool kits and instruments.	1.61	2.1.4 90% Payment shall be made on completion of the entire work.
		2.1.5 Survey of Optical fibre cable system including its design, testing, supply of manuals for new technology Telecommunication equipment installed for each place, supply of completion drawings, etc. Laying of OFC, supply, Installation, testing & commissioning of complete OFC communication system.	32.98	2.1.5 90% Payment shall be made on completion of work on pro rata basis for each block section. Payment against supplies under these items shall be made for quantities as per the approved layout, on receipt of material at contractor depot and production of inspection certificates and other documents and against BG of equivalent amount.
		2.1.6 Design, Foundation, supply, Fabrication, Installation,erection & commissioning of Lattice tower at station/IB/LC	22.83	2.1.6 90% Payment shall be made on completion of work on pro rata basis for each tower with respect to total no. of towers.

Item	Weightage in % to the Contract Price	Stage for Payment	Percentage weightage	Payment Procedure
		2.1.7 Integrated testing and commissioning of the signalling works of the railway project including Supply of Spares and Training to Railway Personal.	5.72	2.1.7 90% Payment shall be made on prorata basis for each block section.
2.2 Civil work	3.76	2.2.1 Survey, design and construction of Service Building at station and Relay hut at LC/IBH including electrical wiring and extension of supply, fittings with complete doors, windows and floorings and any other requirements as per approved drawings	100	2.2.1 90% Payment shall be made on completion of Survey and Design works and approval of these drawings by authority for service building/ Relay Hut and construction of service building on pro rata basis with respect total No. of Service building & Relay Hut in the Section.
2.3 Electrical (G)work	0.30	2.3.1 Electrical wiring and installation of electrical equipment in KAVACH Hut	100	2.3.1 90% Payment shall be made on completion of Survey and Design works and approval of these drawings by authority for service building/ Relay Hut and provision of Electrical supply and equipments at these service building on pro rata basis with respect total No.

Item	Weightage in % to the Contract Price	Stage for Payment	Percentage weightage	Payment Procedure
				of Service building & Relay Hut in the Section. Payment against supplies under these items shall be made for quantities as per the approved layout, on receipt of material at contractor depot and production of inspection certificates and other documents and against BG of equivalent amount.
2.4 Electrical (TRD)work	1.17	2.4.1 Electrical TRD work Both AT to be drop at Hut along with changeover panel	100	2.4.1 90% payment on pro-rata basis for each Tower and AT work (Supply, design, installation and commissioning including EIG) provided for continuous communication in unmanned location.

Note:: First payment will be done only after approval of all design documents as mentioned in Project Milestone-II of Schedule-I.

Annexure

Schedule G-1

Separate BOQ

for

Itemised Work

SCHEDULE–G1

Contract Price Weightages (For BOQ Items)

[20]*If required, PHOD/(CAO/C/ZR) may APPROVE to attach this separate BOQ along with the ECP agreement documents i.e. Standard Agreement of EPC Tender Document for single stage Two Packet System No. 2018/CE-I/CT/36-EPC Contract Policy/Pt-1, dated 15.11.2021'*

1. The Contract Price for this schedule (G1C) of Agreement is Rs. 144576481.30/-

2. Schedule G1 consists of three parts as under of which any or all schedules may be used as per the requirement. However, main schedule (G1A/G1B/G1C) may be bifurcated into item wise i.e. G1A - may be bifurcated broadly into foundation & sub-structure and further into pile, well and column, wall etc for clarity. Similarly G1B & G1C may also be bifurcated.

   a. **Schedule G1A** for **Bridge Foundation and Sub structure** work (NIL)
   [1]*(Total value of schedule may be as per estimated/actual requirement)*

   b. **Schedule G1B** for **Utility shifting** (NIL)
   1(maximum up to 2% of total value of Schedule–G (EPC lump-sum value)

   c. **Schedule G1C** for **Unforeseen works**(Rs. 144576481.30/-)
   1(maximum up to 5%. of total value of Schedule–G (EPC lump-sum value))

3. Rate should be quoted (% above/Below/at par) for schedule of G1. No Separate rates should be quoted for schedule G1A, G1B & G1C. Example:

Schedule:G1-C

S.No.	Description	QTY.	Unit	Rate	Amount
1	Cost of Provision of Kavach for Non-Interlockd LCs	44	Lumpsum	51069.95	2247077.80
2	Cost of Provision of Kavach for Interlocked Traffic LCs	38	Lumpsum	66272.84	2518367.92
3	Cost of Provision of Kavach/RIU for Engineering Interlocked LCs not requiring Building	41	Lumpsum	1669669.66	68456456.06
4	Cost of Provision of Kavach/LC-Kavach for Engineering Interlocked LCs requiring Building	6	Lumpsum	8481768.56	50890611.36

[20] Deleted

S.No.	Description	QTY.	Unit	Rate	Amount
5	Buidling Cost at LC For Masonary Huts	6	Lumpsum	1407923.39	8447540.34
6	Electrical Arrangements at LC Masnory Huts	6	Lumpsum	67337.58	404025.48
7	Augmentation of AT supply from 5KVA to 10 KVA	3	Lumpsum	1100716.02	3302148.06
8	Augmentation of AT supply from 5KVA to 25 KVA	3	Lumpsum	2770084.76	8310254.28
Total for Schedule G1 C					144576481.30/-

4. Schedule G1

Schedule	Description	Item	Value of Item/ Schedule	Payment Procedure	Applicable rates	PVC applicable
G1C	For Unforeseen Work	[23]NS items	Rs. 144576481.30/-	Payment shall be made on actual work done as per work done measured while submitting stage payment certificate.	As detailed in Para-3 above	Not applicable

Note: 1) Before start of any sub-work(s) under Schedule G-1, Drawing, Method Statement, BOQ etc. shall b finalised and approved from Authority.

[$]***(2)*** *Items covered under Schedule G-1 shall be deleted from Schedule-G***)**

The list of Articles of ***'Standard Agreement of EPC Tender Document for single stage Two Packet System date 15.11.2021'*** given below, shall be superseded by the Articles of this document in case G1 is to be mad operational.

---

[23] Deleted

[$]for guidance of the Authority and should be omitted from the draft EPC Agreement forming part of Bid Documents

SCHEDULE - H

(See Clause 10.2.7)

DRAWINGS

1 Drawings

In compliance of the obligations set forth in Clause 10.2 of this Agreement, the Contractor shall furnish to the Authority Engineer, free of cost, all Drawings listed in Annex-I of this Schedule-H.

2 Additional Drawings

If the Authority Engineer determines that for discharging its duties and functions under this Agreement, it requires any drawings other than those listed in Annex-I, it may by notice require the Contractor to prepare and furnish such drawings forthwith. Upon receiving a requisition to this effect, the Contractor shall promptly prepare and furnish such drawings to the Authority Engineer, as if such drawings formed part of Annex-I of this Schedule-H.

Annexure-I

(Schedule-H)

List of Drawings

List of Drawings and Documents to be furnished by the Contractor shall include, but not be limited to:

1. **KAVACH (Train Collision & Avoidance System):**

   (a) Station number allocation.

   (b) TIN mumber allocation (Track Identification Numbers).

   (c) Drone/LiDAR survey data.

   (d) Relay Contact Analysis data.

   (e) RFID Tag Layout.

   (f) RFID Tag data.

   (g) Interface circuit.

   (h) Table of Control or Selection Table.

   (i) Station application Data.

   (j) Floor plan

   (k) Cable Core Chart.

