



Procurement of Works

JAIPUR METRO RAIL CORPORATION LIMITED

BIDDING DOCUMENT

for

Procurement on International Competitive Bidding Mode

of

ICB No.- JP/JS 21 (Phase-1B)

**DESIGN, MANUFACTURE, SUPPLY, INSTALLATION, TESTING &
COMMISSIONING OF AUTOMATIC FARE COLLECTION SYSTEM
FOR JMRC PHASE 1B**

PART - I BIDDING PROCEDURES

Section 1 - Instructions to Bidders (ITB)

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Section 1 - Instructions to Bidders

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Section 1 - Instructions to Bidders

A. General

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| 1. Scope of Bid | <p>1.1 In connection with the Invitation for Bids (IFB) indicated in the Bid Data Sheet (BDS), the Employer, as indicated in the BDS, issues this Bidding Document for the procurement of plant and services as specified in Section 6 (Employer's Requirements). The name, identification, and number of lot/s (contract/s) of the international competitive bidding (ICB) are provided in the BDS.</p> <p>1.2 Unless otherwise stated, throughout this Bidding Document definitions and interpretations shall be as prescribed in Section 7 (General Conditions of Contract).</p> |
| 2. Source of Funds | <p>2.1 The Borrower or Recipient (hereinafter called "Borrower") indicated in the BDS has applied for or received financing (hereinafter called "funds") from the Asian Development Bank (hereinafter called "ADB") toward the cost of the project named in the BDS. The Borrower intends to apply a portion of the funds to eligible payments under the contract(s) for which this Bidding Document is issued.</p> <p>2.2 Payments by ADB will be made only at the request of the Borrower and upon approval by ADB in accordance with the terms and conditions of the Financing Agreement between the Borrower and ADB (hereinafter called "Financing Agreement"), and will be subject in all respects to the terms and conditions of that Financing Agreement. No party other than the Borrower shall derive any rights from the Financing Agreement or have any claim to the funds.</p> |
| 3. Fraud and Corruption | <p>3.1 ADB's Anticorruption Policy requires Borrowers (including beneficiaries of ADB-financed activity), as well as Bidders, Suppliers, and Contractors under ADB-financed contracts, observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, ADB</p> <p>(a) defines, for the purposes of this provision, the terms set forth below as follows:</p> <ul style="list-style-type: none"> (i) "corrupt practice" means the offering, giving, receiving, or soliciting, directly or indirectly, anything of value to influence improperly the actions of another party; (ii) "fraudulent practice" means any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation; (iii) "coercive practice" means impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party; (iv) "collusive practice" means an arrangement between two or more parties designed to achieve an improper purpose, including influencing improperly the actions of another party; (v) "obstructive practice" means (a) deliberately destroying, falsifying, altering, or concealing of evidence material to an ADB investigation; (b) making false statements to investigators in order to materially impede an ADB investigation; (c) failing to comply with requests to provide information, documents, or records in |

connection with an Office of Anticorruption and Integrity (OAI) investigation; (d) threatening, harassing, or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation; or (e) materially impeding ADB's contractual rights of audit or access to information; and

- (vi) "integrity violation" is any act which violates ADB's Anticorruption Policy, including (i) to (v) above and the following: abuse, conflict of interest, violations of ADB sanctions, retaliation against whistleblowers or witnesses, and other violations of ADB's Anticorruption Policy, including failure to adhere to the highest ethical standard.
 - (b) will reject a proposal for award if it determines that the Bidder recommended for award has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices or other integrity violations in competing for the Contract;
 - (c) will cancel the portion of the financing allocated to a contract if it determines at any time that representatives of the Borrower or of a beneficiary of ADB-financing engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices or other integrity violations during the procurement or the execution of that contract, without the Borrower having taken timely and appropriate action satisfactory to ADB to remedy the situation;
 - (d) will impose remedial actions on a firm or an individual, at any time, in accordance with ADB's Anticorruption Policy and Integrity Principles and Guidelines (both as amended from time to time), including declaring ineligible, either indefinitely or for a stated period of time, to participate¹ in ADB-financed, administered, or supported activities or to benefit from an ADB-financed, administered, or supported contract, financially or otherwise, if it at any time determines that the firm or individual has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive or obstructive practices or other integrity violations; and
 - (e) will have the right to require that a provision be included in the Bidding Documents and in contracts financed by ADB, requiring Bidders, suppliers and contractors to permit ADB or its representative to inspect their accounts and records and other documents relating to the bid submission and contract performance and to have them audited by auditors appointed by ADB.
- 3.2 Furthermore, Bidders shall be aware of the provision stated in the General Conditions of Contract (GCC 9.6 and 42.2.1 (c)).

4. Eligible Bidders

- 4.1 A Bidder may be a natural person, private entity, or government-owned enterprise subject to ITB 4.5 - or any combination of them with a formal intent to enter into an agreement or under an existing agreement in the form of a Joint Venture. In the case of a Joint Venture,
- (a) all partners shall be jointly and severally liable, and
 - (b) the Joint Venture shall nominate a Representative who shall have the authority to conduct all business for and on behalf of any and all the partners of the Joint Venture during the bidding process and, in the event the Joint Venture is awarded the Contract, during contract execution.

¹ Whether as a Contractor, Subcontractor, Consultant, Manufacturer or Supplier, or Service Provider; or in any other capacity (different names are used depending on the particular Bidding Document).

- 4.2 A Bidder, and all partners constituting the Bidder, shall have the nationality of an eligible country, in accordance with Section 5 (Eligible Countries). A Bidder shall be deemed to have the nationality of a country if the Bidder is a citizen or is constituted, incorporated, or registered, and operates in conformity with the provisions of the laws of that country. This criterion shall also apply to the determination of the nationality of proposed subcontractors or suppliers for any part of the Contract including related services.
- 4.3 A Bidder shall not have a conflict of interest. All Bidders found to have a conflict of interest shall be disqualified. A Bidder may be considered to be in a conflict of interest with one or more parties in this bidding process if any of, including but not limited to, the following apply:
- (a) they have controlling shareholders in common; or
 - (b) they receive or have received any direct or indirect subsidy from any of them; or
 - (c) they have the same legal representative for purposes of this bid; or
 - (d) they have a relationship with each other, directly or through common third parties, that puts them in a position to have access to material information about or improperly influence the bid of another Bidder, or influence the decisions of the Employer regarding this bidding process; or
 - (e) a Bidder participates in more than one bid in this bidding process, either individually or as a partner in a joint venture, except for alternative offers permitted under ITB 13. This will result in the disqualification of all Bids in which it is involved. However, subject to any finding of a conflict of interest in terms of ITB 4.3 (a) - (d) above, this does not limit the participation of a Bidder as a subcontractor in another Bid or of a firm as a subcontractor in more than one Bid; or
 - (f) a Bidder or any affiliated entity, participated as a consultant in the preparation of the design or technical specifications of the plant and services that are the subject of the Bid; or
 - (g) a Bidder was affiliated with a firm or entity that has been hired (or is proposed to be hired) by the Employer or Borrower as Project Manager for the Contract.
- 4.4 A firm shall not be eligible to participate in any procurement activities under an ADB-financed, administered, or supported project while under temporary suspension or debarment by ADB pursuant to its Anticorruption Policy (see ITB 3), whether such debarment was directly imposed by ADB, or enforced by ADB pursuant to the Agreement for Mutual Enforcement of Debarment Decisions. A bid from a temporary suspended or debarred firm will be rejected.
- 4.5 Government-owned enterprises in the Borrower's country shall be eligible only if they can establish that they (i) are legally and financially autonomous, (ii) operate under commercial law, and (iii) are not dependent agencies of the Employer.
- 4.6 Bidders shall provide such evidence of their continued eligibility satisfactory to the Employer, as the Employer shall reasonably request.
- 4.7 Firms shall be excluded if by an act of compliance with a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations, the Borrower's country prohibits any import of goods or contracting of works or services from that country or any payments to

persons or entities in that country.

- 4.8 In case a prequalification process has been conducted prior to the bidding process, this bidding is open only to prequalified Bidders.
- 5. Eligible Plant and Services**
- 5.1 The plant and services to be supplied under the Contract shall have their origin in eligible source countries as defined in ITB 4.2 and all expenditures under the Contract will be limited to such plant and services.
- 5.2 For purposes of ITB 5.1 above, "origin" means the place where the plant, or component parts thereof are mined, grown, produced, or manufactured, and from which the services are provided. Plant components are produced when, through manufacturing, processing, or substantial or major assembling of components, a commercially recognized product results that is substantially in its basic characteristics or in purpose or utility from its components.

B. Contents of Bidding Document

- 6. Sections of Bidding Document**
- 6.1 The Bidding Document consists of Parts I, II, and III, which include all the sections indicated below, and should be read in conjunction with any addenda issued in accordance with ITB 8.
- PART I Bidding Procedures**
- Section 1 - Instructions to Bidders (ITB)
 - Section 2 - Bid Data Sheet (BDS)
 - Section 3 - Evaluation and Qualification Criteria (EQC)
 - Section 4 - Bidding Forms (BDF)
 - Section 5 - Eligible Countries (ELC)
- PART II Requirements**
- Section 6 - Employer's Requirements (ERQ)
- PART III Conditions of Contract and Contract Forms**
- Section 7 - General Conditions of Contract (GCC)
 - Section 8 - Special Conditions of Contract (SCC)
 - Section 9 - Contract Forms (COF)
- 6.2 The Invitation for Bids (IFB) issued by the Employer is not part of the Bidding Document.
- 6.3 The Employer is not responsible for the completeness of the Bidding Document and its addenda, if they were not obtained directly from the source stated by the Employer in the IFB.
- 6.4 The Bidder is expected to examine all instructions, forms, terms, and specifications in the Bidding Document. Failure to furnish all information or documentation required by the Bidding Document may result in the rejection of the Bid.
- 7. Clarification of Bidding Document, Site Visit, Pre-Bid Meeting**
- 7.1 A prospective Bidder requiring any clarification on the Bidding Document shall contact the Employer in writing at the Employer's address indicated in the BDS, or raise inquiries during the pre-bid meeting if provided for in accordance with ITB 7.4. Refer BDS 7.1. The Employer will respond to any request for clarification, provided that such request is received no later than 21 days prior to the deadline for submission of bids. The Employer's response shall be in writing with copies to all Bidders who have acquired the Bidding Document in accordance with ITB 6.3, including a description of the inquiry but without identifying its source. Should the Employer deem it necessary to amend the Bidding Document as a result of a request for clarification, it shall do so following the procedure under ITB 8 and ITB 24.

- 7.2 The Bidder is advised to visit and examine the site where the plant is to be installed and its surroundings and obtain for itself on its own responsibility all information that may be necessary for preparing the Bid and entering into a contract for the provision of plant and services. The costs of visiting the site shall be at the Bidder's own expense.
- 7.3 The Bidder and any of its personnel or agents will be granted permission by the Employer to enter its premises and lands for the purpose of such visit, but only upon the express condition that the Bidder, its personnel, and agents, will release and indemnify the Employer and its personnel and agents from and against all liability in respect thereof, and will be responsible for death or personal injury, loss of or damage to property, and any other loss, damage, costs, and expenses incurred as a result of the inspection.
- 7.4 The Bidder's designated representative is invited to attend a pre-bid meeting, if provided for in the BDS. The purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage.
- 7.5 The Bidder is requested to submit any questions in writing, to reach the Employer not later than 1 week before the pre-bid meeting.
- 7.6 Minutes of the pre-bid meeting, including the text of the questions raised, without identifying the source, and the responses given, together with any responses prepared after the meeting, will be transmitted promptly to all Bidders who have acquired the Bidding Document in accordance with ITB 6.3. Any modification to the Bidding Document that may become necessary as a result of the pre-bid meeting shall be made by the Employer exclusively through the issue of an addendum pursuant to ITB 8 and not through the minutes of the pre-bid meeting.
- 7.7 Nonattendance at the pre-bid meeting will not be a cause for disqualification of a Bidder.
- 8. Amendment of Bidding Document**
- 8.1 At any time prior to the deadline for submission of Bids, the Employer may amend the Bidding Document by issuing addenda.
- 8.2 Any addendum issued shall be part of the Bidding Document and shall be communicated in writing to all who have obtained the Bidding Document from the Employer in accordance with ITB 6.3.
- 8.3 To give prospective Bidders reasonable time in which to take an addendum into account in preparing their Bids, the Employer may, at its discretion, extend the deadline for the submission of Bids, pursuant to ITB 24.2

C. Preparation of Bids

- 9. Cost of Bidding**
- 9.1 The Bidder shall bear all costs associated with the preparation and submission of its Bid, and the Employer shall in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.
- 10. Language of Bid**
- 10.1 The Bid, as well as all correspondence and documents relating to the bid exchanged by the Bidder and the Employer, shall be written in the English language. Supporting documents and printed literature that are part of the Bid may be in another language provided they are accompanied by an accurate translation of the relevant passages into the English language, in

which case, for purposes of interpretation of the Bid, such translation shall govern.

**11. Documents
Comprising the
Bid**

11.1 The Bid shall comprise two envelopes submitted simultaneously, one containing the Technical Bid and the other the Price Bid, both envelopes enclosed together in an outer single envelope.

11.2 The Technical Bid submitted by the Bidder shall comprise the following:

- (a) Letter of Technical Bid;
- (b) Bid Security or Bid-Securing Declaration, in accordance with ITB 21;
- (c) alternative Bids, if permissible, in accordance with ITB 13;
- (d) written confirmation authorizing the signatory of the Bid to commit the Bidder, in accordance with ITB 22.2;
- (e) documentary evidence in accordance with ITB 14.1, that the plant and services offered by the Bidder in its Bid or in any alternative Bid, if permitted, are eligible;
- (f) documentary evidence in accordance with ITB 15, the Bidder's eligibility and qualifications to perform the contract if its Bid is accepted;
- (g) Technical Proposal in accordance with ITB 17.
- (h) documentary evidence in accordance with ITB 16, that the plant and services offered by the Bidder conform to the Bidding Document;
- (i) in the case of a bid submitted by a Joint Venture, the Bid shall include a copy of the Joint Venture Agreement entered into by all partners. Alternatively, a Letter of Intent to execute a Joint Venture Agreement in the event of a successful bid shall be signed by all partners and submitted with the Bid, together with a copy of the proposed agreement;
- (j) list of subcontractors, in accordance with ITB 17.2; and
- (k) any other document required in the BDS.

11.3 The Price Bid submitted by the Bidder shall comprise the following:

- (a) Letter of Price Bid;
- (b) completed schedules as required, including Price Schedules, in accordance with ITB 12 and ITB 18;
- (c) alternative price Bids, if permissible, in accordance with ITB 13; and
- (d) any other document required in the BDS.

**12. Letter of Bid
and Schedules**

12.1 The Letters of Technical Bid and Price Bid, and the Schedules, and all documents listed under ITB 11, shall be prepared using the relevant forms furnished in Section 4 (Bidding Forms). The forms must be completed without any alterations to the text, and no substitutes shall be accepted. All blank spaces shall be filled in with the information requested and as required in the BDS.

**13. Alternative
Bids**

13.1 The BDS indicates whether alternative Bids are allowed. If they are allowed, the BDS will also indicate whether they are permitted in accordance with ITB 13.3, or invited in accordance with ITB 13.2 and/or ITB 13.4.

13.2 When alternatives to the Time Schedule are explicitly invited, a statement

to that effect will be included in the BDS, and the method of evaluating different time schedules will be described in Section 3 (Evaluation and Qualification Criteria).

- 13.3 Except as provided under ITB 13.4 below, Bidders wishing to offer technical alternatives to the Employer's requirements as described in the Bidding Document must also provide: (i) a price at which they are prepared to offer a plant meeting the Employer's requirements; and (ii) all information necessary for a complete evaluation of the alternatives by the Employer, including drawings, design calculations, technical specifications, breakdown of prices, and proposed installation methodology and other relevant details. Only the technical alternatives, if any, of the lowest evaluated Bidder conforming to the basic technical requirements shall be considered by the Employer.
- 13.4 When Bidders are invited in the BDS to submit alternative technical solutions for specified parts of the facilities, such parts shall be described in Section 6 (Employer's Requirements). Technical alternatives for the specific parts of the facilities that comply with the performance and technical criteria specified for the plant and services shall be considered by the Employer on their own merits, pursuant to ITB 32.
- 14. Documents Establishing the Eligibility of Plant and Services**
- 14.1 To establish the eligibility of the plant and services in accordance with ITB 5, Bidders shall complete the country of origin declarations in the Price Schedule Forms, included in Section 4 (Bidding Forms).
- 15. Documents Establishing the Eligibility and Qualifications of the Bidder**
- 15.1 To establish its eligibility and qualifications to perform the Contract in accordance with Section 3 (Evaluation and Qualification Criteria), the Bidder shall provide the information requested in the corresponding information sheets included in Section 4 (Bidding Forms).
- 15.2 Domestic Bidders, individually or in joint ventures, applying for eligibility for domestic preference shall supply all information required to satisfy the criteria for eligibility as described in ITB 38. Refer BDS.
- 16. Documents Establishing Conformity of the Plant and Services**
- 16.1 The documentary evidence of the conformity of the plant and services to the Bidding Document may be in the form of literature, drawings and data, and shall furnish:
- (a) a detailed description of the essential technical and performance characteristics of the plant and services, including the functional guarantees of the proposed plant and services, in response to the Specification;
 - (b) a list giving full particulars, including available sources, of all spare parts and special tools necessary for the proper and continuing functioning of the plant for the period named in the BDS, following completion of plant and services in accordance with provisions of the contract; and
 - (c) a commentary on the Employer's Specifications and adequate evidence demonstrating the substantial responsiveness of the plant and services to those specifications. Bidders shall note that standards for workmanship, materials and equipment designated by the Employer in the Bidding Document are intended to be descriptive (establishing standards of quality and performance) only and not

restrictive. The Bidder may substitute alternative standards, brand names and/or catalog numbers in its Bid, provided that it demonstrates to the Employer's satisfaction that the substitutions are substantially equivalent or superior to the standards designated in the Specifications.

17. Technical Proposal, Subcontractors

- 17.1 The Bidder shall furnish a Technical Proposal including a statement of work methods, equipment, personnel, schedule and any other information as stipulated in Section 4 (Bidding Forms), in sufficient detail to demonstrate the adequacy of the Bidders' proposal to meet the work requirements and the completion time.
- 17.2 For major items of plant and services as listed by the Employer in Criterion 2.5 of Section 3 (Evaluation and Qualification Criteria), which the Bidder intends to purchase or subcontract, the Bidder shall give details of the name and nationality of the proposed Subcontractors, including Manufacturers, for each of those items. In addition, the Bidder shall include in its Bid information establishing compliance with the requirements specified by the Employer for these items. Bidders are free to list more than one Subcontractor against each item of the plant and services. Quoted rates and prices will be deemed to apply to whichever Subcontractor is appointed, and no adjustment of the rates and prices will be permitted.
- 17.3 The Bidder shall be responsible for ensuring that any Subcontractor proposed complies with the requirements of ITB 4, and that any plant, or services to be provided by the Subcontractor comply with the requirements of ITB 5 and ITB 15.1

18. Bid Prices and Discounts

- 18.1 Unless otherwise specified in the BDS and/or Section 6 (Employer's Requirements), bidders shall quote for the entire plant and services on a "single responsibility" basis such that the total Bid price covers all the Contractor's obligations mentioned in or to be reasonably inferred from the Bidding Document in respect of the design, manufacture, including procurement and subcontracting (if any), delivery, construction, installation, and completion of the plant. This includes all requirements under the Contractor's responsibilities for testing, pre-commissioning and commissioning of the plant and, where so required by the Bidding Document, the acquisition of all permits, approvals, and licenses, etc.; the operation, maintenance, and training services and such other items and services as may be specified in the Bidding Document, all in accordance with the requirements of the General Conditions. Items against which no price is entered by the Bidder will not be paid for by the Employer when executed and shall be deemed to be covered by the prices for other items.
- 18.2 Bidders are required to quote the price for the commercial, contractual and technical obligations outlined in the Bidding Document.
- 18.3 Bidders shall give a breakdown of the prices in the manner and detail called for in the Price Schedules included in Section 4 (Bidding Forms). Where no different Price Schedules are included in the Bidding Document, Bidders shall present their prices in the following manner: Separate numbered Schedules included in Section 4 (Bidding Forms) shall be used for each of the following elements. The total amount from each Schedule (Nos. 1 to 4) shall be summarized in a Grand Summary (Schedule No. 5) giving the total bid price(s) to be entered in the Letter of Price Bid. Absence of the total bid price in the Letter of Price Bid may result in the rejection of the Bid.

- Schedule No. 1: Plant and Mandatory Spare Parts Supplied from Abroad
- Schedule No. 2: Plant and Mandatory Spare Parts Supplied from Within the Employer's Country
- Schedule No. 3: Design Services
- Schedule No. 4: Installation and Other Services
- Schedule No. 5: Grand Summary (Schedule Nos. 1 to 4)
- Schedule No. 6: Recommended Spare Parts

Bidders shall note that the plant and mandatory spare parts included in Schedule Nos. 1 and 2 above exclude materials used for civil, building, and other construction works. All such materials shall be included and priced under Schedule No. 4, Installation and Other Services.

18.4 In the Schedules, Bidders shall give the required details and a breakdown of their prices as follows:

- (a) Plant to be Supplied from Abroad (Schedule No. 1):
 - (i) the price of the plant shall be quoted carriage and insurance paid (CIP)-named place of destination basis specified in the BDS;
 - (ii) all customs duties and other taxes paid or payable in the Employer's country on the plant if the contract is awarded to the Bidder; and
 - (iii) the total price for the plant.
- (b) Plant Supplied from Within the Employer's Country (Schedule No. 2):
 - (i) the price of the plant shall be quoted on an EXW Incoterm basis (ex works, ex factory, ex warehouse, ex showroom, as applicable), including all customs duties and sales and other taxes already paid or payable on the components and raw material used in the manufacture or assembly of plant quoted ex works or ex factory, or on the previously imported plant of foreign origin quoted ex warehouse, ex showroom;
 - (ii) sales tax and other taxes payable in the Employer's country on the plant if the contract is awarded to the Bidder, and
 - (iii) the total price for the plant.
- (c) Design Services. (Schedule No. 3). Rates or prices shall include all taxes, duties, levies, and charges payable in the Employer's country as of 28 days prior to the deadline for submission of Bids.
- (d) Installation and Other Services (Schedule No. 4) shall be quoted separately and shall include rates or prices for local transportation, insurance, and other services incidental to delivery of the plant, all labor, contractor's equipment, temporary works, materials, consumables, and all matters and things of whatsoever nature, including operations and maintenance services, the provision of operations and maintenance manuals, training, etc., where identified in the Bidding Document, as necessary for the proper execution of the installation and other services, including all taxes, duties, levies, and charges payable in the Employer's country as of 28 days prior to the deadline for submission of bids.
- (e) Recommended spare parts (Schedule No. 6) shall be quoted separately as specified in either subparagraph (a) or (b) above in accordance with the origin of the spare parts.