   (l) Cable Route Plan (Separate for station & blocks sections)

   (m) Power Supply Diagram (station/auto huts/ control)

   (n) Equipment sizing (station/ auto huts/gate huts/control)

   (o) Equipment lay out and details including cable troughs required(station/ auto huts/gate huts/control)

   (p) Circuit Diagrams.

   (q) Equipment Rack details

   (r) Cable Termination Rack Diagram

   (s) Fuse Details

   (t) Location/junction boxes lay out & wiring details

   (u) Lightening, surge protection & earthing plan.

   (v) FAT and SAT certificate.

   (w) Station/Gate working Rule/Rule diagrams (in both English and Hindi)

(x) Panel/ VDU diagram (station/ gate huts)

(y) Drawing related to Loco Kavach shall be submitted as per CoE letter no. IRISET/CoE/Kavach/Misc dt.03.08.2023 or latest.

2. Commissioning of 4x 48 Fibre:

(a) OTDR Report

(b) Cable Route Diagram.

(c) OFC Room and Battery room flow Chart.

(d) Fiber distribution and Termination Chart.

(e) Battery Health Report.

(f) Cable Marker position in Cable Route Diagram.

(g) OFC Splicing detail with Km.

(h) E1 detail of STM and STM connectivity Diagram.

(i) Earthing(Ring Earth detail).

(j) Joint report with Open line regarding installation and testing of control phones, various channels used for S&T application, its networking, etc. after installation of OFC backbones.

3. Electrical Engineering (Traction): as applicable

(a) Power supply arrangement for (2 X 10 KV) AT system and Sectioning drawing for the traction arrangement.
(b) Power supply arrangement for the signals at the stations (Auxiliary transformer and the arrangement of 230 volt supply)
(c) Typical arrangement of the regulated OHE for (2 X 10 KV) system with the feeder arrangement.
(d) Power supply arrangement with IR at interface point.

4. Electrical Engineering (General Power supply):

(a) General arrangement of the 11/33/66 KV substations for the station and the service buildings.
(b) General arrangement of the distribution of the 415 V 50 Hz supply to various loads

*****

SCHEDULE - I

(See Clause 10.3.2)

PROJECT COMPLETION SCHEDULE

1. Project Completion Schedule

During Construction period, the Contractor shall comply with the requirements set forth in this Schedule-I for each of the Project Milestones and the **Scheduled Completion Date**. Within 15 (fifteen) days of the date of each Project Milestone, the Contractor shall notify the Authority of such compliance along with necessary particulars thereof.

2 Project Milestone-I

2.1 Project Milestone-I shall occur on the date falling on the 30th day from the Appointed Date (the "**Project Milestone-I**").

2.2 In this milestone all the project facilities mentioned in the Schedule C has to be provided.

2.3 The Contractor shall apply for WPC/SACFA clearance for the sections envisaged under this project & wildlife forest clearance on behalf of authority for KTE-SGRL and Satna-Manikpur section and any other section under this project (as applicable) for implementation of KAVACH system in Jabalpur division.

2.4 The Contractor shall submit an undertaking (as per format in appendix III) from RDSO approved KAVACH OEM to confirm compliance with extant RDSO guidelines and to meet contract specific requirements.

2.5 The contractor shall submit the complete action plan to commission the work as per Milestones. The contractor shall also submit the list of vendors for approval of authority from which material will be procured and supplied.

3. Project Milestone-II

3.1 Project Milestone-II shall occur on the date falling on the 60th (Sixteeth) day from the Appointed Date (the "**Project Milestone-II**").

3.2 In this milestone RF desktop planning and site survey should be completed in the whole section.

3.3 In this period Design submissions for KAVACH in all stations/LCs/IBHs of **Itrasi-Jabalpur** section shall be completed.

3.4 Design submissions shall include:

(i) **Signal & Telecom Engineering:**

(a) Station number allocation.
(b) TIN member allocation (Track Identification Numbers).
(c) Drone survey data.
(d) Relay Contact Analysis data.
(e) RFID Tag Layout.
(f) RFID Tag data.
(g) Interface circuit.
(h) Table of Control or Selection Table.
(i) Station application Data.
(j) Cable core chart
(k) Cable Route Plan (Separate for station & blocks sections)
(l) Power Supply Diagram (station/auto huts/ control)
(m) Equipment sizing (station/ auto huts/gate huts/control)
(n) Equipment layout and details including cable troughs required (station/ auto huts/gate huts/control)
(o) Circuit Diagrams.
(p) Equipment Rack details
(q) Cable Termination Rack Diagram
(r) Fuse Details
(s) Location/Junction boxes lay out & wiring details
(t) Lightening, Surge Protection & Earthing plan.
(u) Tower design
(v) Tower Foundation Design
(w) Tower Location
(x) Drawing related to Loco Kavach shall be submitted as per CoE letter no. IRISET/CoE/Kavach/Misc dt.03.08.2023 or latest.

(ii) **Electrical Engineering**:

(a) Power supply arrangement for the signals at the stations (Auxiliary Transformer and the arrangement of 230 volt supply)
(b) General power supply arrangement for KAVACH HUTs .
(c) CLS panel drawing.

(iii) **Civil Engineering:**

(a) Structural design for KAVACH HUTs (Relay room extensions at Stations and Buildings for LC-Kavach and other mid section buildings) and General arrangement drawings of Structures.

4. Project Milestone-III

4.1 Project Milestone-III shall occur on the date falling on the 270th (two hundred seventieth) day from the Appointed Date (the "**Project Milestone-III**").

4.2 In this milestone, installation of RFID Tags has to be completed on 210th day from the appointed date in all the stations and block sections of ET-JBP section to get the benefit of non signalling-based collision prevention features of Kavach with Kavach equipped Locomotives/Cabs in Non-Kavach territory.

4.3 Works should be completed in ET-JBP section on the 270th (two seventeeth day) from the Appointed Date and shall continued with construction of the Railway Project. In this milestone, contractor has to provide On-board Kavach along with

all accessories in 8 locomotives and 2 no. of test bench. In this milestone, Contractor shall also have to complete positive assessment by ISA and submitted the Specific Application Safety Case (SASC) Report and documentation required for statutory sanction for Kavach deployed in ET-JBP section.

4.4 In this milestone the contractor shall complete design submission for KAVACH in all stations/LCs/IBHs of Jabalpur-Katni-Manikpur and Satna-Rewa section including KMA-SAGM and BNSP-OHAN section as mentioned in project milestone II- Para 3.4 for ET-JBP section.

4.5 Prior to the occurrence of Project Milestone-III, the Contractor shall have continued with construction of the Railway Project and submitted to the Authority duly and validly prepared Stage Payment Statements for an amount not less than 20% of the Contract Price.

4.6 In case positive assessment ISA for ET-JBP section is not done, Stage Payment Statements for an amount not less than 15% of the Contract Price will be submitted. 5% payment of the Contract Price will be done after completion of positive assessment by ISA and submitted the Specific Application Safety Case (SASC) Report and documentation required for statutory sanction for Kavach deployed in ET-JBP section.

5. Project Milestone-IV

5.1 Project Milestone-III shall occur on the date falling on the 480th (Four hundred eighteeth) day from the Appointed Date (the "**Project Milestone-IV**").

5.2 In this milestone installation of RFID Tags has to be completed on 420th day from the appointed date in all the stations and block sections of Jabalpur-Katni-Manikpur and Satna-Rewa including KMA-SAGM and BNSP-OHAN section to get the benefit of non signalling-based collision prevention features of Kavach with Kavach equipped Locomotives/Cabs in Non-Kavach territory.

5.3 Works should be completed in Jabalpur-Katni-Manikpur and Satna-Rewa including KMA-SAGM and BNSP-OHAN section on the 480th day from the Appointed Date and shall continued with construction of the Railway Project. In this milestone, contractor has to provide On-board Kavach along with all accessories in 8 locomotives. In this milestone, Contractor shall also have to complete positive assessment by ISA and submitted the Specific Application Safety Case (SASC) Report and documentation required for statutory sanction for Kavach deployed in Jabalpur-Katni-Manikpur and Satna-Rewa including KMA-SAGM and BNSP-OHAN section

5.4 In this milestone the contractor shall complete design submission for KAVACH in all stations/LCs/IBHs of KTE-KMZ-MAK section as mentioned in project milestone II for ET-JBP section.

5.5 In this milestone the contractor shall submit completion documents for ET-JBP section.

5.6 Prior to the occurrence of Project Milestone-IV, the Contractor shall have continued with construction of the Railway Project and submitted to the Authority

duly and validly prepared Stage Payment Statements for an amount not less than 45% of the Contract Price.

5.7 In case positive assessment ISA for Jabalpur-Katni-Manikpur and Satna-Rewa including KMA-SAGM and BNSP-OHAN section and ET-JBP section is not done, Stage Payment Statements for an amount not less than 35% of the Contract Price will be submitted. 10% payment of the Contract Price will be done after completion of positive assessment by ISA and submitted the Specific Application Safety Case (SASC) Report and documentation required for statutory sanction for Kavach deployed in Jabalpur-Katni-Manikpur and Satna-Rewa including KMA-SAGM and BNSP-OHAN section and ET-JBP section.

5.8 In case positive assessment ISA for any one or all sections as mentioned vide Para 4.3, para 5.3 is not done, Stage Payment Statements will be reduced by 5% per section as mentioned vide para 4.3, para 5.3. For avoidance of doubt, complete section as mentioned in para 4.3 or para 5.3, will be treated as single section individually. 5% payment per section as mentioned in para 4.3 or para 5.3 of the Contract Price will be done after completion of positive assessment by ISA and submitted the Specific Application Safety Case (SASC) Report and documentation required for statutory sanction for Kavach deployed in sections as mentioned vide Para 4.3 or para 5.3.

6. Project Milestone-V

6.1 Project Milestone-III shall occur on the date falling on the 690th (Six hundred nintyth) day from the Appointed Date (the "**Project Milestone-V**").

6.2 In this milestone installation of RFID Tags has to be completed on 630th day from the appointed date in all the stations and block sections of KTE-KMZ-MAKR, MAKR-MDVK (up to station limits of MAKR) & MAKR-AGD (up to station limits of MAKR) to get the benefit of non signalling-based collision prevention features of Kavach with Kavach equipped Locomotives/Cabs in Non-Kavach territory.

6.3 Works should be completed in KTE-KMZ-MAKR section on the 690th day from the Appointed Date and shall continued with construction of the Railway Project. In this milestone, contractor has to provide On-board Kavach along with all accessories in 8 locomotives. In this milestone, Contractor shall also have to complete positive assessment by ISA and submitted the Specific Application Safety Case (SASC) Report and documentation required for statutory sanction for Kavach deployed in KTE-KMZ-MAKR section.

6.4 In this milestone the contractor shall complete design submission & its approval for KAVACH in all stations/LCs/IBHs of New Katni Junction-'A'cabin-Mahdeiya section & Entire Katni Complex as mentioned in project milestone II for ET-JBP section.

6.5 In this milestone the contractor shall submit completion documents for Jabalpur-Katni-Manikpur and Satna-Rewa including KMA-SAGM and BNSP-OHAN section.

6.6 Prior to the occurrence of Project Milestone-V, the Contractor shall have continued with construction of the Railway Project and submitted to the Authority duly and validly prepared Stage Payment Statements for an amount not less than 65% of the Contract Price.

6.7 In case positive assessment ISA for any one or all sections as mentioned vide Para 4.3, para 5.3, Para 6.3 is not done, Stage Payment Statements will be reduced by 5% per section as mentioned vide para 4.3, para 5.3, Para 6.3. For avoidance of doubt, complete section as mentioned in para 4.3 or para 5.3, or Para 6.3 will be treated as single section individually. 5% payment per section as mentioned in para 4.3 or para 5.3, or Para 6.3 of the Contract Price will be done after completion of positive assessment by ISA and submitted the Specific Application Safety Case (SASC) Report and documentation required for statutory sanction for Kavach deployed in sections as mentioned vide Para 4.3 or para 5.3 or Para 6.3.

7. Project Milestone-VI

7.1 Project Milestone-VI shall occur on the date falling on the 900th (Nine hundredth) day from the Appointed Date (the "**Project Milestone-VI**").

7.2 In this milestone installation of RFID Tags has to be completed on 840th day from the appointed date in all the stations and block sections of New Katni Junction-'A'cabin-Mahdeiya section & Entire Katni Complex to get the benefit of non signalling-based collision prevention features of Kavach with Kavach equipped Locomotives/Cabs in Non-Kavach territory.

7.3 Works should be completed in New Katni Junction-'A'cabin-Mahdeiya section & Entire Katni Complex on the 900th day from the Appointed Date. In this milestone, contractor has to provide On-board Kavach along with all accessories in 8 locomotives. In this milestone, Contractor shall also have to complete positive assessment by ISA and submitted the Specific Application Safety Case (SASC) Report and documentation required for statutory sanction for Kavach deployed in New Katni Junction-'A'cabin-Mahdeiya section & Entire Katni Complex.

7.4 In this milestone the contractor shall submit completion documents for KTE-KMZ-MAKR section.

7.5 Prior to the occurrence of Project Milestone-VI, the Contractor shall have continued with construction of the Railway Project and submitted to the Authority duly and validly prepared Stage Payment Statements for an amount not less than 85% of the Contract Price.

7.6 In case positive assessment by ISA for any one or all sections as mentioned vide Para 4.3, para 5.3, Para 6.3, Para 7.3 is not done, Stage Payment Statements will be reduced by 5% per section as mentioned vide para 4.3, para 5.3, Para 6.3, Para 7.3. For avoidance of doubt, complete section as mentioned in para 4.3 or para 5.3, or Para 6.3 or Para 7.3 will be treated as single section individually. 5% payment per section as mentioned in para 4.3 or para 5.3, or Para 6.3 or Para 7.3 of the Contract

Price will be done after completion of positive assessment by ISA and submitted the Specific Application Safety Case (SASC) Report and documentation required for statutory sanction for Kavach deployed in sections as mentioned vide Para 4.3 or para 5.3 or Para 6.3 or Para 7.3.

8. Project Milestone-VII

8.1 Project Milestone-VII shall occur on the date falling on the 960th (Nine hundred sixthth) day from the Appointed Date (the "**Project Milestone-VII**").

8.2 In this milestone the contractor shall submit completion documents for KTE- New Katni Junction-'A'cabin-Mahdeiya section & Entire Katni Complex section.

8.3 Prior to the occurrence of Project Milestone-VII, the Contractor shall have submitted to the Authority duly and validly prepared Stage Payment Statements for an amount not less than 90% of the Contract Price.

9 Scheduled Completion Date

9.1 The Scheduled Completion Date shall be the 960th (Nine Hundred Sixtyth) day from the Appointed Date.

9.2 On or before the Scheduled Completion Date, the Contractor shall have completed construction in accordance with this Agreement.

10 Extension of time

Upon extension of any or all of the aforesaid Project Milestones or the Scheduled Completion Date, as the case may be, under and in accordance with the provisions of this Agreement, the Project Completion Schedule shall be deemed to have been amended accordingly.