- 18.5 The current edition of Incoterms, published by the International Chamber of Commerce shall govern.
- 18.6 The prices shall be either fixed or adjustable as specified in the BDS.
- (a) In the case of Fixed Price, prices quoted by the Bidder shall be fixed during the Bidder's performance of the contract and not subject to variation on any account. A Bid submitted with an adjustable price quotation will be treated as nonresponsive and rejected.
- (b) In the case of Adjustable Price, prices quoted by the Bidder shall be subject to adjustment during performance of the contract to reflect changes in the cost elements such as labor, material, transport, and contractor's equipment in accordance with the procedures specified in the corresponding appendix to the Contract Agreement. A Bid submitted with a fixed price quotation will not be rejected, but the price adjustment will be treated as zero. Bidders are required to indicate the source of labor and material indexes in the corresponding Form in Section 4 (Bidding Forms).
- 18.7 If so indicated in BDS 1.1, Bids are being invited for individual lots (contracts) or for any combination of lots (packages). Bidders wishing to offer any price reduction (discount) for the award of more than one contract shall specify in their Letter of Price Bid the price reductions applicable to each package, or alternatively, to individual contracts within the package, and the manner in which the price reductions will apply.
- 19. Currencies of Bid and Payment**
- 19.1 The currency(ies) of the bid shall be, as specified in the BDS.
- 19.2 Bidders may be required by the Employer to justify, to the Employer's satisfaction, their local and foreign currency requirements.
- 20. Period of Validity of Bids**
- 20.1 Bids shall remain valid for the period specified in the BDS after the bid submission deadline date prescribed by the Employer. A bid valid for a shorter period shall be rejected by the Employer as nonresponsive.
- 20.2 In exceptional circumstances, prior to the expiration of the bid validity period, the Employer may request Bidders to extend the period of validity of their Bids. The request and the responses shall be made in writing. If a bid security is requested in accordance with ITB 21, it shall also be extended 28 days beyond the deadline of the extended bid validity period. A Bidder may refuse the request without forfeiting its bid security. A Bidder granting the request shall not be required or permitted to modify its Bid.
- 21. Bid Security/ Bid Securing Declaration**
- 21.1 Unless otherwise specified in the BDS, the Bidder shall furnish as part of its Bid, in original form, either a Bid-Securing Declaration or a bid security as specified in the BDS. In the case of a bid security, the amount and currency shall be as specified in the BDS.
- 21.2 If a Bid-Securing Declaration is required pursuant to ITB 21.1, it shall use the form included in Section 4 (Bidding Forms). The Employer will declare a Bidder ineligible to be awarded a Contract for a specified period of time, as indicated in the BDS, if a Bid-Securing Declaration is executed.
- 21.3 If a bid security is specified pursuant to ITB 21.1, the bid security shall be, at the Bidder's option, in any of the following forms:
- (a) an unconditional bank guarantee,

- (b) an irrevocable letter of credit, or
- (c) a cashier's or certified check,

all from a reputable source from an eligible country as described in Section 5 (Eligible Countries). In the case of a bank guarantee, the bid security shall be submitted using either the Bid Security Form included in Section 4 (Bidding Forms) or another form acceptable to the Employer. The form must include the complete name of the Bidder. The bid security shall be valid for 28 days beyond the original validity period of the Bid, or beyond any period of extension if requested under ITB 20.2.

- 21.4 Unless otherwise specified in the BDS, any Bid not accompanied by a substantially compliant bid security or Bid-Securing Declaration, if one is required in accordance with ITB 21.1, shall be rejected by the Employer as nonresponsive.
- 21.5 If a bid security is specified pursuant to ITB 21.1, the bid security of the unsuccessful Bidder shall be returned as promptly as possible upon the successful Bidder's furnishing of the performance security pursuant to ITB 45.
- 21.6 If a bid security is specified pursuant to ITB 21.1, the bid security of successful Bidders shall be returned as promptly as possible once the successful Bidder has signed the Contract and furnished the required performance security.
- 21.7 The bid security may be forfeited or the Bid-Securing Declaration executed:
 - (a) if a Bidder withdraws its Bid during the period of bid validity specified by the Bidder on the Letters of Technical Bid and Price Bid, except as provided in ITB 20.2 or
 - (b) if the successful Bidder fails to:
 - (i) sign the Contract in accordance with ITB 44;
 - (ii) furnish a performance security in accordance with ITB 45; or
 - (iii) accept the arithmetical corrections of its Bid in accordance with ITB 36.
- 21.8 The bid security or the Bid-Securing Declaration of a Joint Venture shall be in the name of the Joint Venture that submits the Bid. If the Joint Venture has not been legally constituted at the time of bidding, the bid security or the Bid-Securing Declaration shall be in the names of all future partners as named in the letter of intent referred to in ITB 4.1.

22. Format and Signing of Bid

- 22.1 The Bidder shall prepare one original set of the Technical Bid and one original set of the Price Bid comprising the Bid as described in ITB 11 and clearly mark it "ORIGINAL - TECHNICAL BID" and "ORIGINAL - PRICE BID". Alternative bids, if permitted in accordance with ITB 13, shall be clearly marked "ALTERNATIVE". In addition, the Bidder shall submit copies of the Bid, in the number specified in the BDS and clearly mark each of them "COPY." In the event of any discrepancy between the original and the copies, the original shall prevail.
- 22.2 The original and all copies of the Bid shall be typed or written in indelible ink and shall be signed by a person duly authorized to sign on behalf of the Bidder. This authorization shall consist of a written confirmation as specified in the BDS and shall be attached to the Bid. The name and position held by

each person signing the authorization must be typed or printed below the signature. All pages of the bid, except for unamended printed literature, shall be signed or initialed by the person signing the Bid. If a Bidder submits a deficient authorization, the Bid shall not be rejected in the first instance. The Employer shall request the Bidder to submit an acceptable authorization within the number of days as specified in the BDS. Failure to provide an acceptable authorization within the prescribed period of receiving such a request shall cause the rejection of the Bid.

22.3 A Bid submitted by a Joint Venture shall be signed so as to be legally binding on all partners.

22.4 Any amendments such as interlineations, erasures, or overwriting shall be valid only if they are signed or initialed by the person signing the Bid.

D. Submission and Opening of Bids

23. Submission, Sealing, and Marking of Bids

23.1 Bidders may submit their Bids by mail or by hand. When so specified in the BDS, Bidders shall have the option of submitting their Bids electronically. Procedures for submission, sealing and marking are as follows:

(a) Bidders submitting Bids by mail or by hand shall enclose the original and each copy of the Bid, including alternative Bids, if permitted in accordance with ITB 13, in separate sealed envelopes, duly marking the envelopes as "ORIGINAL," "ALTERNATIVE," and "COPY." These envelopes containing the original and the copies shall then be enclosed in one single envelope. The rest of the procedure shall be in accordance with ITB 23.2 to ITB 23.6.

(b) Bidders submitting Bids electronically shall follow the electronic bid submission procedures specified in the BDS.

23.2 The inner and outer envelopes shall

(a) bear the name and address of the Bidder,

(b) be addressed to the Employer in accordance with ITB 24.1, and

(c) bear the specific identification of this bidding process indicated in the BDS 1.1.

23.3 The outer envelopes and the inner envelopes containing the Technical Bid shall bear a warning not to open before the time and date for the opening of Technical Bid, in accordance with ITB 27.1.

23.4 The inner envelopes containing the Price Bid shall bear a warning not to open until advised by the Employer in accordance with ITB 27.7.

23.5 Alternative Bids, if permissible in accordance with ITB 13, shall be prepared, sealed, marked, and delivered in accordance with the provisions of ITB 20 and ITB 21, with the inner envelopes marked in addition "ALTERNATIVE NO...." as appropriate.

23.6 If all envelopes are not sealed and marked as required, the Employer will assume no responsibility for the misplacement or premature opening of the Bid.

24. Deadline for Submission of

24.1 Bids must be received by the Employer at the address and no later than the date and time indicated in the BDS.

Bids

- 24.2 The Employer may, at its discretion, extend the deadline for the submission of bids by amending the Bidding Document in accordance with ITB 8, in which case all rights and obligations of the Employer and Bidders previously subject to the deadline shall thereafter be subject to the deadline as extended.
- 25. Late Bids**
- 25.1 The Employer shall not consider any Bid that arrives after the deadline for submission of Bids, in accordance with ITB 24. Any Bid received by the Employer after the deadline for submission of Bids shall be declared late, rejected, and returned unopened to the Bidder.
- 26. Withdrawal, Substitution, and Modification of Bids**
- 26.1 A Bidder may withdraw, substitute, or modify its Bid after it has been submitted by sending a written notice, duly signed by an authorized representative, and shall include a copy of the authorization in accordance with ITB 22.2, (except that withdrawal notices do not require copies). The corresponding substitution or modification of the Bid must accompany the respective written notice. All notices must be:
- (a) prepared and submitted in accordance with ITB 22 and ITB 23 (except that withdrawal notices do not require copies), and in addition, the respective envelopes shall be clearly marked "Withdrawal," "Substitution," "Modification;" and
 - (b) received by the Employer prior to the deadline prescribed for submission of Bids, in accordance with ITB 24.
- 26.2 Bids requested to be withdrawn in accordance with ITB 26.1 shall be returned unopened to the Bidders.
- 26.3 No Bid may be withdrawn, substituted, or modified in the interval between the deadline for submission of Bids and the expiration of the period of bid validity specified by the Bidder on the Letter of Technical Bid or any extension thereof.
- 27. Bid Opening**
- 27.1 The Employer shall open the Technical Bids in public at the address, on the date, and time specified in the BDS in the presence of Bidder's designated representatives and anyone who choose to attend. Any specific electronic bid opening procedures required if electronic bidding is permitted in accordance with ITB 23.1 shall be as specified in the BDS. The Price Bids will remain unopened and will be held in custody of the Employer until the specified time of their opening. If the Technical Bid and the Price Bid are submitted together in one envelope, the Employer may reject the entire Bid. Alternatively, the Price Bid may be immediately resealed for later evaluation.
- 27.2 First, envelopes marked "WITHDRAWAL" shall be opened and read out and the envelope with the corresponding Bid shall not be opened, but returned to the Bidder. No bid withdrawal shall be permitted unless the corresponding withdrawal notice contains a valid authorization to request the withdrawal and is read out at bid opening.
- 27.3 Second, outer envelopes marked "SUBSTITUTION" shall be opened. The inner envelopes containing the Substitution Technical Bid and/or Substitution Price Bid shall be exchanged for the corresponding envelopes being substituted, which are to be returned to the Bidder unopened. Only the Substitution Technical Bid, if any, shall be opened, read out, and recorded. Substitution Price Bid will remain unopened in accordance with ITB 27.1. No envelope shall be substituted unless the corresponding Substitution Notice contains a valid authorization to request the

substitution and is read out and recorded at bid opening.

27.4 Next, outer envelopes marked "MODIFICATION" shall be opened. No Technical Bid and/or Price Bid shall be modified unless the corresponding Modification Notice contains a valid authorization to request the modification and is read out and recorded at the opening of Technical Bids. Only the Technical Bids, both Original as well as Modification, are to be opened, read out, and recorded at the opening. Price Bids, both Original as well as Modification, will remain unopened in accordance with ITB 27.1.

27.5 All other envelopes holding the Technical Bids shall be opened one at a time, and the following read out and recorded:

- (a) the name of the Bidder;
- (b) whether there is a modification or substitution;
- (c) the presence of a bid security or a Bid-Securing Declaration, if required; and
- (d) any other details as the Employer may consider appropriate.

Only Technical Bids and alternative Technical Bids read out and recorded at bid opening shall be considered for evaluation. Unless otherwise specified in the BDS, all pages of the Letter of Technical Bid are to be initialed by at least three representatives of the Employer attending the bid opening. No Bid shall be rejected at the opening of Technical Bids except for late Bids, in accordance with ITB 25.1.

27.6 The Employer shall prepare a record of the opening of Technical Bids that shall include, as a minimum: the name of the Bidder and whether there is a withdrawal, substitution, or modification; and alternative Bids; and the presence or absence of a bid security or a Bid-Securing Declaration, if one was required. The Bidders' representatives who are present shall be requested to sign the record. The omission of a Bidder's signature on the record shall not invalidate the contents and effect of the record. A copy of the record shall be distributed to all Bidders who submitted Bids on time, and posted online when electronic bidding is permitted.

27.7 At the end of the evaluation of the Technical Bids, the Employer will invite bidders who have submitted substantially responsive Technical Bids and who have been determined as being qualified for award to attend the opening of the Price Bids. The date, time, and location of the opening of Price Bids will be advised in writing by the Employer. Bidders shall be given reasonable notice of the opening of Price Bids.

27.8 The Employer will notify Bidders in writing who have been rejected on the grounds of their Technical Bids being substantially nonresponsive to the requirements of the Bidding Document and return their Price Bids unopened.

27.9 The Employer shall conduct the opening of Price Bids of all Bidders who submitted substantially responsive Technical Bids, in the presence of Bidders' representatives who choose to attend at the address, on the date, and time specified by the Employer. The Bidder's representatives who are present shall be requested to sign a register evidencing their attendance.

27.10 All envelopes containing Price Bids shall be opened one at a time and the following read out and recorded:

- (a) the name of the Bidder;
- (b) whether there is a modification or substitution;
- (c) the Bid Prices, including any discounts and alternative offers; and

(d) any other details as the Employer may consider appropriate.

Only Price Bids, discounts, and alternative offers read out and recorded during the opening of Price Bids shall be considered for evaluation. Unless otherwise specified in the BDS, all pages of the Letter of Price Bid and Price Schedules are to be initialed by at least three representatives of the Employer attending the opening. No Bid shall be rejected at the opening of Price Bids.

- 27.11 The Employer shall prepare a record of the opening of Price Bids that shall include, as a minimum: the name of the Bidder, the Bid Price (per lot if applicable), any discounts, and alternative offers. The Bidders' representatives who are present shall be requested to sign the record. The omission of a Bidder's signature on the record shall not invalidate the contents and effect of the record. A copy of the record shall be distributed to all Bidders who submitted Bids on time, and posted online when electronic bidding is permitted.

E. Evaluation and Comparison of Bids

- | | |
|--|--|
| 28. Confidentiality | <p>28.1 Information relating to the evaluation of Bids and recommendation of contract award, shall not be disclosed to Bidders or any other persons not officially concerned with such process until information on the Contract award is communicated to all Bidders.</p> <p>28.2 Any attempt by a Bidder to influence the Employer in the evaluation of the Bids or Contract award decisions may result in the rejection of its Bid.</p> <p>28.3 Notwithstanding ITB 28.2, from the time of bid opening to the time of Contract award, if any Bidder wishes to contact the Employer on any matter related to the bidding process, it should do so in writing.</p> |
| 29. Clarification of Bids | <p>29.1 To assist in the examination, evaluation, and comparison of the Technical and Price Bids, and qualification of the Bidders, the Employer may, at its discretion, ask any Bidder for a clarification of its Bid. Any clarification submitted by a Bidder that is not in response to a request by the Employer shall not be considered. The Employer's request for clarification and the response shall be in writing. No change in the substance of the Technical Bid or prices in the Price Bid shall be sought, offered, or permitted, except to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the Bids, in accordance with ITB 36.</p> <p>29.2 If a Bidder does not provide clarifications of its Bid by the date and time set in the Employer's request for clarification, its Bid may be rejected.</p> |
| 30. Deviations, Reservations, and Omissions | <p>30.1 During the evaluation of Bids, the following definitions apply:</p> <ul style="list-style-type: none"> (a) "Deviation" is a departure from the requirements specified in the Bidding Document; (b) "Reservation" is the setting of limiting conditions or withholding from complete acceptance of the requirements specified in the Bidding Document; and (c) "Omission" is the failure to submit part or all of the information or documentation required in the Bidding Document. |
| 31. Examination of Technical Bids | <p>31.1 The Employer shall examine the Technical Bid to confirm that all documents and technical documentation requested in ITB 11.2 have been provided, and to determine the completeness of each document submitted.</p> |

If any of these documents or information is missing, the Bid may be rejected.

31.2 The Employer shall confirm that the following documents and information have been provided in the Technical Bid. If any of these documents or information is missing, the offer shall be rejected.

- (a) Letter of Technical Bid;
- (b) written confirmation of authorization to commit the Bidder;
- (c) Bid Security or Bid-Securing Declaration, if applicable; and
- (d) Technical Proposal in accordance with ITB 17.

32. Responsiveness of Technical Bid

32.1 The Employer's determination of a bid's responsiveness is to be based on the contents of the Bid itself, as defined in ITB11.

32.2 A substantially responsive Technical Bid is one that meets the requirements of the Bidding Document without material deviation, reservation, or omission. A material deviation, reservation, or omission is one that,

- (a) if accepted, would:
 - (i) affect in any substantial way the scope, quality, or performance of the plant and services specified in the Contract; or
 - (ii) limit in any substantial way, inconsistent with the Bidding Document, the Employer's rights or the Bidder's obligations under the proposed Contract; or
- (b) if rectified, would unfairly affect the competitive position of other Bidders presenting substantially responsive Bids.

32.3 The Employer shall examine the technical aspects of the Bid submitted in accordance with ITB 17, Technical Proposal, in particular to confirm that all requirements of Section 6 (Employer's Requirements) have been met without any material deviation, reservation, or omission.

32.4 If a Bid is not substantially responsive to the requirements of the Bidding Document, it shall be rejected by the Employer and may not subsequently be made responsive by correction of the material deviation, reservation, or omission.

33. Nonmaterial Nonconformities

33.1 Provided that a Bid is substantially responsive, the Employer may waive any nonconformities in the Bid that do not constitute a material deviation, reservation, or omission.

33.2 Provided that a Bid is substantially responsive, the Employer may request that the Bidder submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial nonconformities in the Bid related to documentation requirements. Requesting information or documentation on such nonconformities shall not be related to any aspect of the Price Bid. Failure of the Bidder to comply with the request may result in the rejection of its Bid.

33.3 Provided that a Bid is substantially responsive, the Employer shall rectify quantifiable nonmaterial nonconformities related to the Bid Price. To this effect, the Bid Price shall be adjusted, for comparison purposes only, to reflect the price of a missing or non-conforming item or component. The adjustment shall be made using the method indicated in Section 3

(Evaluation and Qualification Criteria).

**34. Detailed
Evaluation of
Technical Bids**

- 34.1 The Employer will carry out a detailed technical evaluation of the Bids not previously rejected as being substantially nonresponsive, to determine whether the technical aspects are in compliance with the Bidding Document. The Bid that does not meet minimum acceptable standards of completeness, consistency, and detail, and the specified minimum and/or maximum requirements for specified functional guarantees, will be treated as nonresponsive and hence rejected. To reach such a determination, the Employer will examine and compare the technical aspects of the bids on the basis of the information supplied by the Bidders, taking into account the following:
- (a) overall completeness and compliance with the Employer's Requirements; deviations from the Employer's Requirements; conformity of the plant and services offered with specified performance criteria; suitability of the plant and services offered in relation to the environmental and climatic conditions prevailing at the site; and quality, function and operation of any process control concept included in the Bid. The Bid that does not meet minimum and/or maximum acceptable standards of completeness, consistency, and detail will be rejected for non-responsiveness;
 - (b) type, quantity, and long-term availability of mandatory and recommended spare parts and maintenance services; and
 - (c) other relevant factors, if any, listed in Section 3 (Evaluation and Qualification Criteria).
- 34.2 Where alternative technical solutions have been allowed in accordance with ITB 13, and offered by the Bidder, the Employer will make a similar evaluation of the alternatives. Where alternatives have not been allowed but have been offered, they shall be ignored.

**35. Eligibility and
Qualification of
the Bidder**

- 35.1 The Employer shall determine to its satisfaction during the evaluation of Technical Bids whether a Bidder meets the eligibility and qualifying criteria specified in Section 3 (Evaluation and Qualification Criteria).
- 35.2 The determination shall be based upon an examination of the documentary evidence of the Bidder's qualifications submitted by the Bidder, pursuant to ITB 15.
- 35.3 An affirmative determination shall be a prerequisite for the opening and evaluation of a Bidder's Price Bid. A negative determination shall result into the disqualification of the Bid, in which event the Employer shall return the unopened Price Bid to the Bidder.
- 35.4 The capabilities of the manufacturers and subcontractors proposed in its Bid for the major items of plant and services to be used by the lowest evaluated Bidder will also be evaluated for acceptability in accordance with Section 3 (Evaluation and Qualification Criteria). Their participation should be confirmed with a letter of intent between the parties, as needed. Should a manufacturer or subcontractor be determined to be unacceptable, the Bid will not be rejected, but the Bidder will be required to propose, without changing its bid price, an acceptable substitute manufacturer or subcontractor meeting the minimum technical specifications stated in Section 6 (Employer's Requirements). If a Bidder does not provide an acceptable substitute manufacturer or subcontractor by the date and time set in the Employer's request for substitution of manufacturer or

- subcontractor, its Bid may be rejected.
- 35.5 Prior to signing the Contract, the corresponding Appendix to the Contract Agreement shall be completed, listing the approved manufacturers or subcontractors for each item concerned.
- 36. Correction of Arithmetical Errors**
- 36.1 During the evaluation of Price Bids, the Employer shall correct arithmetical errors on the following basis:
- (a) where there are errors between the total of the amounts given under the column for the price breakdown and the amount given under the Total Price, the amounts given under the column for the price breakdown shall prevail and the Total Price will be corrected accordingly;
 - (b) where there are errors between the total of the amounts of Schedule Nos. 1 to 4 and the amount given in Schedule No. 5 (Grand Summary), the total of the amounts of Schedule Nos. 1 to 4 shall prevail and the Schedule No. 5 (Grand Summary) will be corrected accordingly;
 - (c) if there is a discrepancy between the grand total price given in Schedule No. 5 (Grand Summary) and the bid amount in item (c) of the Letter of Price Bid, the grand total price given in Schedule No. 5 (Grand Summary) will prevail and the bid amount in item (c) of the Letter of Price Bid will be corrected; and
 - (d) if there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetical error, in which case the amount in figures shall prevail subject to (a), (b), and (c) above.
- 36.2 If the Bidder that submitted the lowest evaluated Bid does not accept the correction of errors, its Bid shall be disqualified and its bid security may be forfeited or its Bid-Securing Declaration executed.
- 37. Conversion to Single Currency**
- 37.1 For evaluation and comparison purposes, the currency(ies) of the Bid shall be converted into a single currency as specified in the BDS .
- 38. Margin of Preference**
- 38.1 Unless otherwise specified in the BDS, a margin of preference shall not apply.
- 39. Evaluation of Price Bids**
- 39.1 The Employer shall use the criteria and methodologies listed in this clause. No other evaluation criteria or methodologies shall be permitted.
- 39.2 I. To evaluate a Price Bid, the Employer shall consider the following:
- (a) the bid price, excluding provisional sums and the provision, if any, for contingencies in the Price Schedules;
 - (b) price adjustment for correction of arithmetical errors in accordance with ITB 36.1;
 - (c) price adjustment due to discounts offered in accordance with ITB 18.7;
 - (d) price adjustment due to quantifiable nonmaterial nonconformities in accordance with ITB 33.3;
 - (e) converting the amount resulting from applying (a) to (c) above, if relevant, to a single currency in accordance with ITB 37; and
 - (f) the evaluation factors indicated in Section 3 (Evaluation and Qualification Criteria).
- II. The Employer's evaluation of a Bid will exclude and not take into account,

- (a) in the case of Plant and Mandatory Spare Parts (Schedule No. 1) supplied from abroad, all taxes and duties, applicable in the Employer's country and payable on the Plant and Mandatory Spare Parts if the Contract is awarded to the Bidder; and
 - (b) in the case of Plant and Mandatory Spare Parts (Schedule No. 2) supplied from within the Employer's country, sales and other taxes, applicable in the Employer's country and payable on the Plant and Mandatory Spare Parts if the Contract is awarded to the Bidder.
- 39.3 If price adjustment is allowed in accordance with ITB 18.6, the estimated effect of the price adjustment provisions of the Conditions of Contract, applied over the period of execution of the Contract, shall not be taken into account in bid evaluation.
- 39.4 If this Bidding Document allows Bidders to quote separate prices for different lots (contracts), and the award to a single Bidder of multiple lots (contracts), the methodology to determine the lowest evaluated price of the lot (contract) combinations, including any discounts offered in the Letter of Price Bid, is specified in Section 3 (Evaluation and Qualification Criteria).
- 39.5 If the Bid, which results in the lowest Evaluated Bid Price, is seriously unbalanced or front loaded in the opinion of the Employer, the Employer may require the Bidder to produce detailed price analyses for any or all items of the Price Schedules, to demonstrate the internal consistency of those prices with the methods and time schedule proposed. After evaluation of the price analyses, taking into consideration the terms of payments, the Employer may require that the amount of the performance security be increased at the expense of the Bidder to a level sufficient to protect the Employer against financial loss in the event of default of the successful Bidder under the Contract.
- 40. **Comparison of Bids**
 - 40.1 The Employer shall compare all substantially responsive Bids to determine the lowest evaluated Bid, in accordance with ITB 39.2. Refer BDS.
- 41. **Employer's Right to Accept Any Bid, and to Reject Any or All Bids**
 - 41.1 The Employer reserves the right to accept or reject any Bid, and to annul the bidding process and reject all Bids at any time prior to contract award, without thereby incurring any liability to Bidders. In case of annulment, all Bids submitted and specifically, bid securities, shall be promptly returned to the Bidders.