*****

SCHEDULE - J

(See Clause 12.1.2)

Tests on Completion

1 Schedule for Tests

1.1 The Contractor shall, no later than 30 (thirty) days prior to the likely completion of construction, notify the Authority Engineer and the Authority of its intent to subject the Railway Project to Tests, and no later than 10 (ten) days prior to the actual date of Tests, furnish to the Authority Engineer and the Authority detailed inventory and particulars of all works and equipment forming part of Works.

1.2 The Contractor shall notify the Authority Engineer of its readiness to subject the Railway Project to Tests at any time after 10 (ten) days from the date of such notice, and upon receipt of such notice, the Authority Engineer shall, in consultation with the Contractor, determine the date and time for each Test and notify the same to the Authority who may designate its representative to witness the Tests. The Authority Engineer shall thereupon conduct the Tests itself or cause any of the Tests to be conducted in accordance with Article 12 and this Schedule-J.

2 Tests

2.1 Visual and physical test: The Authority Engineer shall conduct a visual and physical check of construction to determine that all works and equipment forming part thereof conform to the provisions of this Agreement. The physical tests shall include [***].

2.2 Integrated Testing of system followed by a period of trial running. The test sequence may be as shown below:-

a) Tests on Equipment
b) Installation Test and sub-system individually
c) System Integrated Test
d) Final Acceptance Test
e) Trial Running

2.3 Sanction of Commissioner of Railway Safety (CRS) is required before opening of track in terms of Chapter XIII of Indian Railway Permanent Way Manual.

2.4 [Riding quality of track and recording of various track parameters on electronic track recording car will be arranged and run by the Authority. This run will be scheduled after the floating parameters recorded are found to be within acceptable limits. The TGI value of this trial run shall be more than (specify value)].

2.5 Tests for bridges: All major and minor bridges shall be subjected to the tests as prescribed in Specifications and Standards in Schedule D.

2.6 Other tests: The Authority Engineer may require the Contractor to carry out or cause to be carried additional tests, in accordance with Good Industry Practice, for determining the compliance of the Railway Project with Specifications and Standards.

2.7 Environmental audit: The Authority Engineer shall carry out a check to determine conformity of the Railway Project with the environmental requirements set forth in Applicable Laws and Applicable Permits.

2.8 Safety Audit: The Authority Engineer shall carry out, or cause to be carried out, a safety audit to determine conformity of the Railway Project with the safety requirements and Good Industry Practice.

3 Agency for conducting Tests

All Tests set forth in this Schedule-J shall be conducted by the Authority Engineer or such other agency or person as it may specify in consultation with the Authority.

4 Completion Certificate

Upon successful completion of Tests, the Authority Engineer shall issue the Provisional Certificate in accordance with the provisions of Article 12. For the avoidance of doubt, the Completion Certificate shall not be issued by the Authority Engineer unless authorisation of the Commissioner for Railway Safety has been obtained.

NOTE: The quality and integrity of the installation remains complete responsibility of the OEM. The firm must provide an OEM certificate regarding this before commissioning of any installation, any deficiency pointed out later, shall be done free of cost by OEM. This shall be confirmed by OEM before commissioning.

*****

SCHEDULE - K

(See Clause 12.2 and 12.4)

1. PROVISIONAL CERTIFICATE

1 I/We, ……. (Name of the Authority Engineer), acting as the Authority Engineer, under and in accordance with the Agreement dated ……. (the "**Agreement**"), for provision of Survey, design, supply, installation, testing and commissioning of trackside KAVACH (Indian Railway Automatic Train Protection System) equipments at stations/LC Gates/IBS locations including OFC works. erection of towers and associated Civil/Track/Electrical works required for KAVACH in ITARSI-MANIKPUR, MAHDEIYA-BINA MALKHERI-MAHADEOKHERI, Entire KATNI COMPLEX, BINA MALKHERI-AGASOD, SATNA-REWA, KAIMA-SAGMA, BANSAPAHAR-OHAN of Jabalpur Division of West Central Railway on Engineering, Procurement and Construction(EPC) basis through …… (Name of Contractor), hereby certify that the Tests in accordance with Article 12 of the Agreement have been undertaken to determine compliance of the Railway Project with the provisions of the Agreement.

2 Certain minor works are incomplete and these are not likely to cause material inconvenience to the Users of the Railway Project or affect their safety or the movement of rail traffic in any manner. These works have been specified in the Punch List appended hereto, and the Contractor has agreed and accepted that it shall complete all such works in the time and manner set forth in the Agreement.

3 In view of the foregoing, I/We am/are satisfied that the Railway Project from km ..... to km ..... can be safely and reliably placed in service of the Authority for railway freight and passenger traffic, subject to authorisation by the Commissioner of Railway Safety in accordance with Applicable Laws. In terms of the Agreement, the Railway Project is hereby provisionally declared fit for entry into operation on this the …… day of …….. 20…...

ACCEPTED, SIGNED, SEALED AND DELIVERED For and on behalf of CONTRACTOR by:	SIGNED, SEALED AND DELIVERED For and on behalf of AUTHORITY ENGINEER by:
(Signature)	(Signature)

2. COMPLETION CERTIFICATE

1 I/We, ……. (Name of the Authority Engineer), acting as the Authority Engineer, under and in accordance with the Agreement dated …… (the "**Agreement**"), for provision of Survey, design, supply, installation, testing and commissioning of trackside KAVACH (Indian Railway Automatic Train Protection System) equipments at stations/LC Gates/IBS locations including OFC works. erection of towers and associated Civil/Track/Electrical works required for KAVACH in ITARSI-MANIKPUR, MAHDEIYA-BINA MALKHERI-MAHADEOKHERI, Entire KATNI COMPLEX, BINA MALKHERI-AGASOD, SATNA-REWA, KAIMA-SAGMA, BANSAPAHAR-OHAN of Jabalpur Division of West Central Railway on Engineering, Procurement and Construction (EPC) basis through ……. (Name of Contractor), hereby certify that the Tests in accordance withArticle 12 of the Agreement have been successfully undertaken to determine compliance of the Railway Project with the provisions of the Agreement,and the authorisation by the Commissioner for Railway Safety/ Railway Authority (as required) under Applicable Laws has been obtained.

2 It is certified that, in terms of the aforesaid Agreement, all works forming part of Railway Project have been completed, and the Railway Project is hereby declared fit for entry into operation on this the …… day of …… 20…..

SIGNED, SEALED AND DELIVERED

For and on behalf of

the Authority Engineer by:

(Signature)

(Name)

(Designation)

(Address)

SCHEDULE - L
(See Clause 16.1.1)

SELECTION OF AUTHORITY ENGINEER

1 Selection of Authority Engineer

1.1 Authority shall appoint a railway engineer/ Project Management Services (PMS) Agency, to be the engineer as set forth in Article 16, to be the engineer under this Agreement (the "Authority Engineer").

Generally, a railway officer of Selection Grade (SG)/Junior Administrative Grade (JAG)/Project Management Services (PMS)***Agencyshall be appointed as Authority Engineer. Authority shall notify the Contractor in writing of the appointment and identity of the Authority Engineer and of any replacement thereof from time to time.***

2 Terms of Reference

The Terms of Reference for the Authority Engineer (the "**TOR**") shall substantially conform with Annex 1 to this Schedule L.

Annex – I
(Schedule - L)

DUTIES & RESPONSIBILITIES FOR AUTHORITY ENGINEER

1 Scope

1.1 These Duties & Responsibilities (DR) shall apply to construction and maintenance (wherever applicable) of the Railway Project.

2 Definitions and interpretation

2.1 The words and expressions beginning with or in capital letters and not defined herein but defined in the Agreement shall have, unless repugnant to the context, the meaning respectively assigned to them in the Agreement.

2.2 References to Articles, Clauses and Schedules in this DR shall, except where the context otherwise requires, be deemed to be references to the Articles, Clauses and Schedules of the Agreement, and references to Paragraphs shall be deemed to be references to Paragraphs of this DR.

2.3 The rules of interpretation contained in Clauses 1.2, 1.3 and 1.4 of the Agreement shall apply, *mutatis mutandis*, to this DR.

3. General

3.1 The Authority Engineer shall discharge its duties in a fair, impartial and efficient manner, consistent with the highest standards of professional integrity and Good Industry Practice.

3.2 The Authority Engineer shall perform the duties and exercise the authority in accordance with the provisions of this Agreement, but subject to obtaining prior written approval of the Authority (where Authority Engineer is designated as the Authority, the compliance of these conditions have to be ensured by him/her) before determining:

(a) any Time Extension;

(b) any additional cost to be paid by the Authority to the Contractor;

(c) the Termination Payment;

(d) providing Power Block or Traffic Block to the Contractor;

(e) approval of signalling plan and signalling plan and route control chart;

(f) approval of disconnections for modification of signalling and telecom works;

(g) any other matter which is not specified in (a) to (f)above and which creates an obligation or liability on either Party for a sum exceeding Rs.5,000,000/- (Rupees fifty lakh).

3.3 The Authority Engineer shall submit regular periodic reports, at least once every month, to the Authority in respect of its duties and functions assigned to him for the project. Such reports shall be submitted by the Authority Engineer within 10 (ten) days of the beginning of every month.

3.4 The Authority Engineer shall aid and advise the Authority on any proposal for Change of Scope under Article 13.

3.5 In the event of any disagreement regarding the meaning, scope and nature of Good Industry Practice, as set forth in any provision of the Agreement, the Authority Engineer shall specify such meaning, scope and nature by issuing a reasoned written statement relying on Good Industry Practice and authentic literature.

3.6 The Authority Engineer shall verify the as built drawings submitted by the Contractor after completion of the works. These drawings will be signed by the Authority Engineer after due verification.

4. Construction Period

4.1 During the Construction Period, the Authority Engineer shall review the Drawings furnished by the Contractor along with supporting data, including the geo-technical and hydrological investigations, characteristics of materials from borrow areas and quarry sites and topographical surveys. The Authority Engineer shall complete such review and send its observations to the Authority and the Contractor within 15 (fifteen) days of receipt of such Drawings; provided, however that in case of an Important Bridge, a Major Bridge or Structure, and interlocking and telecom switching equipment the aforesaid period of 15 (fifteen) days may be extended up to 30 (thirty) days. In particular, such comments shall specify the conformity or otherwise of such Drawings with the Scope of the Project and Specifications and Standards.

4.2 The Authority Engineer shall review any revised Drawings sent to it by the Contractor and furnish its comments within 10 (ten) days of receiving such Drawings.

4.3 The Authority Engineer shall review the Quality Assurance Plan submitted by the Contractor and shall convey its comments to the Contractor within a period of 21 (twenty-one) days stating the modifications, if any, required thereto.

4.4 The Authority Engineer shall complete the review of the methodology proposed to be adopted by the Contractor for executing the Works, and convey its comments to the Contractor within a period of 10 (ten) days from the date of receipt of the proposed methodology from the Contractor. The Authority Engineer shall draw the non-interlocking programme for works involving existing yards and issue a jointly agreed NI programme for each such yard.

4.5 The Authority Engineer shall grant written approval to the Contractor, where necessary, for interruption and diversion of the flow of traffic in the existing lane(s) of the Railway Project for purposes of maintenance during the Construction Period in.

4.6 The Authority Engineer shall review the monthly progress report furnished by the Contractor and send its comments thereon to the Authority and the Contractor within 7 (seven) days of receipt of such report.

4.7 The Authority Engineer shall inspect the Construction Works and the Railway Project and shall submit a monthly Inspection Report bringing out the results of inspections and the remedial action taken by the Contractor in respect of Defects or deficiencies.

4.8 The Authority Engineer shall conduct the pre-construction review of manufacturer's test reports and standard samples of manufactured Materials, and such other Materials as the Authority Engineer may require.

4.9 For determining that the Works conform to Specifications and Standards, the Authority 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 the Agreement and in accordance with Good Industry Practice for quality assurance. For purposes of this Paragraph 4.9, the tests specified in RDSO specifications/Railway Manuals or any modification/substitution thereof shall be deemed to be tests conforming to Good Industry Practice for quality assurance.

4.10 The Authority Engineer shall test check prescribed in this agreement for each category or type of test for quality control by the Contractor.

4.11 The timing of tests referred to in Paragraph 4.9, and the criteria for acceptance/ rejection of their results shall be determined by the Authority Engineer in accordance with the Quality Control Manuals. The tests shall be undertaken on a random sample basis and shall be in addition to, and independent of, the tests that may be carried out by the Contractor for its own quality assurance in accordance with Good Industry Practice.

4.12 In the event that results of any tests conducted under Clause 11.10 establish any Defects or deficiencies in the Works, the Authority Engineer shall require the Contractor to carry out remedial measures.

4.13 The Authority Engineer may instruct the Contractor to execute any work which is urgently required for the safety of the Railway Project, whether because of an accident, unforeseeable event or otherwise; provided that in case of any work required on account of a Force Majeure Event, the provisions of Clause 19.6 shall apply.

4.14 In the event that the Contractor fails to achieve any of the Project Milestones, the Authority Engineer shall undertake a review of the progress of construction and identify potential delays, if any. If the Authority Engineer shall determine that completion of the Railway Project is not feasible within the time specified in the Agreement, it shall require the Contractor to indicate within 15 (fifteen) days the steps proposed to be taken to expedite progress, and the period within which the Project Completion Date shall be achieved. Upon receipt of a report from the Contractor, the Authority Engineer shall review the same and send its comments to the Authority and the Contractor forthwith.

4.15 The Authority Engineer shall obtain from the Contractor a copy of all the Contractor's quality control records and documents before the Completion Certificate is issued pursuant to Clause 12.4.

4.16 Authority Engineer may recommend to the Authority suspension of the whole or part of the Works if the work threatens the safety of the public and pedestrians. After the Contractor has carried out remedial measure, the Authority Engineer shall inspect such remedial measures forthwith and make a report to the Authority recommending whether or not the suspension hereunder may be revoked.

4.17 In the event that the Contractor carries out any remedial measures to secure the safety of suspended works and the public, and requires the Authority Engineer to inspect such works, the Authority Engineer shall inspect the suspended works within 3 (three) days of receiving such notice, and make a report to the Authority forthwith, recommending whether or not such suspension may be revoked by the Authority.

4.18 The Authority Engineer shall carry out, or cause to be carried out, all the Tests specified in Schedule-J and issue a Completion Certificate or Provisional Certificate, as the case may be. For carrying out its functions under this Paragraph 4.18 and all matters incidental thereto, the Authority Engineer shall act under and in accordance with the provisions of Article 12 and Schedule-J.

4A Maintenance Period

(i) The Authority Engineer shall aid and advise the Contractor in the preparation of its monthly Maintenance Programme and for this purpose carry out a joint monthly inspection with the Contractor.

(ii) The Authority Engineer shall undertake regular inspections, at least once every month, to evaluate compliance with the Maintenance Requirements and submit a Maintenance Inspection Report to the Authority and the Contractor.

(iii) The Authority Engineer shall specify the tests, if any, that the Contractorshall carry out, or cause to be carried out, for the purpose of determining that the Project KAVACH is in conformity with the Maintenance Requirements. It shall monitor and review the results of such tests and the remedial measures, if any, taken by the Contractor in this behalf.