F. Award of Contract

- 42. **Award Criteria**
 - 42.1 The Employer shall award the Contract to the Bidder whose offer has been determined to be the lowest evaluated Bid and is substantially responsive to the Bidding Document, provided further that the Bidder is determined to be eligible and qualified to perform the Contract satisfactorily. Refer BDS.
- 43. **Notification of Award**
 - 43.1 Prior to the expiration of the period of bid validity, the Employer shall notify the successful Bidder, in writing, that its Bid has been accepted.
 - 43.2 At the same time, the Employer shall also notify all other Bidders of the results of the bidding. The Employer will publish in an English language newspaper or well-known freely accessible website the results identifying the Bid and lot numbers, and the following information: (i) name of each Bidder who submitted a bid; (ii) bid prices as read out at bid opening; (iii) name and evaluated prices of each bid that was evaluated; (iv) name of Bidders whose Bids were rejected and the reasons for their rejection; and (v) name of the winning Bidder, and the price it offered, as well as the duration and summary scope of the contract awarded. After publication of

award, unsuccessful Bidders may request in writing to the Employer for a debriefing seeking explanations on the grounds on which their Bids were not selected. The Employer shall promptly respond in writing to any unsuccessful Bidder who, after publication of contract award, request for a debriefing.

43.3 Until a formal contract is prepared and executed, the notification of award shall constitute a binding Contract.

44. Signing of Contract

44.1 Promptly after notification, the Employer shall send the successful Bidder the Contract Agreement.

44.2 Within 28 days of receipt of the Contract Agreement, the successful Bidder shall sign, date, and return it to the Employer.

45. Performance Security

45.1 Within 28 days of the receipt of notification of award from the Employer, the successful Bidder shall furnish the performance security in accordance with the conditions of contract, subject to ITB 39.5, using for that purpose the Performance Security Form included in Section 9 (Contract Forms), or another form acceptable to the Employer.

45.2 Failure of the successful Bidder to submit the above-mentioned Performance Security or sign the Contract shall constitute sufficient grounds for the annulment of the award and forfeiture of the bid security or execution of the Bid-Securing Declaration. In that event, the Employer may award the Contract to the next lowest evaluated Bidder whose offer is substantially responsive and is determined by the Employer to be qualified to perform the Contract satisfactorily.



Procurement of Works

JAIPUR METRO RAIL CORPORATION LIMITED

BIDDING DOCUMENT

for

Procurement on International Competitive Bidding Mode

of

ICB No.- JP/JS 21 (Phase-1B)

**DESIGN, MANUFACTURE, SUPPLY, INSTALLATION, TESTING &
COMMISSIONING OF AUTOMATIC FARE COLLECTION SYSTEM
FOR JMRC PHASE 1B**

PART - I BIDDING PROCEDURES

Section 2 - Bid Data Sheet (BDS)

**3rd Floor, RAJSICO Building, Udyog Bhawan, Tilak Marg,
C- Scheme, Jaipur (Rajasthan) PIN-302005
Country: India**

Section 2 - Bid Data Sheet

This section consists of provisions that are specific to each procurement and supplement the information or requirements included in Section 1 - Instructions to Bidders.

A. General

ITB 1.1	<p>The Employer is: Jaipur Metro Rail Corporation</p> <p>3rd Floor ,RAJSICO Building, Udhog Bhawan Premises , C-Scheme Jaipur, Rajasthan, India.</p> <p>The name of the International competitive bidding (ICB) is:</p> <p>Design, Manufacture, Supply, Installation, Testing and Commissioning of Automatic Fare Collection (AFC) System for Phase 1B of Jaipur Metro Rail Project (Choti Chouper – Badi Chouper Underground section& OCC/Depot)</p> <p>The identification number of the Bid is: JP/JS21(1B)</p> <p>The number and identification of lots (contracts) comprising this Bid :- One (JP/JS-21(1B))</p>
ITB 2.1	<p>The Borrower is: India</p> <p>The Borrower has received financing (hereinafter called funds) from the Asian Development Bank (hereinafter called ADB) towards the cost of the Project- Design Manufacture, Supply, Installation, Testing and Commissioning of Automatic Fare Collection (AFC) Systems for Jaipur Metro Rail Project (Phase 1B)</p>
ITB 4.1	<p>The Bidder can also form a consortium. All conditions applicable to Joint Venture in the contract shall also be applicable to consortium.</p>
ITB 4.3 (e)	<p>In addition, no bidder can be a subcontractor while submitting a bid individually or as a partner of a JV in the same bidding process. A bidder, if acting in the capacity of subcontractor in any bid, may participate in more than one bid, but only in that capacity</p>

ITB 7.1	<p>For <u>clarification purposes</u> only, the Employer's address is:</p> <p>Attention: Director (Project), Jaipur Metro Rail Corporation.</p> <p>Street address: RAJSICO Building, Udhog Bhawan Premises , C-Scheme</p> <p>Floor/Room number: 3rd Floor,</p> <p>City: Jaipur, PIN Code: 302005, Country: INDIA</p> <p>Telephone: 0141- 2822250</p> <p>Fax: +91-141-2822251</p> <p>E-mail address: dp@jaipurmetrorail.in gmst@jaipurmetrorail.in</p> <p>Last date of Seeking Clarifications, if any: - 07.01.2019. Please note that any clarification or queries after the due date shall not be acknowledged.</p>
ITB 7.4	<p>A Pre-Bid meeting may take place if Prospective bidder/ contractor have some doubt or seek clarification. The date, time and place are as follows :</p> <p>Date: 09.01.2019</p> <p>Time: 03:00 Hrs</p> <p>Place: Jaipur Metro Rail Corporation, Project Directorate, 3rd Floor, RAJSICO Building, Udhog Bhawan Premises , C-Scheme, Jaipur, Rajasthan, India</p> <p>A site visit can be organized by the Employer, if required. The cost of same shall be borne by bidder/ contractor.</p>

C. Preparation of Bids

ITB 11.2 (k)	<p>The Bidder shall submit with its Technical Bid the following additional documents:</p> <ol style="list-style-type: none"> 1. Certificate Of Compliance(Form COC to Section 4) 2. Endorsement of the requirement of SCC, Particular Specifications, Tender drawings. 3. Copy of all documents of Financial Package with Price left blank and Certificate from the Bidder(along with form TRU to Section 4) 4. Bid Index(Form BI to Section 4) 5. Form of Certificate Confirming Receipt of All Tender Addenda(Form ADD to Section 4) 6. Form SD & Form POD to Section 4.
ITB 11.3 (b)	<p>The schedules give the minimum BOQ to be covered as part of the scope of the work. Any other lumpsum item or enhancement to the listed items required to complete the JP/JS21 (1B) Contract shall also be provided as part of this</p>

	lumpsum Contract. The bidder may enhance these quantities based on his experience to meet the scope of whole of works as stipulated in the Employer's Requirements with the Employer's number scored out and the bidder's number inserted. The bidder shall provide an explanation for each of his changes to the Employer's numbers in Schedules.
ITB 11.3 (d)	<ol style="list-style-type: none"> 1. The Bidder shall on or before the date and time notified in Bid Documents, submit along with his Bid: - Original with Two copies each of all the document comprising Bid, including Bid Drawings and Addenda thereto, with each page signed and stamped to confirm acceptance by the Bidder of the contents. Each page of bid submitted shall be uniquely numbered for cross referencing purposes. The bidder shall also submit a soft copy of all bid submission but in case of any discrepancies the hard copy shall prevail. 2. The bidder shall submit Form MIS (Milestones) to Section 4. 3. Priced Form - Subcontractors for Major Items of Plant & Services. 4. The details of registration of Indian company with income tax department: Permanent Account Number (PAN).
ITB 12.1	The units and rates in figures entered into the Price Schedules should be typewritten or if written by hand, must be in print form. Price Schedules not presented accordingly may be considered nonresponsive.
ITB 13.1	Alternative bids are not acceptable .
ITB 13.2	Alternative to the Time Schedule is not permissible .
ITB 13.4	Alternative technical solutions shall not be permitted for any part or sub systems of the plants and services.
ITB 15.2	No provision of domestic preference is kept.
ITB 16.1 (b)	The period following completion of plant and services in accordance with provisions of the contract shall be 10 years from the date of taking over of plant or start of Revenue Operation Date, whichever is later.
ITB 17.2	<p>The Employer reserves the right to screen the list of sub-contractors proposed by the bidder and to require the contractor to remove the names of sub-contractors/vendors from the list, without protest by the bidder.</p> <p>The selection of the sub-contractor/vendor from the names remaining after screening shall be done by the bidder subject to the requirements of Clause 15 of</p>

	SCC.
ITB 18.3	Prices quoted for Schedule 6 (a) shall not to be used for bid price evaluation.
ITB 18.4(a)(i)& 18.4 (B) i.	<p>The Incoterm for quoting plant to be supplied from abroad is CIP.</p> <p>The place of destination for delivery of materials shall be Contractor's warehouse at site allocated by JMRC.</p>
ITB 18.4	The price quoted shall be inclusive of all applicable taxes, duties, cess etc. as per SCC Clause 7, Section-8. Also inclusive in the price shall be cost of local transportation & insurance from warehouse to sites with associated works and services.
ITB 18.6	The prices quoted by the Bidder shall be fixed .
ITB 19.1	<p>The currencies of the Bid shall be as follows:</p> <p>(a) The prices shall be quoted either in the currency of the Employer Country (Indian National Rupee), or in any fully convertible currency of up to three foreign currencies.</p> <p>(b) A Bidder expecting to incur a portion of its expenditures in the performance of the Contract in more than one currency, and wishing to be paid accordingly, shall so indicate in the Schedule of Prices and the Letter of Price Bid.</p> <p>(c) If some of the contract expenditures related to Design, Installation and Other Services are to be incurred in the Employer's country, such expenditures shall be quoted in either foreign and/or local currency, depending upon the currency in which the costs are to be incurred.</p> <p>(d) Bidders may be required by the Employer to clarify their local and foreign currency requirements, and to substantiate that the amounts included in the Price Schedules are reasonable and responsive to ITB 18.1 in which case a detailed breakdown of its foreign currency requirements shall be provided by the Bidder</p> <p>(e) During the performance of the contract, the foreign currency portions of the outstanding balance of the Contract Price may be adjusted by agreement between the Employer and the Contractor to reflect any changes in foreign currency requirements for the contract. Any such adjustment shall be effected by comparing the amounts quoted in the bid with the amounts already used in the Facilities and the Contractor's future needs for imported items.</p>
ITB 20.1	The bid validity period shall be 180 days from the date of final submission.

ITB 21.1	The Bidder shall furnish a bid security in the amount of INR 8,50,000 in the form BG/Demand Draft/ LC.
ITB 21.4	Subject to the succeeding sentences, any bid not accompanied by an irrevocable and callable bid security shall be rejected by the Employer as nonresponsive. If a Bidder submits a bid security that (i) deviates in form, amount, and/or period of validity, or (ii) does not provide sufficient identification of the Bidder (including, without limitation, failure to indicate the name of the Joint Venture or, where the Joint Venture has not yet been constituted, the names of all future Joint Venture Partners), the Employer shall request the Bidder to submit a compliant bid security within 14 (Fourteen) days of receiving such a request. Failure to provide a compliant bid security within the prescribed period of receiving such a request shall cause the rejection of the Bid.
ITB 22.1	In addition to the original Bid, the numbers of copies to be submitted are Two , alongwith scanned copy of submission in soft on CD.
ITB 22.2	<p>The written confirmation of authorization to sign on behalf of the Bidder shall consist of nomination of one of the members of the partnership, consortium or joint venture to be in-charge; and this authorization shall be covered in the Power of Attorney signed by the legally authorized signatories of all members of consortium or joint venture.</p> <p>The Bidder shall submit an acceptable authorization within 14 days.</p>
ITB 22.3	<p>The bidder, to qualify for award of Contract, shall submit a written power of attorney authorizing the signatories of the bid to commit each member of the partnership, consortium or joint venture.</p> <p>The bidder shall submit the following information:-</p> <ul style="list-style-type: none"> i) A Copy of Memorandum of understanding (MOU) relating to the composition of bidder shall be submitted. ii) Nomination of one of the members of the partnership, consortium or joint venture to be in-charge; and this authorization shall be covered in the Power of Attorney signed by the legally authorized signatories of all members of consortium or joint venture; iii) Details of the intended participation by each member shall be reconfirmed and expanded with complete details of the proposed division of responsibilities and corporate relationships among the individual members. iv) The joint venture/consortium/partnership agreement must contain a clause stating "All the partners are jointly and severally liable to JMRC". <p>In case of the bidder being successful, joint venture/consortium/partnership agreement shall be registered in Jaipur so as to be legally valid and binding on partners/members of the joint venture/consortium/partnership</p>

	<p>v) The lead partner in charge shall be authorized to incur liabilities, receive payments and receive instructions for and on behalf of any or all partners of the joint venture/consortium/partnership.</p> <p>vi) The method of making payment to each member for their respective responsibility can also be agreed if it is incorporated in MOU of consortium/JV and each member should submit invoice through Consortium Leader.</p>
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D. Submission and Opening of Bids

ITB 23.1	Bidders shall not have the option of submitting their bids electronically. Bidders must submit their bids by hand / post.
ITB 24.1	<p>For <u>bid submission purposes</u> only, the Employer's address is</p> <p>Attention: Director (Project), Jaipur Metro Rail Corporation. Street address: RAJSICO Building, Udhog Bhawan Premises, C-Scheme Floor/Room number: 3rd Floor City: Jaipur PIN Code: 302005 Country: INDIA</p> <p>The deadline for bid submission is Date: 31.01.2019 Time: 14:30 Hrs</p>
ITB 27.1	<p>The opening of Technical bids shall take place at: Jaipur Metro Rail Corporation. Street address: RAJSICO Building, Udhog Bhawan Premises , C-Scheme Floor/Room number: 3rd Floor City: Jaipur ZIP code: 302005 Country: INDIA Date: 31.01.2019 Time: 15:00 Hrs</p>

E. Evaluation and Comparison of Bids

ITB 30.1	All deviations from the bid documents, remarks, comments etc. shall be included in the Statement of Deviations (Form SD to Section 4). All implicit and explicit deviations, remarks and comments mentioned elsewhere in the Bidder's proposal
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	<p>shall be treated as NULL and VOID and considered withdrawn unconditionally. Any clause included in the Statement of Deviations (Form SD to Section 4) but not priced in the Form POD, shall be treated as NULL and VOID and will be considered unconditionally withdrawn. Each deviation shall have to be individually priced in Form POD.</p> <p>Bidder shall also note that:</p> <ul style="list-style-type: none"> Any Clause which has not been included in the Statement of Deviations (Form SD to Section 4) shall be treated as "Complied". Any "Not Complied" comment by the bidder, which has been included in the Statement of Deviations (Form SD to Section 4) but has not been priced in Form POD shall be treated as null and void and deemed to have been unconditionally withdrawn. Any comment by the bidder other than either of "Complied", "Noted" or "Not Complied" shall be treated as "Not Complied". Unless bidder prices against such clauses in the Form POD, the comment shall be considered as unconditionally withdrawn with no financial implications.
ITB 37.1	<p>The currency that shall be used for bid evaluation and comparison purposes to convert bid prices expressed in various currencies into a single currency is Indian Rupee (INR).</p> <p>The source of the selling exchange rate shall be of Reserve bank of India</p> <p>The date for the selling exchange rate shall be 28 days prior to the deadline for submission of bid.</p>
ITB 38.1	A margin of preference shall not be applied.
ITB 39.2.II	The evaluation of price bid shall take into account prices inclusive of all taxes as applicable in accordance with provisions of SCC Clause 7 or elsewhere in the bidding document.



Procurement of Works

JAIPUR METRO RAIL CORPORATION LIMITED

BIDDING DOCUMENT

for

Procurement on International Competitive Bidding Mode

of

ICB No.- JP/JS 21 (Phase-1B)

**DESIGN, MANUFACTURE, SUPPLY, INSTALLATION, TESTING &
COMMISSIONING OF AUTOMATIC FARE COLLECTION SYSTEM
FOR JMRC PHASE 1B**

PART - I BIDDING PROCEDURES

Section 3 - Evaluation and Qualification Criteria (EQC)

**3rd Floor, RAJSICO Building, Udhog Bhawan, Tilak Marg,
C- Scheme, Jaipur (Rajasthan) PIN-302005
Country: India**

Section 3 - Evaluation and Qualification Criteria

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1. Evaluation

1.1 Technical Evaluation

In addition to the criteria listed in ITB 34.1 (a) – (b), other relevant factors are as follows:

Evaluation of the Bidder's Technical Proposal will include an assessment of the Bidder's technical capacity to mobilize key equipment and personnel for the contract consistent with its proposal regarding work methods, scheduling, and material sourcing in sufficient detail and fully in accordance with the requirements stipulated in Section 6 (Employer's Requirements).

Non-compliance with equipment and personnel requirements described in Section 6 (Employer's Requirements) shall not normally be a ground for bid rejection and such non-compliance will be subject to clarification during bid evaluation and rectification prior to contract award.

1.2 Alternative Technical Solutions

Not Accepted.

1.3 Economic Evaluation

In addition to the criteria listed in ITB 39.2 I (a)–(e), other relevant factors are as follows:

Adjustments in price that result from the procedures outlined below shall be added, for purposes of comparative evaluation only, to arrive at an "Evaluated Bid Price." Bid prices quoted by Bidders shall remain unaltered.

1.3.1 Quantifiable Deviations and Omissions

Quantifiable Deviations and Omissions from the contractual obligations: the evaluation shall be based on the evaluated cost of fulfilling the contract in compliance with all contractual obligations under this Bidding Document. All deviations from the bid documents, remarks, comments etc. shall be included in the Statement of Deviations (Form SD to Section 4). All implicit and explicit deviations, remarks and comments mentioned elsewhere in the Bidder's proposal shall be treated as NULL and VOID and considered withdrawn unconditionally. Any clause included in the Statement of Deviations (Form SD to Section 4) but not priced in the Form POD, shall be treated as NULL and VOID and will be considered unconditionally withdrawn. Each deviation shall have to be individually priced in Form POD. Refer BDS 30.1 for further details.

1.3.2 Time Schedule

Time to complete the plant and services from the effective date specified in Article 3 of the Contract Agreement for determining the time for completion of pre-commissioning activities is: as per the Key Dates specified in Appendix-4 to Section 9. No credit will be given for earlier completion.

1.3.3 Operating and Maintenance Costs

Not Applicable

1.3.4 Functional Guarantees of the Facilities

Not Applicable

1.3.5 Work, Services, Facilities, etc., to be provided by the Employer

JP/JS/21(1B) contractor shall be provided with space / released warehouse of approximately 600 SQM for ware house/storage/office purpose at Mansarovar Depot for construction Phase and equivalent space elsewhere within municipal limits of Jaipur for the DLP period.

Alternatively, equivalent space may be provided elsewhere at different location within municipal limits of Jaipur for entire contract period.

However, the contractor(s) may set up its own office/ ware house/ storage at their own identified location in Jaipur, approved by Employer's representative, throughout the contract period.

The contractor shall be responsible for incurring all costs for running & maintaining the office & ware house premises during the contract period. The key personnel for design and project implementation & coordination shall be stationed at Jaipur.

1.3.6 Specific Additional Criteria

Please refer BDS/ Section 2.

1.3.7 Domestic Preference

Not Applicable

1.4 Multiple Contracts

Not Applicable.

2. Qualification

It is the legal entity or entities comprising the Bidder, and not the Bidder's parent companies, subsidiaries, or affiliates, that must satisfy the qualification criteria described below.

2.1 Eligibility

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture/Consortium			Submission Requirements
		All Partners Combined	Each Partner	One Partner	

2.1.1 Nationality

Nationality in accordance with ITB Sub clause 4.2.	must meet requirement	must meet requirement	must meet requirement	not applicable	Forms ELI - 1; ELI - 2 with attachments
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2.1.2 Conflict of Interest

No conflicts of interest in accordance with ITB Sub clause 4.3. & BDS	must meet requirement	must meet requirement	must meet requirement	not applicable	Letter of Technical Bid
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2.1.3 ADB Eligibility

Not having been declared ineligible by ADB, as described in ITB Sub clause 4.4.	must meet requirement	must meet requirement	must meet requirement	not applicable	Letter of Technical Bid
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2.1.4 Government-Owned Enterprise

Bidder required to meet conditions of ITB Sub clause 4.5.	must meet requirement	must meet requirement	must meet requirement	not applicable	Forms ELI - 1; ELI - 2 with attachments
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2.1.5 United Nations Eligibility

Not having been excluded by an act of compliance with a UN Security Council resolution in accordance with ITB Sub clause 4.7.	must meet requirement	must meet requirement	must meet requirement	not applicable	Letter of Technical Bid
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2.2 Pending Litigation and Arbitration

Pending litigation and arbitration criterion shall apply as below.

2.2.1 Pending Litigation and Arbitration

Criteria	Compliance Requirements			Documents
Requirement	Single Entity	Joint Venture/Consortium		Submission Requirements
		All Partners Combined	Each Partner	
All pending litigation and arbitration, if any, shall be treated as resolved against the Bidder and so shall in total not represent more than 50 percent of the Bidder's net worth calculated as the difference between total assets and total external liabilities.	must meet requirement by itself or as partner to past or existing Joint Venture	not applicable	must meet requirement by itself or as partner to past or existing Joint Venture	Form LIT - 1

2.3 Financial Situation

2.3.1 Historical Financial Performance

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture/Consortium			Submission Requirements
		All Partners Combined	Each Partner	One Partner	
Submission of audited financial statements or, if not required by the law of the Bidder's country, other financial statements acceptable to the Employer, for the last 03 (Three) years to demonstrate the current soundness of the Bidder's financial position. As a minimum, the Bidder's net worth for the last year calculated as the difference between total assets and total external liabilities should be positive.	must meet requirement	not applicable	must meet requirement	not applicable	Form FIN - 1 with attachments

Note :- Financial data for latest last three audited financial years has to be submitted by the bidder along with audited balance sheets. The financial data shall be certified by Chartered Accountant with his stamp and signature in original with membership number. In case audited balance sheet of the last financial year is not made available by the bidder, he has to submit an affidavit certifying that 'the balance sheet has actually not been audited so far'. In such a case the financial data of previous '4th' audited financial years will be taken into consideration for evaluation.

2.3.2 Average Annual Turnover

Criteria	Compliance Requirements				Documents
Requirement**	Single Entity	Joint Venture/Consortium			Submission Requirements
		All Partners Combined	Each Partner	One Partner	
Minimum average annual turnover of (INR) 6.6 Crore (calculated as total certified by CA payments received for contracts in progress or completed, within the last 3 (Three) years).	must meet requirement	must meet requirement	must meet 25% of the requirement	must meet 40% of the requirement	Form FIN - 2

2.3.3 Financial Resources

If the bid evaluation process and the decision for the award of the Contract takes more than one (1) year from the date of bid submission, Bidders shall be asked to resubmit their current contract commitments and latest information on financial resources supported by latest audited accounts / audited financial statements, or if not required by the law of the Bidder's country, other financial statements acceptable to the Employer, and the Bidders' financial capacity shall be reassessed on this basis.

Criteria	Compliance Requirements				Documents
Requirement**	Single Entity	Joint Venture/Consortium			Submission Requirements
		All Partners Combined	Each Partner	One Partner	
The Bidder must demonstrate that it has the financial resources to meet:					
(a) its current contract commitments, as defined in FIN-4 (Total Financial Requirements for Current Contract Commitments), plus	must meet requirement	not applicable	must meet requirement for its own contractual commitments	not applicable	Form FIN - 4
(b) the requirements for the Subject Contract of INR 85 Lacs	must meet requirement	must meet requirement	must meet 25%(A)	must meet 40%(B)	Form FIN – 3 and Form FIN - 4

2.4 Bidder's Experience

2.4.1 Contracts of Similar Size and Nature

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture/Consortium ^a			Submission Requirements
		All Partners Combined	Each Partner	One Partner	
<p>Successful completion of work(s), completion date of which falling during last Seven years (07) ending last day of the month previous to the month of tender submission as given below:</p> <p>One similar substantially completed work costing not less than the amount equal to INR 6.55* Crores of the estimated cost.</p> <p>The similarity of the Bidder's participation shall be based on the physical size, nature of works, complexity, methods, technology or other characteristics as described in Section 6 (Employer's Requirements).</p>	must meet requirement	not applicable	not applicable	must meet requirement	Form EXP - 1

OR

<p>Successful completion of work(s), completion date of which falling during last seven years ending last day of the month previous to the month of tender submission as given below:</p> <p>Two similar substantially completed work costing not less than the amount equal to INR 4.1* Crores of the estimated cost.</p> <p>The similarity of the Bidder's participation shall be based on the physical size, nature of works, complexity, methods, technology or other characteristics as described in Section 6 (Employer's Requirements).</p>	must meet requirement	<p>must meet requirement as follows:</p> <p>Either one partner must meet requirement</p> <p>Or</p> <p>any two partners must each demonstrate one (1) successfully or substantially completed contract of similar size and nature</p>	not applicable	not applicable	Form EXP - 1
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<p>Successful completion of work(s), completion date of which falling during last seven years ending last day of the month previous to the month of tender submission as given below:</p> <p>Three similar substantially completed work costing not less than the amount equal to INR 3.3* Crore of the estimated cost.</p> <p>The similarity of the Bidder's participation shall be based on the physical size, nature of works, complexity, methods, technology or other characteristics as described in Section 6 (Employer's Requirements).</p>	must meet requirement	<p>must meet requirement as follows:</p> <p>Either one partner must meet requirement</p> <p>Or</p> <p>any three partners must each demonstrate one (1) successfully or substantially completed contract of similar size and nature</p>	not applicable	not applicable	Form EXP - 1
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**80%, 50%, 40% of estimated value respectively.*

2.4.2 Experience in Key Activities

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture/Consortium			Submission Requirements
		All Partners Combined	Each Partner	One Partner	
For the above or other contracts executed during the period stipulated in 2.4.1 above, a minimum experience in the following below key activities:					
Design, Manufacturing, Supply, Installation, Testing and Commissioning of AFC system in Metro Rail / other transit system / Railways across countries given in Section 5 for least one work of type & nature given below* :- 1. AFC System network for minimum two stations/ locations including Central Server/ Computer. <u>OR</u> 2. Expansion/ up gradation of existing AFC system of third party to integrate minimum two additional stations.	must meet requirements	not applicable	not applicable	must meet requirements	Form EXP - 2

*Proposed technical solution should have relevance to experience criteria fulfilled.

Note :- Activities specified in clause 2.5, section-3 can be sub-contracted subject to the ceiling limit that not more than 50% of total value of works of whole contract are sub-contracted. For all activities to be sub-contracted, contractor to submit form EXP-3 & Item No.8- Proposed Subcontractors for Major Items of Plant and Services, Technical Proposal, Section 4. The ceiling limit shall be determined from Item No.8- Proposed Subcontractors for Major Items of Plant and Services, Technical Proposal, Section 4.

2.5 Subcontractors

Subcontractors or Manufacturers for the following major items of plant and services must meet the following minimum criteria, herein listed for that item. Failure to comply with this requirement will result in rejection of the subcontractor but not the Bidder.

Item No.	Description of Item	Minimum Criteria to be met	Documents Submission Requirements
1	Supply/Commissioning of Automatic Gate (AG)	Completion of similar works in Metro Rail / Railways / Other transit systems in at least one location in last Seven years	Form EXP-3
2	Supply/Commissioning Ticket Office Machine/Excess Fare Office (TOM/EFO)		
3	Supply/Commissioning of Station Computer (SC)		
4	Supply/Commissioning of Ticket Vending Machine (TVM)		
5	Supply/Commissioning of AVM cum Ticket Reader (TR)		

*In the case of a Bidder who offers to supply and install major items of plant under the contract, which the Bidder do not manufacture or otherwise produce, the Bidder shall provide the Manufacturer's authorization, using the form provided in Section 4 (Bidding Forms), showing that the Bidder has been duly authorized by the Manufacturer or producer of the related plant and equipment or component to supply and install that item in the Employer's country. Failure to submit the **Manufacturer's authorization** at the first instance is considered a minor, nonmaterial omission and shall be subject to clarification. However, failure of the Bidder to submit the omitted authorization shall lead to rejection of the Subcontractor or Manufacturer of the item under evaluation in accordance with ITB 39.*



Procurement of Works

JAIPUR METRO RAIL CORPORATION LIMITED

BIDDING DOCUMENT

for

Procurement on International Competitive Bidding Mode

of

ICB No.- JP/JS 21 (Phase-1B)

**DESIGN, MANUFACTURE, SUPPLY, INSTALLATION, TESTING &
COMMISSIONING OF AUTOMATIC FARE COLLECTION SYSTEM
FOR JMRC PHASE 1B**

PART - I BIDDING PROCEDURES

Section 4 - Bidding Forms (BDF)

**3rd Floor, RAJSICO Building, Udhog Bhawan, Tilak Marg,
C- Scheme, Jaipur (Rajasthan) PIN-302005
Country: India**

Section 4 - Bidding Forms

This section contains the forms to be completed by the Bidder and submitted as part of its Bid.

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Letter of Technical Bid**-- Note --**

The bidder must accomplish the Letter of Technical Bid on its letterhead clearly showing the bidder's complete name and address.

Date:

ICB No.:

Invitation for Bid No.:

To:

We, the undersigned, declare that:

- (a) We have examined and have no reservations to the Bidding Documents, including Addenda issued in accordance with Instructions to Bidders (ITB) 8. _____
- (b) We offer to design, manufacture, test, deliver, install, pre-commission, and commission in conformity with the Bidding Document the following Plant and Services:

- (c) Our Bid consisting of the Technical Bid and the Price Bid shall be valid for a period of 180 days from the date fixed for the bid submission deadline in accordance with the Bidding Documents, and it shall remain binding upon us and may be accepted at any time before the expiration of that period.
- (d) We, including any Subcontractors or Manufacturers for any part of the Contract, have or will have nationalities from eligible countries, in accordance with ITB4.2.
- (e) We, including any Subcontractors or Suppliers for any part of the Contract, do not have any conflict of interest in accordance with ITB 4.3.
- (f) We are not participating, as a Bidder in more than one bid in this bidding process in accordance with ITB 4.3(e), other than alternative offers submitted in accordance with ITB 13.
- (g) Our firm, its affiliates or subsidiaries, including any Subcontractors or Suppliers for any part of the contract, has not been declared ineligible by ADB, under the Employer's country laws or official regulations or by an act of compliance with a decision of the United Nations Security Council.

- (h) [We are not a government-owned enterprise] / [We are a government-owned enterprise but meet the requirements of ITB4.5].¹
- (i) We agree to permit ADB or its representative to inspect our accounts and records and other documents relating to the bid submission and to have them audited by auditors appointed by ADB.
- (j) If our Bid is accepted, we commit to mobilizing key equipment and personnel in accordance with the requirements set forth in Section 6 (Employer's Requirements) and our technical proposal, or as otherwise agreed with the Employer.

Name

In the capacity of

Signed

.....

Duly authorized to sign the Bid for and on behalf of

Date

.....

¹Use one of the two options as appropriate.

Letter of Price Bid

-- Note --

The bidder must accomplish the Letter of Price Bid on its letterhead clearly showing the bidder's complete name and address.

Date:

ICB No.:

Invitation for Bid No.:

To:

We, the undersigned, declare that:

- (a) We have examined and have no reservations to the Bidding Document, including Addenda issued in accordance with Instructions to Bidders (ITB) 8. _____
- (b) We offer to design, manufacture, test, deliver, install, pre-commission, and commission in conformity with the Bidding Document the following Plant and Services:

- (c) The total bid price quoted in accordance with SCC Clause 7, excluding any discounts offered in item (d) below is fixed, lump sum amount and is the sum of

--

- (d) The discounts offered and the methodology for their application are as follows:
-
- (e) Our Bid shall be valid for a period of 180 days from the date fixed for the submission deadline in accordance with the Bidding Documents, and it shall remain binding upon us and may be accepted at any time before the expiration of that period.
- (f) If our Bid is accepted, we commit to obtain a performance security in accordance with the Bidding Document.

- (g) We have paid, or will pay the following commissions, gratuities, or fees with respect to the bidding process or execution of the Contract:¹

Name of Recipient	Address	Reason	Amount
.....
.....

- (h) We understand that this bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal contract is prepared and executed.
- (i) We understand that you are not bound to accept the lowest evaluated bid or any other bid that you may receive.
- (j) We agree to permit ADB or its representative to inspect our accounts and records and other documents relating to the bid submission and to have them audited by auditors appointed by ADB.

Name

In the capacity of

Signed

Duly authorized to sign the Bid for and on behalf of

Date

¹ If none has been paid or is to be paid, indicate "None."

Price Schedules PREAMBLE

General

1. The Price Schedules are divided into separate Schedules as follows:

Schedule No.1:	Plant and Mandatory Spare Parts Supplied from Abroad
Schedule No. 2:	Plant and Mandatory Spare Parts Supplied from within the Employer's Country
Schedule No. 3:	Design Services
Schedule No. 4:	Installation and Other Services
Schedule No. 5:	Grand Summary
Schedule No. 6(a):	Recommended Spare Parts

2. The schedules give the minimum BOQ to be covered as part of the scope of the work. Any other lumpsum item or enhancement to the listed items required to complete the JP/JS21 (1B) Contract shall also be provided as part of this lumpsum Contract. The bidder may enhance these quantities based on his experience to meet the scope of whole of works as stipulated in the Employer's Requirements with the Employer's number scored out and the bidder's number inserted. The bidder shall provide an explanation for each of his changes to the Employer's numbers in Schedules. Bidders shall be deemed to have read the Employer's Requirements and other sections of the Bidding Document and reviewed the Drawings to ascertain the full scope of the requirements included in each item prior to filling in the rates and prices. The entered rates and prices shall be deemed to cover the full scope as aforesaid, including overheads and profit.

3. If Bidders are unclear or uncertain as to the scope of any item, they shall seek clarification in accordance with ITB 7 prior to submitting their bid.

Pricing

4. The units and rates in figures entered into the Price Schedules should be typewritten or if written by hand, must be in print form. Price Schedules not presented accordingly may be considered nonresponsive. Any alterations necessary due to errors, etc., shall be initialed by the Bidder.
 As specified in the Bid Data Sheet and Special Conditions of Contract, prices shall be fixed and firm for the duration of the Contract.

5. Bid prices shall be quoted in the manner indicated and in the currencies specified in the Instructions to Bidders in the Bidding Document.
 For each item, Bidders shall complete each appropriate column in the respective Schedules, giving the price breakdown as indicated in the Schedules.
 Prices given in the Schedules against each item shall be for the scope covered by that item as detailed in Section 6 (Employer's Requirements) or elsewhere in the Bidding Document.

6. Payments will be made to the Contractor in the currency or currencies indicated under each respective item.

7. When requested by the Employer for the purposes of making payments or part payments, valuing variations or evaluating claims, or for such other purposes as the Employer may reasonably require, the Contractor shall provide the Employer with a breakdown of any composite or lump sum items included in the Schedules.

Schedules of Rates and Prices

Schedule No. 1: Plant and Mandatory Spare Parts Supplied from Abroad

Item	Description ^b	Country of Origin	Quantity ^b	Unit Price ^{a,c}	Total Price ^{a,c}	GST ^c
				Foreign Currency	Foreign Currency	Local Currency
1	2	3	4	5	6 = 4 x 5	(7)
1.	Station computer including monitor, CPU trolley etc.		2			
2.	Ticket Vending Machine		8			
3.	TOM/EFO		12			
4.	Gate Cabinets		32			
5.	AVM cum TR		8			
6.	Station Router		2			
7.	Data Switch		6			
8.	Router rack with patch panel, connector etc. complete		2			
9.	Switch rack with patch panel, connector etc. complete		6			
10.	Electrical Cabinet (C)		3			
11.	Electrical Cabinet (B)		4			
12.	Electrical Cabinet (A)		4			
13.	Power Cable for Under Ground Station (Unit=1 Station/OCC)		2			
14.	LAN Cable CAT/OFC for Under Ground Station (Unit=1 Station/OCC)		2			
15.	CPU rack for TOM/EFO including trolley		12			
16.	Emergency switch with housing		4			
17.	Supply & installation of Swing Barrier		4			
18.	Source Code		LS			
19.	Contract Spares as per PS		LS			
20.	Up gradation of existing central computer CC1 (including web server, bank server etc.) at OCC level for integrated with 2 new stations		1			
21.	Any other item for completion		LS			

	of work viz. Furniture, Tools, POS etc. and any OCC equipment required as per proposed technical solution etc. (The bidder(s) have to provide the explanation in technical proposal for each items with quantity listed herein below).					
TOTAL Column 6, 7 to be carried forward to Schedule No. 5: Grand Summary						

- a. *Specify currencies in accordance with ITB 19.1 of the BDS. Create additional columns for up to a maximum of three foreign currencies if so required.*
- b. *Quantity specified in Schedule 1,2,3,4 is total minimum quantity to be covered as part of scope of work. Any other item or enhancement to listed items required to complete the contract shall also be provided as part of this lump sum contract.*
- c. *Column 5 & 6 Prices shall be inclusive of insurance, freight and all taxes & duties as applicable per SCC Clause 7, Section-8 except GST. GST applicable as per SCC Clause 7, Section-8 shall be indicated separately in column 7.*

Name of Bidder _____

Signature of Bidder _____

Country of Origin Declaration Form

Item	Description	Country

Schedule No. 2: Plant and Mandatory Spare Parts Supplied from Within the Employer's Country

Item	Description ^c	Quantity ^c	Unit Price ^{a,b}	Total Price ^b	GST ^b	Grand Total
			Local Currency	Local Currency		
1	2	3	4	5 = 3 x 4	6	7=(5)+(6)
1.	Station computer including monitor, CPU trolley etc.	2				
2.	Ticket Vending Machine	8				
3.	TOM/EFO	12				
4.	Gate Cabinets	32				
5.	AVM cum TR	8				
6.	Station Router	2				
7.	Data Switch	6				
8.	Router rack with patch panel, connector etc. complete	2				
9.	Switch rack with patch panel, connector etc. complete	6				
10.	Electrical Cabinet (C)	3				
11.	Electrical Cabinet (B)	4				
12.	Electrical Cabinet (A)	4				
13.	Power Cable for Under Ground Station (Unit=1 Station/OCC)	2				
14.	LAN Cable CAT/OFC for Under Ground Station (Unit=1 Station/OCC)	2				
15.	CPU rack for TOM/EFO including trolley	12				
16.	Emergency switch with housing	4				
17.	Supply & installation of Swing Barrier	4				
18.	Source Code	LS				
19.	Contract Spares as per PS	LS				
20.	Up gradation of existing central computer CC1 (including web server, bank server etc.) at OCC level for integrated with 2 new stations	1				
21.	Any other item for completion of work viz. Furniture, Tools, SAMs,	LS				

	POS etc. and any OCC equipment required as per proposed solution etc. (The bidder(s) have to provide the explanation in technical proposal for each items with quantity listed herein below).					
TOTAL Column 5,6 and 7 to be carried forward to Schedule No. 5: Grand Summary						

- a. Specify currency in accordance with ITB 19.1 of the BDS.*
- b. Column 4,5 Prices shall be inclusive of insurance, freight and all taxes & duties as applicable as per SCC Clause 7, Section-8 except GST. GST applicable as per SCC Clause 7, Section-8 shall be indicated separately in column6.*
- c. Quantity specified in Schedule 1,2,3,4 is total minimum quantity to be covered as part of scope of work. Any other item or enhancement to listed items required to complete the contract shall also be provided as part of this lump sum contract.*

Name of Bidder _____

Signature of Bidder _____

Schedule No. 3: Design and other Services

Item	Description ^c	Quantity ^c	Unit Price ^{a,b}		Total Price ^{a,b}		GST ^b	Grand Total	
			Local Currency	Foreign Currency	Local Currency	Foreign Currency		Local Currency	Foreign Currency
1	2	3	4	5	6 = 3 x 4	7=3x5	8	9=(6)+(8)	(10)=(7)
1.	Integrated testing and commissioning	3							
2.	Installation, Verification and Partial Acceptance Test	3							
3.	System Acceptance Test including TVM	3							
4.	Service Trial	3							
5.	Submission of complete design documents- Prelim design, Final design, Drawings, Interface application engineering, configuration data etc. including for upgradation of OCC equipment	LS							
6.	Project Management	LS							
7.	Setup of project office and storage space	LS							
8.	Support During Defects Liability Period (Workshop Repair, Support for localization work)(24MM)	LS							
9.	Up gradation of existing central computer with payment interface server and required OCC level integration with CC1[Design/ interface component]	LS							
10.	Maintenance Supervisor- Man month	2 Man month							
11.	Training(2Man Month)	LS							

12.	Transfer of Knowledge	LS							
13.	Any other item for completion of the work.	LS							
TOTAL Column 6,7,8,9 and 10 to be carried forward to Schedule No. 5: Grand Summary									

- a. *Specify currency in accordance with ITB 19.1 of the BDS.*
- b. *Column 4,5,6,7 Prices shall be inclusive of insurance, freight and all taxes & duties as applicable as per SCC Clause 7, Section-8 except GST. GST applicable as per SCC Clause 7, Section-8 shall be indicated separately in column8.*
- c. *Quantity specified in Schedule 1,2,3,4 is total minimum quantity to be covered as part of scope of work. Any other item or enhancement to listed items required to complete the contract shall also be provided as part of this lump sum contract.*

Name of Bidder

Signature of Bidder

Schedule No. 4 – Installation

Item	Description	Quantity ^c	Unit Price ^{a,b}		Total Price ^{a,b}		GST ^b	Grand Total	
			Local Currency	Foreign Currency	Local Currency	Foreign Currency		Local Currency	Foreign Currency
1	2	3	4	5	6 = 3 x 4	7=3x5	8	9=(6)+(8)	10=7
Installation of:									
1.	Station Computer	2							
2.	Installation of TVMs	8							
3.	TOM/EFO	12							
4.	Gate Cabinets	32							
5.	AVM cum TR	8							
6.	Data Switch	6							
7.	Station Router	2							
8.	Router rack with patch panel, connector etc complete	2							
9.	Switch rack with patch panel, connector etc complete	6							
10.	Electrical Cabinet (C)	3							
11.	Electrical Cabinet (B)	4							
12.	Electrical Cabinet (A)	4							
13.	Power Cable for Under Ground Station (Unit=1 Station LS)	2							
14.	LAN Cable CAT/OFC for Under Ground Station (Unit=1 Station LS)	2							
15.	Any other item required for completion of work at stations or OCC based of proposed technical solution etc. (The bidder(s) have to provide the explanation in technical proposal for each items with quantity listed herein below).	LS							
TOTAL Columns 6,7,8,9 and 10 to be carried forward to Schedule No. 5: Grand Summary									

a. Specify currency in accordance with ITB 19.1 of the BDS.

b. Column 4,5,6,7 Prices shall be inclusive of insurance, freight and all taxes & duties as applicable as per SCC Clause 7, Section-8 except GST. GST applicable as per SCC Clause 7, Section-8 shall be indicated separately in column 8.

c. Quantity specified in Schedule 1,2,3,4 is total minimum quantity to be covered as part of scope of work. Any other item or enhancement to listed items required to complete the contract shall also be provided as part of this lump sum contract.

Name of Bidder _____

Signature of Bidder _____

Schedule No. 5: Grand Summary

Schedule No.	Title	Total Price ^a		GST ^b (III)	Grand Total	
		Foreign (I)	Local (II)		Foreign (I)	Local (II) + (III)
1	Plant and Mandatory Spare Parts Supplied from Abroad					
2	Plant and Mandatory Spare Parts Supplied from Within the Employer's Country					
3	Design Services					
4	Installation Services					
Grand Total to be carried forward to Letter of Price Bid						

^a Specify currency in accordance with ITB19.1 of the BDS. Create additional columns for up to a maximum of three foreign currencies if so required. Carried over from Column 6 of Schedule 1, Column 5 of Schedule 2 & Column 6, 7 of Schedule 3, 4.

^b Carried over from Column 7 of Schedule 1, Column 6 of Schedule 2 & Column 8 of Schedule 3, 4.

Name of Bidder

Signature of Bidder

***Schedule No. 6(a): Recommended Spare Parts [Mandatory to be filled in detail but not to be used for bid evaluation].**

Item	Description *	Part No.	Primary Source of Supply	Secondary Source of Supply	Lead Time (Month)	Shelf Life (Month)	Unit Cost Without Escalation	Number of units required for the system during expected life	Number of units required for the system during the first 10 years	Quantity	Unit Price ^a		Total Price ^a		GST ^b
											EXW Local Parts Local Currency	CIP Imported Parts Foreign Currency	Local Currency Portion	Foreign Currency Portion	
1									2	3	4	5	6 = 3 x 4	7 = 3 x 5	
TOTAL															

* Description should include details like part number, lead time, shelf life etc as per SCC Clause no.3.

a. Prices shall be inclusive of insurance, freight and all taxes & duties as applicable as per SCC Clause 7, Section-8 except GST.

b. GST applicable as per SCC Clause 7, Section-8 shall be indicated separately .