(iv) In respect of any defect or deficiency referred to in Paragraph 3 of Schedule- Q, the Authority Engineer shall, in conformity with Good Industry Practice, specify the permissible limit of deviation or deterioration with reference to the Specifications and Standards and shall also specify the time limit for repair or rectification of any deviation or deterioration beyond the permissible limit.

(v) The Authority Engineer shall examine the request of the Contractor for closure of working or operational equipment/systems of the Project KAVACH for undertaking maintenance/repair thereof, and shall grant permission with such modifications, as it may deem necessary, within 3 (three) days of receiving a request from the Contractor. Upon expiry of the permitted period of closure, the Authority Engineer shall monitor the reopening of such equipment/system, and in

case of delay, determine the Damages payable by the Contractor to the Authority under Clause 15A.4.

5. Determination of costs and time

5.1 The Authority Engineer shall determine the costs, and/or their reasonableness, that are required to be determined by it under the Agreement.

5.2 The Authority Engineer shall determine the period of Time Extension that is required to be determined by it under the Agreement.

5.3 The Authority Engineer shall consult each Party in every case of determination in accordance with the provisions of Clause 16.5.

6. Payments

6.1 The Authority Engineer shall withhold payments for the affected works for which the Contractor fails to revise and resubmit the Drawings to the Authority Engineer in accordance with the provisions of Clause 10.2.7 (d).

6.2 Authority Engineer shall -

(a) within 10 (ten) days of receipt of the Stage Payment Statement from the Contractor pursuant to Clause 17.4, determine the amount due to the Contractor and recommend the release of 80 (eighty) percent of the amount so determined as part payment, pending issue of the Interim Payment Certificate; and

(b) within 20 (twenty) days of the receipt of the Stage Payment Statement referred to in Clause 17.4, deliver to the Authority and the Contractor an Interim Payment Certificate certifying the amount due and payable to the Contractor.

7. Other duties and functions

The Authority Engineer shall perform all other duties and functions as specified in the Agreement.

8. Miscellaneous

8.1 A copy of all communications, comments, instructions, Drawings or Documents sent by the Authority Engineer to the Contractor pursuant to this TOR, and a copy of all the test results with comments of the Authority Engineer thereon, shall be furnished by the Authority Engineer to the Authority forthwith.

8.2 The Authority Engineer shall retain at least one copy each of all Drawings and Documents received by it, including 'as-built' Drawings, and keep them in its safe custody.

8.3 Within 90 (ninety) days of the Project Completion Date, the Authority Engineer shall obtain a complete set of as-built Drawings, in 2 (two) hard copies and in

micro film form or in such other medium as may be acceptable to the Authority, reflecting the Railway Project as actually designed, engineered and constructed, including an as-built survey illustrating the layout of the Railway Project and setback lines, if any, of the buildings and structures forming part of Project Facilities; and shall hand them over to the Authority against receipt thereof.

8.4 The Authority Engineer shall inform the Authority and the Contractor of any event of Contractor's Default within one week of its occurrence.

SCHEDULE - M

(See Clauses 17.4.1, 17.6.1, and 17.6.1)

Forms of Payment Statements

1. Stage Payment Statement for Works

The Stage Payment Statement for Works shall state:

(a) the estimated amount for the Works executed in accordance with Clause 17.3.1 subsequent to the last claim;

(b) amounts reflecting adjustments in price for the aforesaid claim;

(c) the estimated amount of each Change of Scope Order executed subsequent to the last claim;

(d) amounts reflecting adjustment in price, if any, for (c) above in accordance with the provisions of Clause 13.2.3 (a);

(e) total of (a), (b), (c) and (d) above;

(f) Deductions:

  (i) Any amount to be deducted in accordance with the provisions of the Agreement except taxes;

  (ii) Any amount payable by the Contractor to the Authority under the provisions of the Agreement; and

  (iii) Any amount towards deduction of taxes at source under Applicable Laws.

  (iv) Total of (i) to (iii) above.

(g) Net claim: (e) – (f) (iv);

(h) The amounts received by the Contractor up to the last claim:

  (i) For the Works executed (excluding Change of Scope orders);

  (ii) For Change of Scope Orders, and

  (iii) Taxes deducted at source under Applicable Laws

1A. Monthly Maintenance Payment Statement

The monthly Statement for Maintenance Payment shall state:

(a) the monthly payment admissible in accordance with the provisions of the Agreement;

(b) the deductions for maintenance work not done;

(c) net payment for maintenance due, (a) minus (b);

(d) amounts reflecting adjustments in price under Clause 17.9a; and

(e) amount towards deduction of taxes.

2. Contractor's claim for Damages

Note: The Contractor shall submit its claims in a form acceptable to the Authority.

SCHEDULE - N
(See Clause 18.1)

INSURANCE

1. Insurance during Construction Period

1.1 The Contractor shall effect and maintain at its own cost, from the Appointed Date till the date of issue of the Completion Certificate, the following insurances for any loss or damage occurring on account of Non Political Event of Force Majeure, malicious act, accidental damage, explosion, fire and terrorism:

(a) insurance of Works, Plant and Materials and an additional sum of [15% (fifteen per cent)] of such replacement cost to cover any additional costs of and incidental to the rectification of loss or damage including professional fees and the cost of demolishing and removing any part of the Works and of removing debris of whatsoever nature; and

(b) insurance for the Contractor's equipment and Documents brought onto the Site by the Contractor, for a sum sufficient to provide for their replacement at the Site.

1.2 The insurance under paragraph 1.1 (a) and (b) above shall cover the Authority and the Contractor against all loss or damage from any cause arising under paragraph 1.1 other than risks which are not insurable at commercial terms.

2. Insurance for Contractor's Defects Liability

The Contractor shall effect and maintain insurance cover for the Works from the date of issue of the Completion Certificate until the end of the Defects Liability Period for any loss or damage for which the Contractor is liable and which arises from a cause occurring prior to the issue of the Completion Certificate. The Contractor shall also maintain other insurances for maximum sums as may be required under Applicable Laws and in accordance with Good Industry Practice.

3. Insurance against injury to persons and damage to property

3.1 The Contractor shall insure against its liability for any loss, damage, death or bodily injury, or damage to any property (except things insured under Paragraphs 1 and 2 of this Schedule) or to any person (except persons insured under Clause 18.9), which may arise out of the Contractor's performance of this Agreement. This insurance shall be for a limit per occurrence of not less than the amount specified below with no limit on the number of occurrences.

The insurance cover shall be not less than: Rs. [**.....**]

3.2 The insurance shall be extended to cover liability for all loss and damage to the Authority's property arising out of the Contractor's performance of this Agreement excluding:

(a) the Authority's right to have the construction works executed on, over, under, in or through any land, and to occupy this land for the Works; and

(b) damage which is an unavoidable result of the Contractor's obligations to execute the Works.

4. Insurance to be in joint names

The insurance under paragraphs 1 to 3 above shall be in the joint names of the Contractor and the Authority.

*****

SCHEDULE - O

(See Clauses 4.6 &4.7)

Provision of Traffic Blocks and Power Blocks

1. Provision of Traffic Blocks Power Blocks and Disconnections

1.1 The authority shall provide Power Blocks or Traffic Blocks or Power 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 work as may be determined by the Authority Engineer. The maximum aggregate duration of blocks for the Railway Project shall be [***] hours.

1.2 The Contractor is entitled to execute the construction work within the block period specified in this Schedule-O. The total duration of Power Block or Traffic Block or both, as the case may be, shall not exceed 20% of the period specified in this Agreement. In case such total duration exceeds 20% the Contractor shall pay Damages at the rate of [Rs.***] per hour or part thereof for the exceeded Block periods.