Name of Bidder_____

Signature of Bidder_____

Bid Security

Bank Guarantee

..... *Bank's name, and address of issuing branch or office*¹

Beneficiary: *Name and address of employer*

Date:

Bid Security No.:

We have been informed that ***name of the bidder.*** (herein after called "the Bidder") has submitted to you its bid dated (herein after called "the Bid") for the execution of ***name of contract*** under Invitation for Bids No. ("the IFB").

Furthermore, we understand that, according to your conditions, bids must be supported by a bid guarantee.

At the request of the Bidder, we ***name of Bank.*** hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of ***amount in figures*** (. ***amount in words***) upon receipt by us of your first demand in writing accompanied by a written statement stating that the Bidder is in breach of its obligation(s) under the bid conditions, because the Bidder:

- (a) has withdrawn its Bid during the period of bid validity specified by the Bidder in the Letters of Technical and Price Bid; or
- (b) does not accept the correction of errors in accordance with the Instructions to Bidders (hereinafter "the ITB"); or
- (c) having been notified of the acceptance of its Bid by the Employer during the period of bid validity, (i) fails or refuses to execute the Contract Agreement, or (ii) fails or refuses to furnish the Performance Security, in accordance with the ITB.

This guarantee will expire (a) if the Bidder is the successful Bidder, upon our receipt of copies of the Contract Agreement signed by the Bidder and the Performance Security issued to you upon the instruction of the Bidder; or (b) if the Bidder is not the successful Bidder, upon the earlier of (i) our receipt of a copy of your notification to the Bidder of the name of the successful Bidder, or (ii) 28 days after the expiration of the Bidder's bid.

Consequently, any demand for payment under this guarantee must be received by us at the office on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 458.²

..... *Bank's seal and authorized signature(s)*

-- Note --

*In case of a **joint venture / consortium**, the bid security must be in the name of all partners to the **joint venture / consortium** that submits the bid.*

¹ All italicized text is for use in preparing this form and shall be deleted from the final document.

² Or 758 as applicable.

Technical Proposal

- 1. Site Organization**
- 2. Method Statement**
- 3. Mobilization Schedule**
- 4. Construction Schedule**
- 5. Plant**
- 6. Personnel**
- 7. Equipment**
- 8. Proposed Subcontractors for Major Items of Plant and Services**
- 9. Manufacturer's Authorization**
- 10. Time Schedule**
- 11. Functional Guarantee of the Proposed Facilities**

1.Site Organization

2. Method Statement

Methodology Proposed for Installation, Testing, Interfacing, Commissioning, Final Integration and Trials.

- a) Methodology and procedures for expansion of existing AFC Network to integrate additional two or more stations or any other Proposed solution.
- b) Methodology for installation,
- c) Interfacing with various other Designated Contractors, Banks, external agencies etc.
- d) Methodology and procedures for Type test, Factory Acceptance test.
- e) Methodology and procedures for Interface with designated Project & other contractors.
- f) Methodology and procedures for installation test.
- g) Methodology and procedures for Partial Tests including functional tests
- h) Methodology and procedures for dynamic tests.
- i) Methodology and procedures for System Acceptance Test.
- j) Methodology and procedures for final integration of various SLE systems with CC.
- k) Methodology and procedure for service trail.

3. Mobilization Schedule

4. Construction Schedule

5. Plant

As per Section-6.

6. Personnel

Form PER – 1: Proposed Personnel

Bidders should provide the details of proposed personnel and their experience record in the relevant Information Forms below for each of the candidate.

1.	Title of position*		
	Name		
	Employee of bidder/ consortium partner		
	Will be based at Jaipur during execution stage.		
2.	Title of position*		
	Name		
	Employee of bidder/ consortium partner		
	Will be based at Jaipur during execution stage.		
etc.	Title of position*		
	Name		

-- Note --

*** As listed in Section 6 (Employer's Requirements).**

Project Director of the bidders shall be based in Jaipur. Design Liaison Engineer, Interface, Installation & other managers shall be continuously based in Jaipur throughout the commissioning, testing & service trial period.

The Bidders shall include in its proposal for his co-ordination Control Team and include the name and qualifications of the Team Leader responsible for the interface co-ordination with Designated Contractors.

7. Equipment

Form EQU: Equipment

The Bidder shall provide adequate information and details to demonstrate clearly that it has the capability to meet the equipment requirements indicated in Section 6 (Employer's Requirements), using the Forms below. A separate Form shall be prepared for each item of equipment listed, or for alternative equipment proposed by the Bidder.

Item of Equipment <i>[Insert type of equipment here e.g. AG, TOM, TVM etc.]</i>		
Equipment Information	Name of manufacturer	Model and power rating
	Capacity	Year of manufacture
Current Status	Current location <i>[Insert Factory/Warehouse location, where equipment is available]</i>	
	Details of current commitments <i>[Insert name of projects where equipment is commissioned]</i>	
Source	Indicate source of the equipment <input type="checkbox"/> Owned <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	

Omit the following information for equipment owned by the Bidder.

Owner	Name of owner	
	Address of owner	
	Telephone	Contact name and title
	Fax	Telex
Agreements	Details of rental/lease/manufacture agreements specific to the project	

Requirement for Bidder Technical Proposals

- (a) The Bidder's attention is drawn to the List of Definitions and List of Abbreviations in the Employer's Requirements and to Clause 1 of the General conditions of Contract in which terms are defined.(Section 6)
- (b) The Bidder Technical Proposals shall comply or, subject to reasonable development, be capable of complying with the Employer's Requirements in all respects. The Bidder Technical Proposals shall establish the intended design, safety standards followed, manufacturing technology and installation testing practices.
- (c) The following paragraphs list the minimum documentation that shall be supplied by the Bidder to enable technical evaluation of the bid. The Bidder shall include any further information necessary to demonstrate the suitability of his proposal.

A. General Requirements

1. The Bidder shall submit a Certificate of Compliance (Form COC to Bidding Forms, Section 4) on all the clauses of the Employer's Requirements. Where the Bidder is not able to comply fully with certain clauses and proposes an alternative design it should be mentioned as deviations. All the deviations shall be consolidated and listed separately in the Statement of Deviations (Form SD to Bidding Forms, Section 4). Excepting the items listed in the statement of deviations, the contractor shall give a Certificate of Compliance in the form attached of all the items.
2. The Bidder shall also advise the conflicts, if any, in the bid documents between various functional requirements or specifications.
3. A General description of the complete AFC System for this Contract with brief technical description as indicated in the following sections. Soft copy of technical specification in word/PDF format is to be submitted as well.
4. The Bidder shall detail out the technical solution proposed for OCC level system, which includes requirements at Central Computer level, its integration with SLE of proposed stations, integration of POS and existing bank, Testing platforms etc. The bidder has to provide general schematic drawings for this proposed solution/ equipments and shall clearly state its merits, any limitations and non-compliance
5. The Bidder shall detail any potential problems or hazards that have been identified during the Bidder's assessment of the Employer's Requirements.
6. Brief plan for installation, testing and commissioning, proposed method of interfacing and final integration of the system with relevant Designated Contractors shall be given.
7. The bidder shall also submit the existing/proposed maintenance facilities in India for subsystems/items as given in the Annexure-A to Requirement for Bidder Technical Proposals given below.
8. For the system/sub-system the Bidder shall submit:

-
- a) Technical Information of equipment proposed by the Bidder. The Bidder shall also submit a summary in the format given in Annexure B to Requirement for Bidder Technical Proposals.
 - b) Information for justifying the proven-ness of the equipment proposed by the Bidder in the format given in Annexure A to Requirement for Bidder Technical Proposals
 - c) Information for sub-contract of design and manufacture or vending proposed by Bidder in the format given in Annexure C to Requirement for Bidder Technical Proposals.
 - d) Conformity to the required International, Indian Railway and other standards, as stipulated in the Employer's Requirements.
 - e) Electromagnetic compatibility of the systems in accordance with the standard stipulated in the Employer's Requirements.
 - f) Physical dimensions, spare requirements.
 - g) Power supply requirements.

B. Maintenance Requirements:

- a. Proposals for complying with the obligation for supervision of maintenance.
- b. Provide details of inspection and maintenance schedules of similar equipment/cables supplied and commissioned by the Bidder, and already in use on a Mass Rapid Transit system

Annexure A

Technical Information Employer's Requirement for AFC System

S. No	Equipment	Architecture/Specifications (Specified in PS)	Model No. / Trade Name	Data Sheet Attached (Y/N)	Proposed to be Maintained in India (Y/ N)	Remarks	Reference page no. in bid.
A1	AFC Gates	As specified in GS & PS					
A2	TOMs	As specified in GS & PS					
A3	AVM cum TR	As specified in GS & PS					
A4	Station Computer	As specified in GS & PS					
A5	TVM	As specified in GS & PS					

Annexure B**Information regarding Performance of the offered equipment for AFC systems.**

S.No.	Equipment	Specified as in PS	Model No. /Trade Name	Details of Metro/ Railway Authority / Other Authority	Location of installation of Proposed Equipment on Passenger carrying Railways	Quantity of Equipment Use	Date of Commissioning	User Acceptance Certificate Attached (Y/N)	Performance Data	Reference page no. in bid.
B1	AFC Gates	As specified in GS & PS								
B2	TOMs	As specified in GS & PS								
B3	AVM cum TR	As specified in GS & PS								
B4	Station Computer	As specified in GS & PS								
B5	Routers & Switches	As specified in PS								
B6	Power Cables	As specified in PS								
B7	Any other equipment	Bidder's Proposal								
B8	TVM	As specified in GS & PS								

Annexure C- PROPOSAL FOR SUB-CONTECTED WORKS
INFORMATION TO BE FURNISHED BY CONTRACTOR FOR MANUFACTUING OR SUB CONTRACTORS

S. No	Equipment	Name of Proposed Vendors/ Subcontractors		
		A	B	C
C1	AFC Gates			
C2	TOMs			
C3	AVM cum TR			
C4	Station Computer			
C5	TVM			

8. Proposed Subcontractors for Major Items of Plant and Services

The following Subcontractors and/or Manufacturers are proposed for carrying out the item of the facilities indicated. Bidders are free to propose more than one for each item.

Major Items of Plant and Services*	Proposed Subcontractors	Nationality	% of Value Sub-contracted	Value sub-contracted
Total Value of Works sub-contracted				
% of works sub-contracted				
Whether % of works sub-contracted is less than 50% of Total value of works(Yes/No)				

* For items listed in Clause 2.5, Section-3 of bid document. Indicate NONE if no works sub-contracted.

Note: This Form shall be submitted **unpriced with Technical bid** & priced with financial bid.

9. Manufacturer's Authorization

Date: *[insert date (as day, month and year) of bid submission]*

ICB No.: *[insert number of bidding process]*

To: *[insert complete name of employer]*

WHEREAS

We *[insert complete name of manufacturer or manufacturer's authorized agent]*, who are official manufacturers or agent authorized by the Manufacturer of *[insert type of goods manufactured]*, having factories at *[insert full address of manufacturer's factories]*, do hereby authorize *[insert complete name of bidder]* to submit a bid the purpose of which is to provide the following goods, manufactured by us *[insert name and/or brief description of the goods]*, and to subsequently negotiate and sign the Contract.

We hereby extend our full guarantee and warranty in accordance with Clause 27 of the General Conditions of Contract, with respect to the goods offered by the above firm.

Signed: *[insert signature(s) of authorized representative(s) of the manufacturer]*

Name: *[insert complete name(s) of authorized representative(s) of the manufacturer]*

Title: *[insert title]*

Duly authorized to sign this Authorization on behalf of: *[insert complete name of bidder]*

Dated on _____ day of _____, _____ *[insert date of signing]*

-- Note --

The bidder shall require the manufacturer to fill out this form in accordance with the instructions indicated. This letter of authorization should be signed by a person with the proper authority to sign documents that are binding on the manufacturer. The bidder shall include it in its bid, if so indicated in the BDS.

10. Time Schedule

Bidder shall demonstrate methodology to achieve the Key Dates as specified in the bid.

11. Functional Guarantee of the Proposed Facilities

Not Applicable

Bidder's Qualification

To establish its qualifications to perform the contract in accordance with Section 3 (Evaluation and Qualification Criteria) the Bidder shall provide the information requested in the corresponding Information Sheets included hereunder.

Form ELI - 1: Bidder's Information Sheet

Bidder's Information	
Bidder's legal name	
In case of Joint Venture/Consortium, legal name of each partner	
Bidder's country of constitution	
Bidder's year of constitution	
Bidder's legal address in country of constitution	
Bidder's authorized representative (name, address, telephone numbers, fax numbers, e-mail address)	
<p>Attached are copies of the following documents:.</p> <p><input type="checkbox"/> 1. In case of single entity, articles of incorporation or constitution of the legal entity named above, in accordance with ITB 4.1 and ITB 4.2</p> <p><input type="checkbox"/> 2. Authorization to represent the firm or Joint Venture/Consortium named above, in accordance with ITB 22.2</p> <p><input type="checkbox"/> 3. In case of Joint Venture/Consortium, letter of intent to form Joint Venture/Consortium or Joint Venture/Consortium agreement, in accordance with ITB 4.1</p> <p><input type="checkbox"/> 4. In case of a government-owned enterprise, any additional documents not covered under 1 above required to comply with ITB 4.5</p>	

Form ELI - 2: Joint Venture/Consortium Information Sheet

Each member of the Joint Venture/Consortium must fill out this form separately. Subcontractor must fill out this form.

Joint Venture/Consortium/Subcontractor Information	
Bidder's legal name	
Joint Venture/Consortium Partner's or Subcontractor's legal name	
Joint Venture/Consortium Partner's or Subcontractor's country of constitution	
Joint Venture/Consortium Partner's or Subcontractor's year of constitution	
Joint Venture/Consortium Partner's or Subcontractor's legal address in country of constitution	
Joint Venture/Consortium Partner's or Subcontractor's authorized representative information (name, address, telephone numbers, fax numbers, e-mail address)	
Attached are copies of the following documents: <ul style="list-style-type: none"> <input type="checkbox"/> 1. Articles of incorporation or constitution of the legal entity named above, in accordance with ITB 4.1 and ITB 4.2 <input type="checkbox"/> 2. Authorization to represent the firm named above, in accordance with ITB 22.2 <input type="checkbox"/> 3. In the case of government-owned enterprise, documents establishing legal and financial autonomy and compliance with commercial law, in accordance with ITB 4.5 	

Subcontractors are those listed in Technical Proposal – Proposed Subcontractors for Major Items of Plant and Services.

Form LIT – 1: Pending Litigation and Arbitration

Each Bidder must fill out this form if so required under Criterion 2.2 of Section 3 (Evaluation and Qualification Criteria) to describe any pending litigation or arbitration formally commenced against it.

In case of joint Ventures/Consortiums, each Joint Venture/Consortium Partner must fill out this form separately, and provide the Joint Venture/Consortium Partner name below:

Joint Venture/Consortium Partner: _____

Pending Litigation and Arbitration			
Choose one of the following: <input type="checkbox"/> No pending litigation and arbitration. <input type="checkbox"/> Below is a description of all pending litigation and arbitration against the Bidder (or each Joint Venture/Consortium member if Bidder is a Joint Venture/Consortium).			
Year	Matter in Dispute	Value of Pending Claim in INR Equivalent	Value of Pending Claim as a Percentage of Net Worth

- Note -

This form shall only be included if Criterion 2.2 of Section 3 (Evaluation and Qualification Criteria) is applicable.

Form FIN - 1: Historical Financial Performance

Each Bidder must fill out this form.

In case of joint ventures/Consortiums, each Joint Venture/Consortium Partner must fill out this form separately, and provide the Joint Venture/Consortium Partner name below:

Joint Venture/Consortium Partner: _____

Financial Data for Previous 3 Years [INR Equivalent]		
Year 1:	Year 2:	Year 3:

Information from Audited Balance Sheet

Total Assets (TA)			
Total Liabilities (TL)			
Net Worth = TA-TL			
Current Assets (CA)			
Current Liabilities (CL)			
Working Capital = CA - CL			

Most Recent Working Capital		To be obtained for most recent year and carried forward to FIN-3 Line 1; in case of Joint Ventures/Consortiums, to the corresponding Joint Venture/Consortium Partner's FIN-3
------------------------------------	--	---

Information from Income Statement

Total Revenues			
Profits Before Taxes			
Profits After Taxes			

- ☐ Attached are copies of financial statements (balance sheets including all related notes, and income statements) for the last 3 years, as indicated above, complying with the following conditions.
- Unless otherwise required by Section 3 of the Bidding Documents, all such documents reflect the financial situation of the legal entity or entities comprising the Bidder and not the Bidder's parent companies, subsidiaries or affiliates.
 - Historical financial statements must be audited by a certified accountant.
 - Historical financial statements must be complete, including all notes to the financial statements.
 - Historical financial statements must correspond to accounting periods already completed and audited (no statements for partial periods shall be requested or accepted).

Form FIN - 2: Average Annual Turnover

Each Bidder must fill out this form.

The information supplied should be the Annual Turnover of the Bidder or each member of a Joint Venture/Consortium in terms of the amounts billed to clients for each year for work in progress or completed, converted to INR at the specified exchange rate in ITB 37.1.

In case of joint ventures/Consortiums, each Joint Venture/Consortium Partner must fill out this form separately, and provide the Joint Venture/Consortium Partner name below:

Joint Venture/Consortium Partner: _____

Annual Turnover Data for the Last 3 Years			
Year	Amount Currency	Exchange Rate	INR Equivalent
Average Annual Turnover			

Form FIN – 3: Availability of Financial Resources

Bidders must demonstrate sufficient financial resources, usually comprising of Working Capital supplemented by credit line statements or overdraft facilities and others to meet the Bidder's financial requirements for

- (a) its current contract commitments, and
- (b) the subject contract.

In case of joint ventures/Consortiums, each Joint Venture/Consortium Partner must fill out this form separately and provide the Joint Venture/Consortium Partner name below:

Joint Venture/Consortium Partner: _____

Financial Resources		
No.	Source of financing	Amount (INR equivalent)
1	Working Capital (to be taken from FIN-1)	
2	Credit Line ^a	
3	Other Financial Resources	
Total Available Financial Resources		

^a To be substantiated by a letter from the bank issuing the line of credit.

Form FIN- 4: Financial Requirements for Current Contract Commitments

Bidders (or each Joint Venture/Consortium partner) should provide information on their current commitments on all contracts that have been awarded, or for which a letter of intent or acceptance has been received, or for contracts approaching completion, but for which an unqualified, full completion certificate has yet to be issued.

In case of joint ventures/Consortiums, each Joint Venture/Consortium Partner must fill out this form separately and provide the Joint Venture/Consortium Partner name below:

Joint Venture/Consortium Partner: _____

Current Contract Commitments						
No .	Name of Contract	Employer's Contact (Address, Tel, Fax)	Contract Completion Date	Outstanding Contract Value (X)	Remaining Contract Period in months (Y)	Monthly Financial Resources Requirement (X / Y)
1						
2						
3						
4						
Total Monthly Financial Requirement for Current Contract Commitments						INR

Form FIN - 5: Compliance to Financial Resources (Criterion 2.3.3 of Section 3)**Form FIN-5A: For Single Entities**

For Single Entities:	Total Available Financial Resources from FIN-3 (C)	Total Monthly Financial Requirement for Current Contract Commitments (CCC) from FIN-4 (D)	Available Financial Resources net of CCC (C-D)		Requirement^a
_____	_____	_____	_____		
_____	_____	_____	_____		
_____ (Name of Bidder)	_____	_____	_____		100% requirement from Section 3-2.3.3(b)

Form FIN-5B: For Joint Ventures/Consortiums

For Joint Ventures/Consortiums :	Total Available Financial Resources from FIN-3 (C)	Total Monthly Financial Requirement for Current Contract Commitments (CCC) from FIN-4 (D)	Available Financial Resources net of CCC (C-D)		Requirement^a
One Partner:					
_____	_____	_____	_____		B (%) of requirement
_____ (Name of Partner)	_____	_____	_____		
Each (Other) Partner:					
_____	_____	_____	_____		A (%) of requirement
_____ (Name of Partner 1)	_____	_____	_____		
_____	_____	_____	_____		A (%) of requirement
_____ (Name of Partner 2)	_____	_____	_____		
_____	_____	_____	_____		A (%) of requirement
_____ (Name of Partner 3)	_____	_____	_____		
All combined partners			(C-D)^b =		100% requirement from Section 3-2.3.3(b)

Form FIN – 5 is made available for use by the bidder as a self-assessment tool, and by the employer as evaluation work sheet, to determine compliance with financial resources.

- ^a ***Requirement for the subject contract is defined in Criterion 2.3.3(b) of Section 3. Value A is the required percentage of the subject contract, which each partner must meet; and value B is the required percentage of the subject contract, which one partner must meet. A and B values are defined in Criterion 2.3.3 of Section 3 (Evaluation and Qualification Criteria).***
- ^b ***(C – D) = sum of available financial resources net of current contract commitments (CCC) for all partners.***

Form EXP – 1: Contracts of Similar Size and Nature

Fill out one (1) form per contract.

Name of Contractor:

Contract of Similar Size and Nature		
Contract No.	Contract Identification: <i>[Insert Name of contract]</i>	
Award Date		Completion Date
Role in Contract	<input type="checkbox"/> Contractor <input type="checkbox"/> Management Contractor <input type="checkbox"/> Subcontractor	
Total Contract Amount	INR	
If partner in a Joint Venture/Consortium or subcontractor, specify participation of total contract amount	Percent of Total	Amount
Employer's name Address Telephone number Fax number E-mail	<i>[Insert Name of Agency who awarded the contract]</i>	
Description of the similarity in accordance with Criterion 2.4.1 of Section 3		
	<i>[Brief description of whole works]</i>	

Note: This Form should be accompanied by necessary documents viz. work completion certificates/performance certificates to establish credentials.

Form EXP - 2: Experience in Key Activities

Fill out one (1) form per contract.

Name of Contractor:

Contract for the Major Items		
Contract No	Contract Identification: <i>[Insert Name of contract]</i>	
Award Date		Completion Date
Role in Contract	<input type="checkbox"/> Contractor <input type="checkbox"/> Management Contractor <input type="checkbox"/> Subcontractor	
Total Contract Amount	INR	
If partner in a Joint Venture/Consortium or subcontractor, specify participation of total contract amount	Percent of Total	Amount
Employer s name Address Telephone number Fax number E-mail	<i>[Insert Name of Agency who awarded the contract]</i>	
Description of the major items in accordance with Criterion 2.4 of Section 3		
	<i>[Brief description of whole works]</i>	

Note: This Form should be accompanied by necessary documents viz. work completion certificates/performance certificates to establish credentials.

Form EXP - 3: Subcontractors

Fill out one (1) form per contract.

Name of Sub contractor

Contract for the Major Items		
Contract No	Contract Identification <i>[Insert Name of contract]</i>	
Award Date		Completion Date
Role in Contract	<input type="checkbox"/> Contractor <input type="checkbox"/> Management Contractor <input type="checkbox"/> Subcontractor	
Total Contract Amount	INR	
If partner in a Joint Venture/Consortium or subcontractor, specify participation of total contract amount	Percent of Total	Amount
Employer s name Address Telephone number Fax number E-mail	<i>[Insert Name of Agency who awarded the contract]</i>	
Description of the major items in accordance with Criterion 2.5 of Section 3		
	<i>[Brief description of whole works]</i>	

Note: This Form should be accompanied by necessary documents viz. work completion certificates/performance certificates to establish credentials.