1.3 The Authority shall arrange for disconnections of S&T system as determined by Authority Engineer, to enable the Contractor to execute the construction work which affects existing Signalling and Telecommunication installations.

*****

SCHEDULE - P

(See Clauses 4.4)

Machinery and equipment

2 The Authority shall provide the following machinery and equipment to the Contractor at the daily rates shown against each machinery and equipment:

S. No.	Particulars of each type of machinery and equipment	[Daily rate in rupees in rounded figures.]

NOTE: No Railway equipment is expected to be utilised for this work.

Note: For Machines and T&P whose hire charges on not mentioned above, the monthly rate for those machines/ equipment shall be equal to 2% (two per cent) of the cost of such machine or equipment, as published in the latest Pink Book of Ministry of Railways. If the cost of any machine or equipment has not been published in the latest Pink Book, then the last purchase price thereof, shall be applicable for determining the charges for such machine or equipment.

*****

Schedule-Q
Maintenance Requirements

1. **Maintenance Requirements**

(i) The Contractor shall, at all times maintain the Project KAVACH in accordance with the provisions of this Agreement, Applicable Laws and Applicable Permits.

(ii) The Contractor shall repair or rectify any Defect or deficiency within the time limit as specified by Authority Engineer and any failure in this behalf shall constitute non-fulfillment of the Maintenance obligations by the Contractor. Upon occurrence of any breach hereunder, the Authority shall be entitled to effect reduction in monthly lump sum payment as set forth in Clause 15A.5 of this Agreement, without prejudice to the rights of the Authority under this Agreement, including Termination thereof.

(iii) All Materials used /provided during the maintenance period, shall be in conformity with RDSO Specifications/Guidelines/Technical Advisory Notes (TANs) as applicable and will be compatible to the installed system in operation. Standard drawings / Good Industry Practice shall be adopted for these materials/works for which RDSO specification/TAN/guidelines are not available. [Specify all the relevant documents]

(iv) Any updation, upgradation, modification in software (executive/application or other) arising due to requirement of latest version of RDSO specifications/Guidelines/TANs issued time to time during maintenance period, shall be done by the contractor at his own cost with prior confirmation from Authority Engineer. This does not include migration/change of technology.

2. **Prompt Response Teams**

(i) The Contractor shall engage trained personnel and constitute teams comprising of at least 2 (two) such personnel each to provide a prompt response for Unscheduled Maintenance and for carrying out the Consumables Replenishment Schedule outside the Maintenance Depots and for confirming with the Maintenance Requirements (the "Prompt Response Teams" or "PR Teams"). The Contractor shall ensure that one PR Team is available for approximately every [100 (hundred) Kms]. Such that PR Teams are able reach their destination, along with suitable maintenance kit, within [90 (ninety) minutes] of being notified of an event requiring Unscheduled Maintenance hereunder. For the avoidance of doubt, the Parties expressly agree that the Contractor may, with the consent of the Authority, employee other forms of prompt response which can be demonstrated as equivalent to or better than the prompt response specified herein.

(ii) The PR Team shall, to the extent possible, repair and rectify the defects and deficiencies, including those specified in the Maintenance Requirements, and notify the Authority of further repairs, if any, required to be taken for safe and reliable operation of the KAVACH system. Upon receiving such report, the Parties agree to take action as may be necessary to procure safe and reliable operation of the KAVACH system.

(iii) The Parties agree that the obligation of the Contractor to provide PR Teams shall be restricted to Project.

(iv) The helpline stated in 15A.2.2(i) will also be used to monitor and maintain NMS of KAVACH

3. **Tests**

For determining that the Project KAVACH conforms to the Maintenance Requirements, the Authority Engineer shall require the Contractor to carry out, or

cause to be carried out, Tests specified by him or in accordance with Good Industry Practice. The Contractor shall, with due diligence, carry out or cause to be carried out all such Tests in accordance with the instructions of the Authority Engineer and furnish the results of such Tests forthwith to the Authority' Engineer.

4. **Other Defects and Deficiencies**

In respect of any Defect or deficiency not specified in Annex - I of this Schedule-Q, the Authority Engineer may, in conformity with Good Industry Practice, specify the permissible limit of deviation or deterioration with reference to the Specifications and Standards, and any deviation or deterioration beyond the permissible limit shall be repaired or rectified by the Contractor within the time limit specified by the Authority Engineer.

5. **Extension of Time Limit for Rectification**

Notwithstanding anything to the contrary specified in this Schedule-Q, if the nature and extent of any Defect or deficiency justifies more time for its repair or rectification than the time specified herein, the Contractor shall be entitled to additional time in conformity with Good Industry Practice. Such additional time shall be determined by the Authority Engineer and conveyed to the Contractor and the Authority with reasons thereof.

6. **Emergency Repairs/Restoration**

Notwithstanding anything to the contrary contained in this Schedule-Q, if any Defect, deficiency or deterioration in the Project KAVACH poses a hazard to safety or risk of damage to property, the Contractor shall promptly take all reasonable measures for eliminating or minimizing such danger.

7. **Maintenance record by the Contractor**

The Contractor shall, through its engineer, shall maintain a record of inspections undertaken on a day to day basis in a register to be kept in such form and manner as the Authority Engineer may specify. Such record shall be kept in safe custody of the Contractor and shall be open to inspection by the Authority and the Authority Engineer at any time during office hours.

8. **Repairs on Account of Natural Calamities**

All damages occurring to the Project KAVACH on account of a Force Majeure Event or wilful default or neglect of the Authority shall be undertaken by the Authority at its own cost. The Authority may instruct the Contractor to undertake the repairs at the rates agreed between the Parties.

9. **Epidemic Defect Warranty**

(i) The Contractor agrees that if any identical defect or deficiency occurs on more than 20% (twenty percent) of KAVACH equipments installed in Project, in any rolling period of 36 (thirty six) months commencing from the date of supply, such defect or deficiency shall be deemed to be an epidemic defect (the "Epidemic Defect") and Contractor shall cover such epidemic defect under epidemic defect warranty to be maintained by Contractor for the Maintenance Period (The "Epidemic Defect Warranty"). In addition, any manufacturing defect observed in KAVACH equipment will be rectified/replaced free of cost by the contractor.

(ii) If during the Agreement Period, the Authority notifies the Contractor that an Epidemic Defect has occurred, the Contractor shall remedy such Epidemic Defect on all KAVACH equipments, and shall undertake such other work and measures as may be necessary for enabling the KAVACH System to continue in operation in conformity with the Maintenance Obligations until such defects are rectified. Within 30 (thirty) days having

been notified of such Epidemic Defects by the Authority, the Contractor shall submit to the Authority a programme for rectification of the Epidemic Defects as soon as practicable and the Contractor and the Authority shall negotiate and agree to such programme in good faith, within a period of 30 (thirty) days after receipt of such programme.

(iii) If Contractor and the Authority are unable to agree to a programme within 30 (thirty) days of its receipt, the Authority may rectify the defect, or cause rectification of the defect, at the Contractor's cost and expense, and recover the same from the Contractor in accordance with Clause 15A.6, along with the Damages specified therein.

10. **Distribution of Roles and Responsibility for KAVACH equipments**

10(a) **Authority**

(i) Maintenance of earthing of equipments.
(ii) Maintenance of KAVACH E1 network for NMS connectivity
(iii) Tracking for any changes in yard.
(iv) Maintenance of RFID tags (excluding programming)
(v) Checking PSR resulting in KAVACH Application Logic alterations
(vi) Maintenance of towers, OFC and Signalling systems other than KAVACH.