FORM COC: Certificate of Compliance**CONTRACTOR'S LETTER HEAD****CERTIFICATE OF COMPLIANCE**

This Certificate is issued in the full knowledge that the Technical Proposals submitted in Section 4 of the bid document, are in, Clause by Clause, Compliance with the Instruction to Bidder, Employer's Requirements (General Specifications and Particular Specifications), General Conditions of Contract (GCC), Special Conditions of Contract (SCC) except as noted in Form SD (Statement of Deviations) of Section 4, accompanying this Certificate.

Signed**Authorised Representative**

NOTE: A bid without a Compliance Certificate as stated above, is liable to be treated as unresponsive and be rejected.

FORM SD: Statement of Deviations**(A) STATEMENT OF DEVIATIONS FROM THE INSTRUCTION TO BIDDER**

Clause Number	Details of Deviations	Remarks explaining reasons for deviations and why it may be considered by the employer

(B) STATEMENT OF DEVIATIONS FROM THE GCC AND SCC

Clause Number	Details of Deviations	Remarks explaining reasons for deviations and why it may be considered by the employer

(C) STATEMENT OF DEVIATIONS FROM THE EMPLOYERS REQUIREMENT- GENERAL SPECIFICATIONS AND TECHNICAL SPECIFICATION

Clause Number	Details of Deviations	Remarks explaining reasons for deviations and why it may be considered by the employer

Note:

1. We hereby confirm that the pricing for unconditional withdrawal of the deviations from Instruction to Contractor, GCC & SCC and the Employers Requirements (General Specifications and Particulars Specifications) noted in this Form SD has been given in the financial Bid.
2. We hereby confirm that all implicit and explicit deviations, comments and remarks mentioned elsewhere in our proposal shall be treated as NULL and VOID and stand withdrawn.
3. We hereby confirm that but for the deviations noted in this Form SD, our proposal is full and truly compliant.

SIGNATURE OF BIDDER

FORM POD: PRICING OF UNQUALIFIED WITHDRAWAL OF CONDITIONS, QUALIFICATIONS, DEVIATIONS ETC. SUBMITTED IN FORM SD

Item	Condition, Qualification, Deviation etc.	Increase or Decrease for unqualified withdrawal of each conditions, qualification, deviation etc.	
		Foreign Currency	Indian Rupees

Notes:

1. In case price for unqualified withdrawal of any remark, comment, condition, qualification or deviation etc. indicated in Form SD('A', 'B' and 'C') is not quoted in Form POD', it shall be considered that the remark, comment, condition, qualification or deviation is unconditionally withdrawn without any financial implication.
2. It is certified that 'Form POD' annexed in Technical Bid as a "TRUE COPY" (with prices blanked off) of the said 'Form POD' in the Financial Package.

SIGNATURE OF BIDDER

FORM TRU: FORM OF CERTIFICATE CONFIRMING SUBMISSION OF ALL DOCUMENTS OF FINANCIAL PACKAGE IN THE TECHNICAL PACKAGE WITH PRICES LEFT BLANK

1. This is to certify that the copy of all the documents of Financial Package, submitted with the Technical Package, is a True Copy of the Financial Package with prices left blank.
2. It is further certified that there are no additional comments, remarks, deviations, terms and conditions in our Financial Package and even if it is there, it shall be treated as NULL and VOID and stand withdrawn.

SIGNATURE OF BIDDER

FORM BI: BID INDEX

The Bidder shall include with his Bid an index which cross refers all of the Employer's Bid requirements elaborated in these documents to all the individual sections within Bid, Technical Bid and Financial Bid which the Bidder intends to be the responses to each and every one of those requirements.

FORM ADD: FORM OF CERTIFICATE CONFIRMING RECEIPT OF ALL BID ADDENDA

This is to certify that we, M/S [* Name of the Company] have received all Bid Addenda to Bid 'JP/JS21(1B)', as listed below:

1. Addendum No.

2.

3.

4.

We also certify that we have carefully examined all the contents of the Bid Documents and all the pages of Bidder's proposal have been signed and stamped.

SIGNATURE OF BIDDER

* To be submitted by each constituent member of consortium.

FORM MIS: Milestones

The Bidder shall submit with his bid all annexures / schedules listed here under this form. Instructions to fill this form are given below:

General Requirements

1. This Contract is a fixed Lump Sum priced Contract for Design, Manufacture, Supply, Installation, Testing and Commissioning of AFC System for two underground Metro Stations at Choti Chouper and Badi Chouper & OCC on East–West Corridor of Jaipur Metro Phase- 1B
The price to be quoted shall be in accordance with provisions of SCC Clause 7.
- A. Apportionment of Fixed Lump Sum Price To Sections and To Cost Centres and Milestones under each Section.**
2. The whole of Works including design are divided into Section EW-B and Section MS as detailed in Annexure B to this Form MIS. Each Section is divided into the various Cost Centres named according to their general scope of work as detailed. The scope of the work for EW-B section also includes the corresponding work in the respective OCC at Mansarover.
3. The fixed Lump Sum price for whole of the Works shall be apportioned by the Contractor amongst the various Sections. The apportioned amount for each Section will be further distributed among various Cost Centres included in that Section, separately for foreign currency and for the Rupee portion. The apportioned amount for each Cost Centres will be further distributed amongst various Milestones included in that Cost Centre, separately for the foreign currency and the Rupee portion as in Annexure C & D to this Form MIS.
4. The sum of amounts shown against Milestones in a Cost Centre is the Cost Centre Total that is to be carried forward to the Section Summary. The division of the respective Cost Centre Totals between Indian Currency and Foreign currency shall be shown in the said Summary. The Section Summary will be carried forward to the Bid's Total.
5. The scope and extent of the Works are to be ascertained by reference to the Contract Documents as a whole and shall not be limited in any manner whatsoever by the descriptions of the Cost Centres under each Section or of the Milestones under each Cost Centre, as given in the Form MIS to the Pricing document.
6. The amount apportioned to Section MS shall not be more than 10% of Fixed Lump Sum Price. Please refer to Clause 9 below.
7. The sum of the amounts apportioned to Cost Centres 'A' and 'B' of a Section except Section MS shall not exceed 5% and 10% respectively of the apportioned amount for that Section.
8. The sum of the amounts apportioned to Cost Centres 'D' and 'E' of a Section except Section MS shall not be less than 15% and 5% respectively of the apportioned amount for that Section.
9. The Contractor shall note that the apportionment of a Section Total into Cost Centres and then in to milestones should have relation to the Content of work involved. The Total Price of a Section shall not be apportioned more than 5% and 10% against Cost Centre A and B respectively. Also Total Price against a Section shall not be apportioned less than 15% and 5% against Cost Centre D and E respectively.

B. Milestones Achievement Periods

10. The Milestones under each Cost Centre identify verifiable steps towards the completion of the work within that Cost Centre under a Section. The Contractor shall indicate the date within which he shall achieve each Milestone.

C. Milestone Payment Schedule (MPS)

11. The Contractor shall submit with his Bid the Milestone Payment Schedule which shall show in tabular form the anticipated accumulated value to work done of all Cost Centres for Sections put together except Cost Centre B of Section MS.

The Contractor shall also submit monthly cash flows for the Contract as a whole except Cost Centre B of Section MS.

Both Milestones Payment Schedules and monthly cash flows shall be submitted for each currency of the Contract separately.

12. The MPS covers the period which will commence on the first day of the calendar month next after the month containing the Commencement Date of the Works as per the Contract. The first application for interim payment may be made not earlier than during the month following the calendar month next after the month containing the Commencement Date of the Works, such first application relating to the first month (i.e. month 1) of the MPS.

D. Bid Total

13. The Bid's Total submitted by the Contractor shall be in the format shown in the Pricing Document, Annexure A to Form MIS, Contract Forms, Section 9.
14. The Pricing Document contains Sections, with Cost Centres under each Section and Milestones under each Cost Centre. The Sections, Cost Centres and Milestones have been prepared to indicate the extent of detail required in the bid. The Bidder shall prepare and complete documents, in this format, as being his bid and submit as part of the Financial Package. The schedules given in Section 4 of Bidding Documents (Schedules, Section 4) gives the minimum BOQ to be covered as part of the scope of the work.. Any other item or enhancement to the listed items required to complete the JP/JS21 (1B) Contract shall also be provided as part of this lump sum Contract and should be filled in schedules.
15. The prices quoted by the Bidder in **Schedule 1,2,3,4,5 of Section 4** and activities given as part of the pricing document, shall be evaluated for reasonability. Bidder is advised to quote reasonable and appropriate/correlated rates for the bill of quantities so as to enable evaluating the reasonability of price. Offer found unreasonable may be rejected.

JMRC reserves the right of deleting/adding some of the items in **Schedule 1,2,3,4,5 of Section 4** of the pricing document during Project implementation stage based on the Project Requirement.

JMRC reserves the right of variation of any items in **Schedule 1,2,3,4,5 of Section 4** upto +/- 25% at the same unit prices during Project implementation stage based on the Project Requirement.

16. The Pricing Document completed and submitted by the Bidder, as part of his bid, should use an indexing and page numbering system such that its extent and completeness is clearly evident.

E. Currency

17. Section Totals, Cost Centre Totals and Milestone amounts shall be indicated in Indian Rupees and in a foreign currency wherever required.

F. Cost Centres

18. Cost Centres under each Section are fixed and shall not be changed by the Bidder. The Bidder, however, may add additional Milestones in a Cost Centre provided such Milestones genuinely relate to that Cost Centre activity. The Cost Centres represent the major items of the Works for which the Employer will pay the Contractor, and the Contractor shall ensure that he has allowed for all his costs he requires for the Contract to meet the Employer's Requirements.

19. If during the course of execution, it becomes necessary, to meet the Employer's Requirements (as indicated in these Bidding Documents), to add more Milestones in a Cost Centre, the Lump Sum Price of the whole of Works, which will remain unaltered, will be reapportioned amongst the Sections, and further redistributed under the Cost Centres in each Sections and the Milestones in each Cost Centre. The liability of the Employer will be limited to the fixed Lump Sum price already accepted and the Contractor will have no right to claim any thing over and above the fixed Lump Sum price for any such addition of Milestones in any Cost Centre. The decision of the Employer will be final and binding in such matters and will not be subject to Conciliation or Arbitration.

G. Milestones

20. The Milestones represent the completion of verifiable activities to be undertaken by the Contractor. A date for the achievement of each of the Works shall be entered in the column provided. Milestones that lead to the achievement of a Stage must always precede the Key Date for achievement of that Stage.

Annexure A – BID TOTAL

(THIS DOCUMENT IS TO BE PREPARED AND COMPLETED BY THE BIDDER)

The fixed Lump Sum Price of this Contract is:

Rupees _____ (In figures)

and _____ (In words)

(In Foreign Currencies) _____ (In figures)

_____ (In words)

The above fixed Lump Sum Price shall be apportioned among the Sections as below:

SN		Sections	Total Apportioned Amounts of Sections			
			Foreign Currency (1)	Local Currency		
				(2) ^a	GST (3)	Total (4)=(2)+(3)
1	EW-B	CHOTI CHOUPER TO BADI CHOUPER& OCC				
2	MS	MISCELLANEOUS				
TOTAL (TOTAL OF 1 & 2)						
BID TOTAL (TOTAL OF 1 & 2)						

^a Price excluding GST.

ANNEXURE C**SECTION EW-B -- CHOTI CHOUPER TO BADI CHOUPER& OCC****COST CENTRE A – PRELIMINARIES AND GENERAL REQUIREMENTS**

Cost Centres	Description of Cost Centres	Foreign Currency (1)	Local Currency		
			(2)^a	GST (3)	Total (4)=(2)+(3)
A	Preliminaries and General Requirements				
B	Detailed Design				
C	Manufacture and Delivery				
D	Installation and Site Testing				
E	System Acceptance Tests, Integrated Testing and Commissioning				
SECTION TOTAL CARRIED TO TENDER TOTAL					

Annexure D**SECTION MS – MISCELLANEOUS**

Cost Centres	Description of Cost Centres	Foreign Currency (1)	Local Currency		
			(2)^a	GST (3)	Total (4)=(2)+(3)
A	Training				
B	Spares, Special Tools, Supervision of Maintenance & Defect Liability Period				
SECTION TOTAL CARRIED TO BID TOTAL					

SECTION EW-B - CHOTI CHOUPER TO BADI CHOUPER& OCC
COST CENTRE A– PRELIMINARIES AND GENERAL REQUIREMENTS

This Cost Centre comprises all those obligations and ongoing activities throughout the Contract not associated directly with any other Cost Centre.

This Cost Centre includes but is not limited to :

- Works Program for JP/JS21(1B) Contract.
- Setting up to Site Offices & Related Activities
- Submission of Plans for JP/JS21(1B) Contract and their review by Employer's Representative with "No Objection" or as "No Objection Subject To" such as:
 - Preliminary System Assurance Plans
 - EMC Management Plans.
 - RAMS Plans
 - Software Quality Assurance Plans.
 - Quality Plans
 - Site Safety Plans.
 - Site Environmental Plans.
- Submission of Interface Management Plan mutually agreed and signed with Designated Contractors.
- Submission of Preliminary System Design for JP/JS21(1B) Contract and its review by Employer's Representative with "No Objection" or as "No Objection Subject To"
- Submission of System Verification and Validation Documents for complete JP/JS21(1B) Contract and its review by Employer's Representative with "No Objection" or as "No Objection Subject To"
- Submission of Specifications for station equipments of EW-B section & OCC for Complete JP/JS21(1B) Contract and their review by Employer's Representative with "No Objection" or as "No Objection Subject To".
- Submission of Interface Management Plan with requirement of power, space and mounting details for EW-B Section& OCC.
- Any other item(s) considered necessary to comply with the Scope of Work

MILE STONE NO.	WORK DESCRIPTION	Apportioned Amount				Date for completion of Milestone
	MILESTONE ACTIVITY	Foreign Currency (1)	Local Currency			
			(2) ^a	GST (3)	Total (4)=(2)+(3)	
	Obtain the notice of “No Objection” or as “No Objection Subject To” from the Employer’s representative for::					
A1	Works Programme for complete JP/JS21 (1B) Contract					
A2	Preliminary System Assurance Plans for complete JP/JS21(1B) Contract					
A3	Site Safety Plans for complete JP/JS21(1B)Contract					
A4	Site Environmental Plans for complete JP/JS21(1B)Contract					
A5	Interface Management Plan with Designated Contractors for Section EW-B& OCC.					
A6	Preliminary System Design for complete JP/JS21(1B)Contract					
A7	Software &System verification and validation with complete verification and validation documents for complete JP/JS21(1B)Contract					
A8	Specifications for AFC equipment including the requirement of power, space and mounting details					
A9	Setting up Site Office and related activities					
A10	Earthing and Lightening Protection Design for both indoor and outdoor equipment for complete JP/JS21(1B)Contract.					
A11	Any other item(s) considered necessary to comply with the scope of Works					
COST CENTRE TOTAL CARRIED TO EW-B SECTION SUMMARY						

^a Price excluding GST.

COST CENTRE B – DETAILED DESIGN

This Cost Centre comprises all those obligations and ongoing activities through out of the Contract not associated directly with any other Cost Centre.

This Cost Centre includes but is not limited to :

- Complete system configuration data, equipment parameters and network configuration for Central computer and connectivity with stations for complete JP/JS21(1B) contract
- Submission of Final design for AFC & SDC System for EW-B& OCC Section and its review by Employer's Representative with "No Objection" or as "No Objection Subject To".
- Submission of Detailed module level drawings of equipment and Illustrated part catalogues
- Submission of Installation Plans, Method Statements, Installation Design & Drawings and their review by Employer's Representative with "No Objection" or as "No Objection Subject To".
- Submission of Complete specifications of cables, power supply, network components etc for complete JP/JS21(1B) contract
- Submission of Delivery Schedules for Materials for EW-B&OCC section.
- Any other item(s) considered necessary to comply with the Scope of Work

MILES- TONE NO.	WORK DESCRIPTION	Apportioned Amount				Date for completion of Milestone
	MILESTONE ACTIVITY	Foreign Currency (1)	Local Currency			
			(2) ^a	GST (3)	Total (4)=(2)+(3)	
	Obtain the notice of “No Objection” or as “No Objection Subject To” from the Employer’s representative for::					
B1	Specifications for Various Cables & Equipments and associated accessories for complete JP/JS21(1B) Contract.					
B2	Final Design for Complete AFC System for EW-B Section& OCC.					
B3	System configuration, equipment parameters and network configuration for Central Computer and connectivity with all stations, Station Computer and connectivity with all station equipment.					
B4	Layout plan for all equipment including Central computer installation, routers, switches, cable routes etc.					
B5	Detailed module level drawings equipment and Illustrated parts catalogue for Automatic Fare Collection system.					
B6	Final System assurance for complete JP/JS21(1B) contract					
B7	List of materials required for complete JP/JS21(1B) and delivery schedule thereof					
B8	Complete software application, COTS, licenses and source codes for station/OCC equipment for JP/JS21 (1B) contract.					
B9	Any other item(s)considered necessary to comply with Scope of Work					
COST CENTRE TOTAL CARRIED TO EW-B SECTION SUMMARY						

^a Price excluding GST.

COST CENTRE C – MANUFACTURE AND DELIVERY

This Cost Centre comprises all those obligations and ongoing activities throughout the Contract not associated directly with any other Cost Centre.

This includes but is not limited to:

- Submission of Type Test Reports and their review by Employer's Representative with "No Objection" or as "No Objection Subject To".
- Submission of Factory Acceptance Test Reports and their review by Employer's Representative with "No Objection" or as "No Objection Subject To".
- Delivery of AFC equipment and associated Accessories at Contractor's premises in Jaipur.
- Any other item(s) considered necessary to comply with Scope of Work.

MILE STONE NO.	WORK DESCRIPTION	Apportioned Amount				Date for completio n of Milestone
	MILESTONE ACTIVITY	Foreign Currenc y (1)	Local Currency			
			(2) ^a	GST (3)	Total (4)=(2)+(3)	
	Obtain the notice of “No Objection” or as “No Objection Subject To” from the Employer’s representative for::					
C1	Delivery of station equipment e.g. automatic gates, TOM, TVM, AVM etc. with Associated Accessories at Contractor’s premises in Jaipur.					
C4	Delivery of all types of cables, connectors, racks, electrical cabinets etc.					
C5	Delivery of station level IT equipment.					
C6	Delivery of Source Code					
C7	Delivery of API & DLL for the interface with bank/third party					
C8	Any other item(s) considered necessary to comply with Scope of Work.					
COST CENTRE TOTAL CARRIED TO EW-B SECTION SUMMARY						

^a Price excluding GST.

COST CENTRE D – INSTALLATION AND SITE TESTING

This Cost Centre comprises all those obligations and ongoing activities throughout the Contract not associated directly with any other Cost Centre.

This shall include but not be limited to:

- Delivery to Site from Contractor's premises in Jaipur of Equipment/Cables and associated accessories.
- Pre Installation Test of Equipment/Cables and associated accessories delivered to site.
- Installation as per reviewed Installation Plans, Method Statements, Installation Design & Drawings.
- Submission of Installation Test Plans and their review by Employer's Representative with "No Objection" or as "No Objection Subject To".
- Installation Test as per reviewed Installation Test Plans.
- Submission of Partial Acceptance Test Plans and their review by Employer's Representative with "No Objection" or as "No Objection Subject To".
- Partial Acceptance Test as per reviewed Partial Acceptance Test Plans.
- Any other item(s) considered necessary to comply with the Scope of Works.

MILE STONE NO	WORK DESCRIPTION	Apportioned Amount			Date for completion
	MILESTONE ACTIVITY	Foreign Currenc y (1)	Local Currency		
			(2) ^a	GST (3)	
	Obtain the notice of “No Objection” or as “No Objection Subject To” from the Employer’s representative for::				
D1	Delivery to Site from Contractor’s premises in Jaipur, Installation and Testing (includes Pre Installation Tests & Post Installation Tests) of all Station Indoor Equipment and Associated Accessories for the whole of EW-B Section.				
D2	Delivery to Site from Contractor’s premises in Jaipur, Installation and Testing (includes Pre Installation Tests & Post Installation Tests) of all Station Outdoor Equipment and Associated Accessories for the whole of EW-B Section.				
D3	Completion of Partial Acceptance Tests for station level equipment				
D4	Any other item(s) considered necessary to complete the Scope of Work.				
COST CENTRE TOTAL CARRIED TO EW-B SECTION SUMMARY					

^a Price excluding GST.

COST CENTRE E – SYSTEM ACCEPTANCE TESTS AND INTEGRATED TESTING AND COMMISSIONING

This Cost Centre comprises all those obligations and ongoing activities throughout the Contract not associated directly with any other Cost Centre.

This shall include but not be limited to:

- System Acceptance Tests in accordance with Reviewed System Acceptance Plan with Designated AFC System Project Contractors.
- Integrated Testing and Commissioning with all Designated Project Contractors (including existing AFC system)
- Service Trials
- Any other items considered necessary to comply with the Scope of Work

MILE- STON E NO.	WORK DESCRIPTION	Apportioned Amount			Date of Comple tion
	MILESTONE ACTIVITY	Forei gn Curr ency (1)	Local Currency		
			(2) ^a	GS T (3) Total (4)=(2)+(3)	
	Obtain the notice of “No Objection” or as “No Objection Subject To” from the Employer’s representative for::				
E1	Completion of Service Trials for whole of EW-B Section.				
E2	Integrated Testing and Commissioning & Service Trial Plan (ITC & ST) for complete EW-B section & OCC				
E3	Completion of System Acceptance Test Plan (SAT) for complete EW-B section & OCC.				
E4	Any other item(s) considered necessary to comply with the Scope of Work.				
COST CENTRE TOTAL CARRIED TO SECTION EW-B SUMMARY					

^a Price excluding GST.

Annexure D

SECTION MS – MISCELLANEOUS

COST CENTRE A

This Cost Centre comprises all those obligation and ongoing activities throughout Contract not associated directly with any other Cost Centre.

This Cost Centre includes but is not limited to:

- Submission of Training Plan ,Training Guide ,Training Manuals and their review by Employer's Representative with "No Objection" or as "No Objection Subject To".
- Training of Employer's Maintenance Personnel as per provisions of Contract.
- Submission of Training Report and its review by Employer's Representative with "No Objection" or as "No Objection Subject To".
- Any other item(s) considered necessary to comply with the scope of Works.

MILE STONE NO.	WORK DESCRIPTION MILESTONE ACTIVITY	Apportioned Amount				Date of Completi on
		Foreign Currency (1)	Local Currency (2) ^a	GST (3)	Total (4)=(2)+(3)	
	Obtain the notice of "No Objection" or as "No Objection Subject To" from the Employer's representative for::					
A1	Training of Employer's Maintenance Personnel as per provisions of AFC System.					
A2	Delivery of Training Equipment & Training Manuals as per provisions of AFC Systems.					
A3	Any other item(s) considered necessary to comply with the Scope of Work.					
COST CENTRE TOTAL CARRIED TO SECTION MS SUMMARY						

^a Price excluding GST.

COST CENTRE B

This Cost Centre comprises all those obligation and ongoing activities throughout Contract not associated directly with any other Cost Centre.