10(b) **Contractor**

i) Maintenance of complete way side KAVACH equipment including modems, sub assembly cards, GPS and GSM modules and other items excluding items covered in 10(a) above supplied by the contractor.

ii) Maintenance of on board KAVACH equipment including BIU, DMI, RFID reader, pulse generator, modems, sub assembly cards, GPS and GSM modules and other items supplied by the contractor.

iii) Maintenance of test benches for way side and on board KAVACH systems installed in stations and loco sheds

iv) Maintenance of lab models installed in training institutes

v) Maintenance of NMS server (hardware and software) and connected modems and other sub systems

vi) Maintenance of radio modems and radio antenna

vii) Maintenance of power supply items associated with KAVACH system supplied by the contractor.

viii) Carrying out RSSI survey on quarterly basis and submission of report.

ix) In case of any damage, theft of RFID tags, the same shall be programmed and reinstalled by Contractor. RFID tag for this purpose may be supplied by Railway (from procured spares)

x) Notwithstanding above, the contractor shall maintain the KAVACH system during maintenance period ensuring fitness of the purpose.

*****

Annex-I, Schedule-Q

Maintenance Schedule

Item No.	Location	Maintenance task description	Frequency	Responsibility of maintenance (Railway)	Responsibility of maintenance (Contractor)
To be filled by Zonal Railway					
1					
2					
3					
4					
5					
6					
-					
-					
-					
-					

Note:

1. Maintenance Schedule (Stationery & Onboard KAVACH) may be based on schedule issued by RDSO vide letter no. RDSO-SIG0MISC(Gen)/1/2021 dated 27.12.2021 or latest.
2. Zonal Railway may further modify Maintenance Schedule of RDSO with approval of PCSTE as per field requirement.

*****

Schedule-R

Payment Reduction for Non-Compliance

1. Payment reduction for breach of Maintenance Obligations.

(i) Monthly lump sum payments for maintenance shall be reduced in the case of noncompliance with the Maintenance Requirements set forth in Schedule-Q.

(ii) Any deduction made on account of non-compliance with the Maintenance Requirements shall not be paid even after compliance subsequently. The deductions shall continue to be made every month until compliance is done.

(iii) The Authority Engineer shall calculate the amount of payment reduction in the event that the contractor fails to carry out Maintenance Requirements set forth in Schedule-Q, it shall be deemed to be breach of this Agreement and the Authority shall be entitled to recover Damages, to be calculated and paid for each day of delay at the rate of 0.5% (zero point five percent) of the Maintenance fee of that month for respective Wayside Station/Locomotive. Recovery of such Damages shall be without prejudice to the rights of the Authority under this Agreement, including the right of Termination thereof.

(iv) For delay in repairing or rectification of any defect or deficiency in respective Wayside Station/ locomotive beyond a reasonable time as decided by Authority Engineer, a lumpsum penality may be imposed on contractor by Authority Engineer.

*****

Schedule-S

Tests on Completion of Maintenance Period

1. Visual and Physical Test:

The Authority Engineer shall conduct a visual and physical check of construction to determine that all works and equipment forming part thereof conform to the provisions of this Agreement.

1. **Quality Test:**

Quality test: Quality parameters of each equipment of the system shall be checked. The quality tests shall include measurement of parameters be as per the requirement of maintenance mentioned in Schedule-Q.

*****

Schedule-T

Taking Over Certificate

I, ……. (Name and designation of the Authority's Representative) under and in accordance with the Agreement dated …… (the "Agreement"), for [construction of the

****section (km ** to km **) of

****] (the "Project KAVACH") on Engineering, Procurement and Construction (EPC) basis through (Name of Contractor), hereby certify that the Tests on completion of

Maintenance Period in accordance with Article 15A of the Agreement have been successfully undertaken to determine compliance of the Project KAVACH with the provisions of the Agreement and I hereby certify that the Authority has taken over the Project KAVACH from the Contractor on this day.....

SIGNED, SEALED AND DELIVERED

(Signature)

(Name and designation of Authority's Representative) (Address

*****

The End of Schedules.

Appendices

APPENDIX-I

LIST OF BID-SPECIFIC CLAUSES[$]

A. Clauses with non-numerical ($) footnotes:

1. Clause 3.2.1 : Obligation relating to sub-contracts and any other agreements
2. Clause 13.5.1 : Power of the Authority to undertake works
3. Article 26 : Definition of Consortium/Joint Venture
4. Schedule-F, Annexure-I : Item (C)-8
5. Schedule-F, Annexure-III : Item (B) and Item (C)-8

B. Clauses with curly { } brackets:

1. Recital : Para 2
2. Clause 1.5 : Joint and several liability
3. Clause 3.2.1 : Obligations relating sub-contracts and any other agreements
4. Clause 5.1 (l) : Representations and warranties of the Contractor
5. Article 26 : Definition of "Affiliate", "Consortium/Joint Venture" and "Lead Member"
6. Contract Agreement : 'Signature' page
7. Schedule-F, Annexure-I : Item (B) and Item (C) 1
8. Schedule-F, Annexure-III : Item (B)

[$] This Appendix-I contains a list of clauses that would need to be suitably modified for reflecting bid-specific provisions after the contractor has been selected. This Appendix-I may be included in the draft EPC Agreement forming part of the bid documents. It may, however, be deleted when the Contract Agreement is to be executed.

C. Clauses with Blank Spaces (.....), (***)

1. First line of the Concession Agreement
2. Recital : Para 2
3. Recital : Item A, B, C and D
4. Clause 3.9 : Training of Authority's Personnel
5. Clause 17.1.1 : Contract Price
6. Schedule-F, Annexure-I : Item A, B and C
7. Schedule-F, Annexure-I : Signing Date
8. Schedule-F, Annexure-II : Item A and C
9. Schedule-F, Annexure-II : Signing Date
10. Schedule-F, Annexure-III : Item A, B and C
11. Schedule-F, Annexure-III : Signing Date
12. Schedule-L, Annexure-I : Clause 1.1 : Scope

APPENDIX-II

LIST OF PROJECT SPECIFIC CLAUSES[24]

DELETED

[24] Deleted

APPENDIX-III

Undertaking From RDSO approved Kavach OEM

To,
General Manager (S&T)
West Central Railway,
Jabalpur

Undertaking
Dear Sir,

We, ----------(Original Equipment Manufacturer), having our office at ----------, hereby state that we are RDSO approved Original Equipment Manufacturer of KAVACH (Train Collision Avoidance System) (Specification: RDSO/SPN/196/2020,Ver. 4.0 or latest) and give our consent for supply, installation, testing, commissioning and to provide CAMC support for KAVACH (Train Collision Avoidance System) system to ----------(Bidder), having its registered Office at ---------- subject to the terms and conditions agreed mutually between M/s ----------(OEM) and ----------(Bidder).

We also undertake and guarantee that all maintenance spares and tools required for the KAVACH equipment during its codal life as defined by Indian Railways shall be available on payment at mutually agreed terms. We agree to supply the additional equipment required for replacement/expansion of the network due to additional traffic requirements at terms and conditions to be mutually agreed. At least one year notice shall be given to Railways before any equipment or components are discontinued or phased out from the manufacturing plans.

We further ensure the availability of all components / modules / subsystems required and repair services for keeping the System in working order in accordance with the tender conditions for OEM's scope of work and subject to the terms and conditions as contained in the Undertaking.

This Undertaking is given with reference to Tender No. _____for"_____ _____."

We hereby certify that our KAVACH (Train Collision Avoidance System), which we offered for the above-mentioned tender, is meeting and fulfilling the technical specification mentioned in the tender document.

Yours faithfully,
(Authorised Signatory of OEM)