This Cost Centre includes but is not limited to:

- Submission of "List of Spares along with supporting Calculations and other information as per provisions of Contract" its review by Employer's Representative with "No Objection" or as "No Objection Subject To".
- Submission of "List of Special Tools & Test Equipment alongwith other information as per provisions of Contract" its review by Employer's Representative with "No Objection" or as "No Objection Subject To".
- Submission of Maintenance Plan and its review by Employer's Representative with "No Objection" or as "No Objection Subject To".
- Completion of Supervision of Maintenance as per provisions of contract
- Submission of Operation & Maintenance Manuals and its review by Employer's Representative with "No Objection" or as "No Objection Subject To".
- Delivery of Operation & Maintenance Manuals to Employer as per provisions of contract.
- Delivery to Employer of Contract Spares as per provisions of Contract.
- Delivery to Employer of Special Tools & Test Equipment as per provisions of Contract.
- Defect liability Plan and its review by Employer's Representative with "No Objection" or as "No Objection Subject To".
- Completion of Defect liability as per provisions of contract
- Any other item(s) considered necessary to comply with the scope of Works.

MILE STONE NO.	WORK DESCRIPTION	Apportioned Amount				Date of Comple tion
	MILESTONE ACTIVITY	Foreign Currency (1)	^a (2)	GST (3)	Total (4)=(2)+(3)	
	Obtain the notice of "No Objection" or as "No Objection Subject To" from the Employer's representative for::					
B1	Delivery to Employer of Contract Spares as per provisions of AFC System.					
B2	Delivery to Employer of Special Tools & Test Equipment as per provisions of AFC Systems.					
B3	Delivery of Operation & Maintenance manuals as per provisions of AFC Systems.					
B4	Completion of Supervision of Maintenance as per provisions of AFC System					
B5	Completion of Defect liability Period as per provisions of AFC System					
B6	Any other item(s) considered necessary to comply with the Scope of Work.					
COST CENTRE TOTAL CARRIED TO SECTION MS SUMMARY						

^a

Price excluding GST.



Procurement of Works

JAIPUR METRO RAIL CORPORATION LIMITED

BIDDING DOCUMENT

for

Procurement on International Competitive Bidding Mode

of

ICB No.- JP/JS 21 (Phase-1B)

**DESIGN, MANUFACTURE, SUPPLY, INSTALLATION, TESTING &
COMMISSIONING OF AUTOMATIC FARE COLLECTION SYSTEM
FOR JMRC PHASE 1B**

PART - I BIDDING PROCEDURES

Section 5 - Eligible Countries (ELC)

**3rd Floor, RAJSICO Building, Udhog Bhawan, Tilak Marg,
C- Scheme, Jaipur (Rajasthan) PIN-302005
Country: India**

Section 5 - Eligible Countries

- | | |
|---------------------------------|-------------------------------------|
| 1. Afghanistan | 35. Micronesia, Federated States of |
| 2. Armenia | 36. Mongolia |
| 3. Australia | 37. Myanmar |
| 4. Austria | 38. Nauru |
| 5. Azerbaijan | 39. Nepal |
| 6. Bangladesh | 40. The Netherlands |
| 7. Belgium | 41. New Zealand |
| 8. Bhutan | 42. Norway |
| 9. Brunei Darussalam | 43. Pakistan |
| 10. Cambodia | 44. Palau |
| 11. Canada | 45. Papua New Guinea |
| 12. China, People's Republic of | 46. Philippines |
| 13. Cook Islands | 47. Portugal |
| 14. Denmark | 48. Samoa |
| 15. Fiji | 49. Singapore |
| 16. Finland | 50. Solomon Islands |
| 17. France | 51. Spain |
| 18. Georgia | 52. Sri Lanka |
| 19. Germany | 53. Sweden |
| 20. Hong Kong, China | 54. Switzerland |
| 21. India | 55. Taipei, China |
| 22. Indonesia | 56. Tajikistan |
| 23. Ireland | 57. Thailand |
| 24. Italy | 58. Timor-Leste |
| 25. Japan | 59. Tonga |
| 26. Kazakhstan | 60. Turkey |
| 27. Kiribati | 61. Turkmenistan |
| 28. Korea, Republic of | 62. Tuvalu |
| 29. Kyrgyz Republic | 63. United Kingdom |
| 30. Lao PDR | 64. United States |
| 31. Luxembourg | 65. Uzbekistan |
| 32. Malaysia | 66. Vanuatu |
| 33. Maldives | 67. Viet Nam |
| 34. Marshall Islands | |



Procurement of Works

JAIPUR METRO RAIL CORPORATION LIMITED

BIDDING DOCUMENT

for

Procurement on International Competitive Bidding Mode

of

ICB No.- JP/JS 21 (Phase-1B)

**DESIGN, MANUFACTURE, SUPPLY, INSTALLATION, TESTING &
COMMISSIONING OF AUTOMATIC FARE COLLECTION SYSTEM
FOR JMRC PHASE 1B**

PART - II REQUIREMENTS

Section 6 – Employer's Requirements

Volume – I General Specification

**3rd Floor, RAJSICO Building, Udhog Bhawan, Tilak Marg,
C- Scheme, Jaipur (Rajasthan) PIN-302005
Country: India**

1. GENERAL SPECIFICATION OF AFC SYSTEM PHASE-1B

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1.1.1 The provisions contained in the Particular Specification (PS) and the Employer's Drawings shall prevail over the provisions contained in this GS.

1.1.2 The provisions contained in the GS shall prevail over the provisions contained in International Standards, European Standards, British Standards, Indian Standards, British Standard Codes of Practice and similar standard documents stated in the Contract.

1.1.3 This GS shall be read in conjunction with the other documents constituting the Contract.

1.1.4 Abbreviations

Common abbreviations used in the GS and in the PSs shall have the following meanings:

ACB	: Air Circuit Breaker
AMC	: Annual Maintenance Contract
BCC	: Backup Control Centre
BS	: British Standard
CADD	: Computer Aided Design and Drafting
CAR	: Corrective Action Request
CNP	: Construction Noise Permits
COTS	: Commercial Off the Shelf
CPM	: Critical Path Method
CV	: Curriculum Vitae
DLP	: Defects Liability Period
JMRC	: Jaipur Metro Rail Corporation
DVT	: Design Verification Table
E&M	: Electrical & Mechanical
EMC	: Electromagnetic Compatibility
EMIP	: Environmental Mitigation Implementation Plan
EMP	: Environmental Management Plan
EMSD	: Electrical and Mechanical Services Department
EMU	: Electric Multiple Unit
EN	: Euro-Norm (European Standards)
EPD	: Environmental Protection Department
ETI	: Employer's Training Instructors

FAI	: First Article Inspection
FAT	: Factory Acceptance Test(s)
FMEACA	: Failure Mode Effect and Criticality Analysis
GCC	: General Conditions of Contract
GIF	: Graphic Information Format
GS	: General Specification (this document)
HV	: High Voltage
IEC	: International Electro-technical Commission
IEE	: The Institution of Electrical Engineers
IP	: Ingress Protection
IS	: Indian Standards
ISO	: International Standards Organisation
ITT	: Instructions To Tenderers
ITU	: International Telecommunications Union
LV	: Low Voltage
MC	: Metro Corridor
MCB	: Miniature Circuit Breaker
MMI	: Man-Machine Interface
MTR	: Mass Transit Railway
NSR	: Noise Sensitive Receivers
OCC	: Operations Control Centre
OCS	: Overhead Contact System (Rigid Conductor)
OSR	: Operational Safety Report
OSR(S)	: Operational Safety Report (Software)
OHE	: OverHead Equipment (Flexible Catenary)
P3	: Primavera Project Planner
PLC	: Programmable Logic Controller
PPE	: Personal Protective Equipment
PS	: Particular Specification
PVC	: Polyvinyl Chloride
QA	: Quality Assurance
RAMS	: Reliability, Availability, Maintainability and Safety
RC	: Rail Corridor
RTU	: Remote Terminal Unit
SAR	: Special Administrative Region
SAT	: Systems Acceptance Test(s)

SCC	: Special Conditions of Contract
SIL	: Safety Integrity Level
SQAP	: Software Quality Assurance Plan
SRR	: Submission Review Request
SWA	: Steel Wire Armoured
T/C	: Time Chainage
TRIP	: Track Related Installation Programme

Table 1-1 General Abbreviations

- 1.1.5 Further abbreviations may be defined within the body of the GS or PS where there is only local applicability. Where such abbreviations exist the Contractor shall exercise great care that the abbreviation is not used out of context when communicating with the Employer, the Employer's Representative or any Third Party.
- 1.1.6 Abbreviations of units of measurement used in the GS shall have the meanings as defined under the SI system of units.

1.2 Definitions

Words and phrases defined in the GCC or SCC shall retain the same meaning within the GS and PS unless specifically redefined within this GS or under the provisions of clause 1.1.1 above for the purpose of a particular clause or group of clauses.

- (1) "Access Dates" are dates that are to be achieved by other than the Contractor and which are considered to be essential to the successful completion of the Contract to the original planned schedule. A list of the activities completion of which are considered to give rise to an Access Date are included in the PS.
- (2) "Commissioning" means the process of setting to work the complete transportation system through a series of integrated tests that demonstrate the installation and performance in accordance with the specified criteria.
- (3) "Day" means calendar day unless expressly stated otherwise.
- (4) "Defined Area" means an area within which Works Trains will be operated and the Employer's defined area working safety rules will apply.
- (5) "Key Dates" are dates which are to be achieved by the Contractor and which are considered to be essential to the successful completion of the project to the original planned schedule. A list of the activities, completion of which gives rise to a Key Date, is included in the PS.
- (6) "Service Trial" means the phase after completion of the System Acceptance Tests where the training and operating procedures are validated through the running of the trains to the published timetable. Service Trial form part of the Tests on Completion to be performed under the Contract in order to achieve Employer's Taking Over of the Works or any Section.
- (7) "Quality Control Point" means a point in time when a notice or other document is to be submitted to the Employer's Representative in accordance with the Contract before the Contractor can commence, proceed with or terminate an activity

- (8) “Quality Hold Point” means a point in time when a notice of no objection by the Employer’s Representative is required.
- (9) “‘S’ curve” means the graphical relationship between the planned (and actual where appropriate) quantity of completed work (or resources) and time. The curve produced is to be illustrated on an accumulative basis where the slope of the line indicates the rate of undertaking the work or rate of expenditure of the resources.
- (10) “Specification (the)” means the aggregate sum of the documents and any amendments thereto, issued to Tenderers by DMRC as part of the Tender process before the final date for submission of Tenders. This shall include but not be limited to; Design Criteria, Employer’s Requirements, Employer’s Tender Drawings, Preliminary Operating Plan and Clarification of Tender Documents issued in accordance with the ITT but shall not include the ITT itself nor any minutes of meetings.
- (11) “Specification (this)” means the particular document within which the reference is made.
- (12) “Validation” means the process of confirmation by examination and provision of objective evidence that the application produced achieves the particular requirements specified.
- (13) “Verification” means the process of confirmation by examination and provision of objective evidence that the specified requirements have been incorporated within design.

1.3 Glossary of Terms

- 1.3.1 Words and expressions to which meanings are assigned in any paragraph of the GS shall have the same meanings in other paragraphs of the GS except when the context otherwise requires.
- 1.3.2 Utilities are electricity, lighting, traffic control, telephone and other communication cables, gas, water, sewage and drainage pipes and ducts, including all associated protection, supports, ancillary structures, fittings and equipment.

1.4 Submission for Review

- 1.4.1 Reference in the GS and PS to any submission made by the Contractor to the Employer’s Representative having been reviewed without objection by the Employer’s Representative shall mean the issue of a notice of no objection by the Employer’s Representative issued in response to a submission made by the Contractor. Documents, drawings, specifications, calculations, technical papers, material samples, methods of construction and any other matters which have been reviewed without objection by the Employer’s Representative shall not be changed without further submission for review to the Employer’s Representative of the proposed changes.
- 1.4.2 Clause 4.2 belowprescribes the process to be adopted for submissions of documents, material samples and any other items to the Employer’s Representative. Schedules of items that are to be submitted to the Employer’s Representative for review are contained within this GS and/or the PS.
- 1.4.3 Submissions for review shall be made in accordance with the dates (relative to the Works Programme) stated in the GS and/or the PS, or in accordance with Appendix 4of this Specification. For items not specifically given a submission date in the Specification submissions shall be strictly in accordance with the agreed Submissions Programme or as directed by the Employer’s Representative.

1.5 Standards, Codes of Practice

- 1.5.1 Unless otherwise stated in the Contract, reference in the GS to International Standards, European Standards, British Standards, British Standard Codes of Practice and similar standards shall be to that edition of the document stated in the PS, including all latest amendments issued by the relevant authority. In the event that no specific edition reference is given, the current edition as at the date of issue of the Letter of Acceptance shall apply.
- 1.5.2 Later editions of International Standards, European Standards, other national or international Standards or Codes of Practice and other similar standards, or standards which are considered to be equivalent, shall not apply unless reviewed without objection by the Employer's Representative. The Employer's Representative shall give or withhold his notice of no objection after the Contractor has provided him with a copy of the relevant standard for information. If a notice of no objection is given, the Contractor shall provide two copies of the document for use by the Employer's Representative.
- 1.5.3 Permanent Works, Temporary Works, Contractor's Equipment, hardware, firmware, software, apparatus of all kinds, and, where appropriate, materials and workmanship shall be in accordance with the Standards quoted in the Specification and the requirements identified in the PS or, where no Standard is identified, the Contractor shall make a proposal which shall be subject to review by the Employer's Representative.

1.6 Employer's Drawings

- 1.6.1 The Employer's Drawings assist in describing the scope of the Works in general and clarify constraints, interface arrangements and the conceptual nature of the finished structures/system outline.
- 1.6.2 The Contractor shall carefully check all Employer's Drawings and advise the Employer's Representative of discrepancies, omissions, errors or ambiguities should any be found.
- 1.6.3 The Contractor shall note that any drawings included but marked "For information only" do not form part of the Contract.
- 1.6.4 Dimensions shall not be obtained by scaling from the Employer's Drawings. Dimensions that are not shown or are not calculable from dimensions shown on Employer's Drawings shall be obtained from the Employer's Representative.

1.7 Specifications in Metric and Imperial Units

- 1.7.1 Specifications in imperial units shall not be substituted for specifications in metric units stated in the Contract without the prior consent of the Employer's Representative.
- 1.7.2 Conversion of metric units to imperial units and of imperial units to metric units shall be in accordance with the Standard International Practice.

1.8 System Safety

1.8.1 Safety philosophy

- 1.8.1.1 Safety of passengers, staff and the general public is paramount for railway operation. Prime consideration shall be given to all design issues that can have an effect on safety.
- 1.8.1.2 During the construction phase the safety of all staff involved in the Works and any members of the general public affected by the Works shall be the prime feature of all working methods, including storage and transport to site as well as all temporary works not incorporated into the final construction.

1.9 Climatic Condition / Operating Environment

1.9.1 General

1.9.1.1 The following information on climatic conditions in Jaipur shall be taken into account by the Contractor when designing any part of the Permanent Works. The Contractor shall ensure that due allowance is made for more severe local conditions when Permanent Works are required to operate, for example, with restricted ventilation that may lead to higher local ambient temperatures, and any other factors that may affect the operating environment in any way.

- (1) Unless specific figures are provided elsewhere, the Permanent Works will generally be required to function at its rated value with the values of ambient temperature and relative humidity appropriate to the location of the equipment within the classifications shown in Table 1-2. Certain parts of the Permanent Works may need to be rated for more or less onerous conditions as required by the PS.
- (2) Clause 1.11.2 below gives the different classifications of environment to be encountered. For any type of item, examples of which are installed in more than one environmental class, all examples of the type shall be suitable for installation in the most severe environmental class conditions encountered by any example of the type.
- (3) The Contractor's attention is drawn to the more severe environmental conditions that may exist during the construction period and shall take adequate measures to protect the Permanent Works against any deleterious effects of such conditions during the time between installation and final completion of the Project.
- (4) Air throughout the Project will contain considerable moisture content and the atmosphere will be corrosive. The Permanent Works shall be tropicalised and vermin proof.

1.9.2 Classification of Equipment Environment

The locations at which equipment may be installed have been divided into four environmental classes as shown in Table 1-2. The classes of environment are considered to become more extreme from A to D.

CLASS	LOCATION of EQUIPMENT
A	Air Conditioned Offices, Computer and Equipment Rooms
B	Ventilated Equipment Rooms in buildings at the surface or at the underground station or structures.
C	Train Tunnels
D	Outdoors

Table 1-2 Classes of Environment

The following are the minimum design requirements for equipment to be installed in each class of environment. Where any class does not have a value for a parameter the most extreme value quoted for the lesser class environments should be used.

1.9.3 Requirements for Class A

Minimum Temperature -	5°C
Ambient Temperature -	25°C
Maximum Temperature -	35°C
Relative Humidity -	Minimum 0%, Nominal 65%, Maximum 95% (Non Condensing)
Electrical Noise -	High Frequency to 1MHz, 1kV damped to 50% after 6 cycles. Radio Frequency field strength 10 V/m, UHF & VHF bands.

1.9.4 Requirements for Class B

Ambient Temperature -	30°C
Maximum Temperature -	45°C
Relative Humidity -	Nominal 70%, Maximum 100% (Non Condensing)
Air Quality -	Polluted and dusty - SO ₂ : 80-120mg/m ³ Suspended Particulate Matter: 360-540mg/ m ³
Electrical Noise -	Impulse 1kV, 1.2/50 rise/decay, 500Ω source impedance, 0.5 J source energy. Radio & High frequency as Class A.

1.9.5 Requirements for Class C

Ambient Temperature -	46°C
Maximum Temperature -	60°C
Electrical Noise -	Impulse 5kv, otherwise as Class B.

1.9.6 Requirements for Class D

1.9.6.1 Temperature

All equipment shall be designed and tested in accordance with the given figured allowing a margin of at least 10% greater and 2°C less than the limits recorded. All designs for equipment shall work within the enclosures proposed with the specified environment outside the enclosure

1.9.7 Electromagnetic Compatibility (EMC)

For this, the following EMC classification in accordance to IEC 801 or similar, for the equipment rooms shall be achieved:

1.9.7.1 Electrostatic discharge

The electronic equipment rooms shall be designed in accordance to class 2 of IEC 801-2 or similar.

1.9.7.2 Electromagnetic fields

The electronic equipment rooms shall be designed in accordance to class 2 of IEC 801-3 or similar.

1.9.7.3 Fast transient interference (Burst)

The electronic equipment rooms shall be designed in accordance to class 2 of IEC 801-4 or similar.

1.9.7.4 High energy transient interference

The electronic equipment rooms shall be designed in accordance to class 2 of IEC 801-5 or similar.

1.9.7.5 Switching processes in high-voltage installations

The location of computer systems in the neighbourhood < 1m of high-voltage installations, such as medium voltage or transformer stations as well as direct parallel exposure of power and data cables should be avoided.

1.9.8 Magnetic fields

The following magnetic field strengths at the place of installation of cathode ray tube (CRT) based visual display units (VDU) should not be exceeded:

DC fields: 10 A/m or 12 μ T

AC fields: 1 A/m or 1,2 μ T

If the image quality is impaired by values exceeding the above the Contractor shall provide any necessary shielding or alternative corrective measures to restore the picture quality. Note flat screen VDU using LED technology or similar may be acceptable if a sufficiently high resolution and image size can be obtained.

1.10 Survey and Site Investigations

1.10.1 For reference to surveys external to the Contract, the Contractor shall refer all Levels to Mean Sea Level (MSL) Datum, which is that generally used throughout Jaipur.

1.10.2 The datum used for the Contract shall be Mean Sea Level Datum.

CHAPTER 2

2. PLANNING, PROGRAMME AND PROGRESS MONITORING

2.1 Planning

- 2.1.1 The Contractor shall develop in detail, a logical method of executing the Works taking into account their complex nature and different phases and shall provide programmes which reflect the detailed planning undertaken.
- 2.1.2 The programmes shall start with the Commencement Date of the Works as day one, are to be realistic, achievable and shall be accompanied by the detailed supporting Plans referred to in Chapter 3 below.

2.2 Programming General Requirements

- 2.2.1 Programme activities shall be discrete items of work, which when combined, produce definable elements, components, Milestones, Stages and Sections of the Works and clearly identify the completion obligations of the Contractor. Design programmes shall be organised by Design Stages and Plans as described in clause 3.5.1 below.
- 2.2.2 Key Dates and Milestones shall be an integral part of all programmes and all activities, and sequencing and interrelationships required to achieve each completion obligation shall be shown. Milestones shall not impose constraints that in any way affect the programme logic and float or limit the achievement of Key Dates. Milestones shall not be introduced into any programme as constrained dates.
- 2.2.3 The critical path shall be clearly identified in the programme and fully described in the accompanying programme narrative. Activity descriptions shall clearly convey the nature and scope of the Works. Programmes shall take into account the activities of precursor, concurrent, adjacent and follow on Project Contractors as well as utility service diversions, new utilities and connections and any other activity that may affect the progress of the Works.
- 2.2.4 The Contractor shall also incorporate the Employer's Representative's requirements for additional activities, to further explain or subdivide complex or long duration tasks, without affecting completion dates.

2.3 Progress Monitoring

The Contractor shall monitor its and its subcontractors' performance and against programmes to ensure its compliance with its obligations under the Contract. Monitoring of the Works shall include direct, daily monitoring of the progress of the Works and the preparation of written and computerised reports to be submitted to the Employer's Representative. The reports shall include all necessary supporting data to apprise the Employer's Representative of the status of the completion of the Works as described in clause 2.10 below.

2.4 Works Programme

The Works Programme to be submitted under the Contract shall be developed from the Outline Works Programme submitted and developed during the Tender period. Similarly the Design Submission Programme shall be developed from the Outline Design Submission Programme submitted and developed during the Tender period.

2.4.1 Submission Dates

- 2.4.1.1 Within 30 days of the Commencement Date of the Works, the Contractor shall submit for review by the Employer's Representative, his proposed initial version of the Works Programme which shall provide full programme details for the first six months of the Contract and shall provide outline details for the remaining period of the Contract.
- 2.4.1.2 Within 60 days of the Commencement Date of the Works, the Contractor shall submit for review by the Employer's Representative the proposed full version of the Works Programme.
- 2.4.1.3 Should the Contractor fail to submit the initial and full versions of the Works Programme within the timescales nominated above the Employer may nominate the Outline Works Programme as the first issue of the Works Programme required under the Contract.
- 2.4.1.4 In the event that the Employer does nominate the Outline Works Programme as the first issue of the Works Programme under the Contract the Employer's Representative may include any amendments that he sees fit to change external constraining dates, duration of activities by parties other than the Contractor and subdivide the Contractor's own activities to provide additional detail and links to other activities but without altering the duration or sequencing of the activities shown on the Outline Works Programme.
- 2.4.1.5 Any either initial or final Works Programme resulting from a nomination by the Employer of the Outline Works Programme as amended shall be taken by the Contractor as his own work and any responsibility for further maintenance of the Works Programme as nominated shall remain the Contractor's.
- 2.4.2 Content**
- 2.4.2.1 The Works Programme shall demonstrate by reference to its Sub-Programmes, Supplementary Programmes and associated Management Plans, the sequence and duration of activities and any restraints thereto, that the Contractor shall adopt to achieve Key Dates and to fulfil all Contract obligations. The Works Programme shall become the Employer's Representative's basis of administration of the time-related aspects of the Contract.
- 2.4.2.2 The Contractor shall provide the Employer's Representative with substantiation for each constraint whether target start, target finish or mandatory constraint entered by the Contractor into the Works Programme. The number of constraints shall be kept to an absolute minimum.
- 2.4.2.3 The Works Programme shall include activities for all the phases and stages of the Works, clearly showing all logical interdependencies and stages in the development of the Contractor's design, procurement, installation, commissioning and setting to work. As a minimum, it shall include:
- (1) all work comprising the Permanent Works;
 - (2) preparation, submission and review of Design Documents showing all items where review by the Employer's Representative is required;
 - (3) not used
 - (4) procurement of all major materials and items of Contractor's Equipment for the Works, including the dates orders are to be placed, manufacture period and the expected delivery date to the Site for each item;
 - (5) any software development requirements and Validation time frames;
 - (6) all manufacture or prefabrication of materials or components;
 - (7) all design and installation of major Temporary Works;
 - (8) all activities associated with the securing of necessary permits and other statutory approvals for the Works;
 - (9) access and availability dates for all Project Contractors;
 - (10) all interfaces related to the Project that may affect the progress of the Works;
 - (11) testing and commissioning activities which demonstrate an understanding of the interfaces and requirements of Chapter 9 below; and

(12) Training.

2.4.2.4 The Works Programme shall be divided into Sub-Programmes of manageable sizes addressing in more specific detail, the content of the Management Plans as stated in Chapter 3 below. The Sub-Programmes shall be as follows:

- (1) Design Submission Programme;
- (2) Design, Procurement and Manufacturing Programme;
- (3) Installation Programme;
- (4) Testing and Commissioning Programme; and
- (5) Not Used

2.4.2.5 The submission of the full version of the Works Programme shall include the Design, Procurement and Manufacturing Programme and a preliminary version of the Installation Programme and the Testing and Commissioning Programme identifying all major installation, testing activities and associated interfaces.

2.4.2.6 The Sub-Programmes shall be further substantiated by the supplementary programmes, as required by the Employer's Representative.

2.4.2.7 The Contractor's Works Programme shall comply with the following:

- (1) all programmes submitted in both hard copy and electronic data format;
- (2) all programmes, shall be prepared using the latest version of CPM scheduling software Primavera Project Planner or similar;
- (3) Not Used;
- (4) a standard Gregorian calendar shall be used for planning and execution of the Works. All programme submissions shall include details of the Contractor's allowance for Public Holidays and non-work periods. If a Key Date or Milestone falls on a Public Holiday or non-work day, it shall be effective the next working day;
- (5) the planning unit for the duration of all programme activities shall be the day. Any activity having a duration of more than thirty (30) days shall be divided into sub-activities that shall not exceed (30) days;
- (6) CPM programmes shall reflect status using remaining duration and percent complete;
- (7) all programmes shall be fully resource loaded as appropriate or required by the Employer's Representative covering all stages and aspects of the Contract and shall include, but not be limited to:
 - (a) major manpower for both design and installation ;
 - (b) number of items of Contractor's Equipment ;
 - (c) number of drawings and other design deliverables ;
 - (d) principle quantities of components or parts ;
 - (e) principle quantities of bulk materials inclusive of cabling, pipe, ductwork and equipment items, etc.

2.4.2.8 All programmes constituting the Works Programme shall be organised in a logical work breakdown structure including work stages or phases. Each activity shall be coded to indicate, as a minimum, the work group or entity responsible for the activity, the area, facility or location and the Cost Centre in which the activity is included, from information provided in the Pricing Document. Key Dates and Milestones shall be coded so as to be separately identifiable. The Contractor may be required to assign additional activity codes as required by the Employer's Representative.

2.5 Design Submission Programme

2.5.1 The Contractor shall, within 30 days of the Commencement Date of the Works, submit a Design Submission Programme covering all proposed submissions to the Employer's Representative. The Design Submission Programme shall be broken down into a submission programme for each of the Management Plans defined in clause 3.5.2 below each of which shall define the dates for individual submissions and these shall conform to the baseline dates shown in the Works Programme.

- 2.5.2 The Submissions Programme shall include the requirements of the Design Submissions as described in clause 3.5.1 below, including the procurement activities of all sub-contractors and suppliers.
- 2.5.3 The Submissions Programme shall include each submission for every item listed in the Specification as being required to be submitted.
- 2.5.4 The Submissions Programme shall ensure that all submissions are properly co-ordinated with the Contractor's overall Works Programme, particularly in respect of the following:-
- (i) progress of design, manufacture, installation and testing work;
 - (ii) co-ordination with other Contractors; and
 - (iii) including due allowance for the Employer's Representative's review process to be undertaken, including the time needed for any re-submissions.
- 2.5.5 The Design Submission Programme shall specifically include a milestone for the submission by the Contractor of the Final Design on completion of the Preliminary Design stage referred to in clause 3.5.1.1 below. The Final Design shall include at least but not limited to; details showing all of the proposed equipment, interconnections, physical layout, installation locations and interfaces to other suppliers.

2.6 Design, Procurement and Manufacturing Programme

- 2.6.1 Within 60 days of the Commencement Date of the Works, the Contractor shall submit for review by the Employer's Representative a Design, Procurement and Manufacturing Programme that shall be an integrated part of the overall Works Programme.
- 2.6.2 The Design, Procurement and Manufacturing Programme shall show the interdependencies between engineering disciplines as well as between the Contractor and its sub-contractors and suppliers. This programme shall demonstrate compliance with the requirements of the Submissions Programme in clause 2.5 below.
- 2.6.3 The Contractor shall submit a weighted bar chart of the Contractor's design, procurement and manufacturing activities. Each activity weight shall normally not be more than 5% of the total man-hour content or value of the respective work.
- 2.6.4 The Design, Procurement and Manufacturing Programme shall include a separate breakdown, supported by the Material Control Schedule, which shall be a complete amplification of the Contractor's programme and equipment list, including those items which are subject to long lead time or component parts which are manufactured from countries outside the country of assembly and testing.
- 2.6.5 The Material Control Schedule shall be automated, and shall detail the following information for each permanent major and minor material and significant component. The format of such a schedule shall include:
- (1) name, description, supplier/sub-supplier details;
 - (2) drawing information (where appropriate), title, drawing status, submission dates, shop drawings/ fabrication drawing preparation, etc.;
 - (3) the manufacturing process, manufacturing of test pieces, trial production, Employer's Representative's inspection, monthly production of components and monthly supply of components;

- (4) the assembly process, erection and assembly sequences (particularly for the first pieces) prior to shipment, test assemblies, monthly assembly requirement, Employer's Representative's inspection, testing of assemblies; and
- (5) transportation process, quality release from factory, factory storage, transport to dock, shipment.

2.6.6 The Contractor shall continuously maintain this schedule and report upon the status of each item as part of the Contractor's regular progress reporting.

2.6.7 From this base data, the Contractor shall prepare an exception report detailing all components that are in delay. This report shall be annotated with the reason for the delay and indicate what action the Contractor is taking to recover the lost time.

2.6.8 The Contractor shall submit, as part of the Design, Procurement and Manufacturing Programme, a Factory Testing Programme that shall support all aspects of the Factory Testing Plan. This Programme shall clearly demonstrate the logic and include the topics listed in clause 3.5.3 below.

2.6.9 The Factory Testing Programme shall be fully detailed, with activities individually identifying all tests for which a certificate will be issued, and shall include activities for preparation, submittal and review of the test procedures.

2.6.10 The Factory Testing Programme shall demonstrate the logical dependencies between the individual tests of the Works, and shall also show the interfaces and dependencies with the Contractor's delivery programme.

2.6.11 The Factory Testing Programme shall include details of inspection, testing and witnessing of the Contractor's and subcontractor's procurement and manufacturing activities. As a minimum, it shall include:

- (1) First Article Inspection;
- (2) Quality Hold Points;
- (3) Quality Control Points;
- (4) Type Tests; and
- (5) Routine tests.

2.7 Installation Programme

2.7.1 The Installation Programme shall be submitted as stated in the PS or as directed by the Employer's Representative. The Installation Programme shall comply with the requirements of clause 2.4.2.7 above.

2.7.2 The Installation Programme shall indicate the physical areas to which the Contractor requires access, access date, duration required and the required degree of completion for civil or architectural finishes prior to the access date.

2.7.3 The Installation Programme shall take into account the requirements for arrival at port, delivery, storage, preservation and positioning of large items of Contractor's Equipment and Permanent Works and shall set out the Contractor's proposed delivery route for such items to the Site.

2.7.4 Installation Tests shall be clearly shown in the Installation Programme and shall include those interface tests required to be carried out by others to establish a timetable for these tests.

2.7.5 Activities that may be expedited by the use of overtime, additional shifts or by any other means shall be identified and explained.

2.7.6 In preparing the Installation Programme, the Contractor should note that the following conditions shall apply:

- (1) the Contractor shall not have exclusive access to any part of the Site except by the specific consent of the Employer's Representative;
- (2) the Contractor shall take note that concurrent time allocations for certain areas may be given to more than one contractor. The Contractor shall co-ordinate the Contractor's work in such areas with that of Project Contractors through the Employer's Representative;
- (3) the absence of a programme date or installation period for the Contractor in a specific area shall not prejudice the right of the Employer's Representative to establish a reasonable programme date or installation period for that area;
- (4) the Contractor shall comply with the identified Key Dates. The Contractor shall also comply with the Milestone dates identified in the Schedule of Milestones; and
- (5) the Contractor shall deliver all Contractor's Equipment and Permanent Works for stations and ventilation shafts by road and via temporary access openings unless otherwise reviewed by the Employer's Representative.

2.7.7 The Testing and Commissioning Programme shall be submitted as stated in the PS or as directed by the Employer's Representative and shall comply with the requirements of clause 2.4.2.7 above.

The Contractor shall submit the Testing and Commissioning Programme that shall fulfil all the on-Site testing and commissioning requirements.

2.8 Programme Review

2.8.1 The Employer's Representative shall, within 28 days of receipt of the initial submission of any programme for review, either give a notice of no objection or provide specific details as to why a notice of no objection is not given. If the Contractor is advised that the programme is not given a notice of no objection, the Contractor shall amend the programme taking into account the Employer's Representative's comments and/or requirements and resubmit the programme within 14 days.

2.8.2 In the case of further re-submittals, the resubmission time shall also be 14 days.

2.9 Works Programme Revisions

2.9.1 The Contractor shall immediately notify the Employer's Representative in writing of the need for any change in the Works Programme, whether due to a change of intention or circumstances or for any other reason. Where such a proposed change affects the timely completion of the Works or any Section or Stage; the Contractor shall within 14 days of the date of notifying the Employer's Representative submit for the Employer's Representative's review his proposed revised Works Programme and accompanying Programme Analysis Report. The proposed revised Works Programme shall show the sequence of operations of any and all work related to the change and the impact of changed work or changed conditions on the Works and Project Contractors and their works.

2.9.2 If at any time the Employer's Representative considers the actual or anticipated progress of the work reflects a significant deviation from the Works Programme, he may request the Contractor to submit a proposed revised Works Programme. Upon receipt of such a request the Contractor shall submit within 14 days a revised Works Programme, together with an accompanying Programme Analysis Report and Narrative Statement, that shall demonstrate the means by which the Contractor intends to eliminate the deviation.

2.10 Monthly Progress Report

- 2.10.1 The Contractor shall prepare Monthly Progress Reports covering all aspects of the execution of the Works. Such Monthly Progress Reports shall be in writing and shall be delivered to the Employer's Representative by the 5th day of the month following the month of the Monthly Progress Report. The Monthly Progress Report shall take account of work performed up to and including the last day of the month to which the Monthly Progress Report relates.
- 2.10.2 The Monthly Progress Report shall include an executive summary and contain clear and concise statements in respect of every significant aspect of the Works including, without limitation, the requirements specified in this Specification.
- 2.10.3 The Monthly Progress Report shall contain evidence that documents and supports the progress of the Works, as stated in the Interim Payment Certificates, to the satisfaction of the Employer's Representative.
- 2.10.4 The reports, documents and data provided shall be an accurate representation of the current status of the Works and of the work to be accomplished and shall provide the Employer's Representative with a sound basis for identifying problems and deviations from planned work and for making decisions.

2.11 Key Date and Milestone Report

- 2.11.1 The Key Date and Milestone Report shall be prepared in a format reviewed by the Employer's Representative and identify and state the status of :-
- (1) all Key Dates and Milestones that were planned to be achieved in the reporting period or earlier but have not been achieved;
 - (2) all Key Dates and Milestones that have been achieved in the reporting period;
 - (3) all Key Dates and Milestones that are planned to be achieved in the next reporting period; and
 - (4) any future Key Dates and Milestones that appear unlikely to be achieved on time.
- 2.11.2 The Key Date and Milestone Report shall identify, for all relevant Key Dates and Milestones, the planned dates, the actual dates achieved, and where the original planned dates are forecast to be unachieved, the revised dates identified in the Contract, as the same may be revised from time to time in accordance with the Contract.
- 2.11.3 The Key Date and Milestone Report shall also provide an explanation for any deviation from the planned dates. Measures taken or required to recover programme delays shall also be identified.

2.12 Progress Meetings

- 2.12.1 The Employer will chair progress meetings every month with the Contractor. These meetings will be held at dates and times to be advised by the Employer's Representative. Progress meetings shall not be later than 10 days after the issue of the Contractor's Monthly Progress Report.
- 2.12.2 The Employer's Representative may convene at his discretion, at any time upon reasonable notice to the Contractor, any meeting, either on or off the Site, to discuss and address any aspect of the Works or the Contract. The Contractor shall attend any such meetings convened by the Employer's Representative.

- 2.12.3 All meetings shall be convened in Jaipur unless directed otherwise by the Employer's Representative. Meetings shall be attended by senior personnel from the Contractor who shall arrive properly briefed for all aspects of the meeting and shall be empowered to make executive decisions in respect of the execution of the Works.

2.13 Quarterly Review Meetings

- 2.13.1 The Employer's Representative may convene Quarterly Review Meetings in Jaipur at approximately three monthly intervals. The Employer's Representative will notify the Contractor the date of such Quarterly Review Meetings
- 2.13.2 Quarterly Review Meetings shall be held over a period of up to 3 days in order to review the overall progress of the Works in the context of the Project as a whole and to address and resolve any issues relevant to the execution and progress of the Works. Such Quarterly Review Meetings will be chaired by the Senior Director, Capital Projects of the Employer or his delegate. The Contractor shall have in attendance one senior representative of Director Level from each of the companies comprising the Contractor (together with the Managing Director of the company acting as leader or sponsor of the Contractor if it is a joint venture, consortium or partnership whenever necessary and required by the Employer's Representative).
- 2.13.3 The Contractor shall submit names of the persons whom the Contractor proposes to attend each Quarterly Review Meeting to the Employer's Representative for review not less than 7 days prior to each Quarterly Review Meeting.

CHAPTER 3

3. MANAGEMENT PLANS AND SUBMISSIONS

3.1.1 General

3.1.2 In order to organise the various submissions required by the Employer's Representative, and to ensure the Contractor understands and compliance with the requirements of the Contract, a series of Management Plans shall be developed. These Management Plans will serve to structure the submittals in a manner that the Contractor can develop and prepare the submittals and the Employer's Representative can review and comment on a prescribed programme.

3.1.3 The Management Plans shall be configured as a family of "stand-alone" plans and associated documents each covering one of the subjects listed below.

The plans and documents shall be co-ordinated with each other and shall collectively define, describe and encompass the Contractor's proposed methods, procedures, processes, organisation, sequencing of activities, etc. and shall show how these combine together to assure that the Works truly meet the requirements of the Specification in respect of the subjects listed.

3.2 General Organisation

3.2.1 The Plans listed below shall be developed and submitted by the Contractor for the Employer's Representative's review:

Project Management Plan

- Contractor's Project Plan
- Interface Management Plan

Systems Assurance Plans

- Quality Plans- Safety Plans
- Electromagnetic Compatibility Management Plan(if required)
- Software Quality Assurance Plan

Design, Procurement and Manufacturing Plan

- Design Plan
- Design Verification and Validation Plan
- Factory Testing Plan
- Procurement, Manufacturing and Delivery Plan

Construction and Installation Management Plan

- Construction and Installation Plan
- Health and Safety Documentation
- Environmental Qualities Management Plan
- Environmental Mitigation Implementation Schedule
- Traffic ManagementSubmission (if required)

Completion Management Plan

- Commissioning Plan
- Operation and Maintenance Manuals Plan(ifrequired)
- Training Plan (if required)
- Spares Management Plan
- Defects Liability Management Plan

3.3 Project Management Plan

The overall management of the Works shall be the Contractor's responsibility. The organisation of the resources for the design, procurement, manufacture, delivery, installation, testing and commissioning, and setting to work is to be developed into a Project Management Plan. Each section of this plan shall fully describe the Contractor's understanding of the Works and management skills and structure required to achieve the same.

3.3.1 Contractor's Project Plan

3.3.1.1 The Contractor's Project Plan shall provide a clear overview of the Contractor's organisation, management systems and methods to be used for the complete execution of the Works.

3.3.1.2 The Contractor's Project Plan shall include a summary description of each and every stage of implementation of the Works, clearly showing the principal organisational interfaces both within the Contractor's own organisation (including sub-contractors of every tier) and with Other Contractors and Relevant Authorities, defining how each of these interfaces is to be managed and controlled. An organisation chart shall be produced to illustrate the subdivision of the work into elements for effective technical and managerial control, the reporting structure and the interface relationship among all parties involved. Names, addresses, telephone and fax numbers of all principal contacts shall be listed.

3.3.1.3 The Contractor's Project Plan shall contain structured organisation charts showing the hierarchical relationship of the Contractor's organisation (including sub-contractors of every tier). The organisation charts shall be produced as a "family" such that the basic chart shows the overall organisation structure supported by subsidiary charts detailing the internal structure of the various departments or sections of the overall organisation.

3.3.1.4 The Contractor's Project Plan shall include full details of the qualifications, experience, authority and responsibility of the personnel assigned to all key positions of the Contractor's organisation (including sub-contractors of every tier). As a minimum, this shall include all levels down to senior managers and shall include the personnel responsible for each individual department and functional group. A clear reference shall be given as to the location of staff (e.g. Site resident or factory based, etc.). Names, addresses, telephone and fax numbers of all principal contacts shall be listed.

3.3.1.5 The Contractor's Project Plan shall define the Contractor's management structure for the execution of the Works and for the control of the quality of the Works and shall, without limitation, identify and set out:

- (1) the procedure for audit;
- (2) the procedures for the control of receipt and issue of all Works related correspondence so as to ensure traceability;
- (3) the procedures for filing system to be implemented to maintain the Contractor's records during the course of the work. The filing systems used by the Contractor and sub-contractors of any tier shall be compatible as far as is necessary;
- (4) the procedures for the identification, production, verification, internal approval, review (when required) by the Employer's Representative, distribution, implementation and recording of changes to all drawings, reports and specifications;
- (5) the procedures for the evaluation, selection, engagement and monitoring of sub-contractors / suppliers together with the

- means of application of quality assurance to their work including audit and acceptance;
- (6) the procedure for the regular review and revision of each type of quality plan and its supplemental individual specific quality plans to ensure their continuing suitability and effectiveness, in addition to the method to be used for revision and issue of revised documentation;
 - (7) the procedures for the control, calibration and maintenance of inspection, testing and measuring equipment;
 - (8) the procedures for the selection, indexing, disposition and maintenance of project records for storage in the archives. A list of items to be archived including their periods of retention shall be submitted for review by the Employer's Representative;
 - (9) the procedures for identifying training needs and for the provision of training of all personnel performing activities affecting quality; and
 - (10) the procedures for the control of non-conformity.

3.3.1.6 Particulars of Contractor's Manager/Agent

- (1) The Contractor shall give and provide all necessary supervision during the execution of the Works as long as the Employer's Representative considers necessary for the proper fulfilment of the Contractor's obligations under the Contract.
- (2) The Contractor shall ensure that he is at all times represented on the Site by a competent and authorised English/Hindi speaking agent who shall be deemed to have been reviewed without objection by the Employer's Representative provided such agent is not expressly objected to by the Employer's Representative in writing within 14 days from the service of a notice upon the Employer's Representative by the Contractor of the appointment of such agent. Such agent shall be constantly on the Site and shall give his full time to the superintendence of the Works.
- (3) The Employer's Representative shall have the authority to withdraw his notice of no objection to the agent at any time. If such notice of no objection is withdrawn the Contractor shall remove the agent from the Site forthwith and shall not thereafter employ him again on the Site in any capacity and shall forthwith replace him by another competent English/Hindi speaking agent reviewed without objection by the Employer's Representative.
- (4) Such authorised agent shall receive on behalf of the Contractor directions and instructions from the Employer's Representative.
- (5) The following particulars of the proposed agent shall be submitted to the Employer's Representative for review:-
 - (i) name;
 - (ii) copy of Identity Card;
 - (iii) details of qualifications, including copies of certificates; and
 - (iv) details of previous experience.
- (6) The particulars of the agent shall be submitted 30 days before the agreed scheduled start of that part of the Works. Except in the case of a replacement agent (as provided for in clause 3.3.1.6 (3) above), in which case the said particulars shall be submitted forthwith.
- (7) The agent shall possess relevant academic or professional qualification and have at least 10 years experience in relevant engineering works. The Employer's Representative reserves the right to call upon the Contractor to prove such qualifications/experience to the satisfaction of the Employer's Representative.

3.3.1.7 Interface Management Plan

- a) The Contractor shall interface and liaise with other Contractors in accordance with the requirements of clause 16.3 below.
- b) Within 60 days of notification from the Employer's Representative of the identity of each Other Contractor, the Contractor shall develop and submit to the Employer's Representative an Interface Management Plan that is mutually acceptable to both the Contractor and the other Contractors. The Interface Management Plan shall:
 - (1) identify the sub-systems as well as the civil works and facilities with interfacing requirements;
 - (2) define the authority and responsibility of the Contractor's and other Contractors' (and any relevant sub-contractors') staff involved in interface management and development;
 - (3) identify the information to be exchanged, together with the management and technical skills required for the associated development work, at each phase of the Contractor's and other Contractors' (and any relevant sub-contractors') project life-cycles;
 - (4) include considerations of the Interface Hazard Analysis;
 - (5) specify the configuration and version control procedures in accordance with the Contractor's and other Contractors' (and any relevant sub-contractors') quality management system; and
 - (6) address the design, supply, installation, testing and commissioning programme of the contracts to meet the key dates of each contract, and highlight any programme risks requiring management attention.
- c) Once the Interface Management Plan has been reviewed without objection by the Employer's Representative, the Contractor shall execute the Works in accordance with the Interface Management Plan. The Contractor shall advise the Employer's Representative immediately of any difficulty in developing a mutually acceptable Interface Management Plan.
- d) Within 60 days of notification from the Employer's Representative of the identity of each Other Contractor, the Contractor shall develop and submit to the Employer's Representative for review a Detailed Interface Document for each Other Contractor that is mutually acceptable to both contractors. The Detailed Interface Document shall address in detail how the dates identified in the Interface Management Plan shall be achieved and shall identify the data required by the interfacing other Contractors to meet the requirements of the PS.
- e) The Detailed Interface Document shall specify the proposed method and schedule for verifying the interface integrity, the individual equipment/system performance and the combined system performance. The Detailed Interface Document shall include a programme of tests to demonstrate the performance and integrity of the integrated systems. The Interface Specification appended to the PS shall form the basis of the Detailed Interface Document, but does not relieve the Contractor's obligation to identify any new interface to meet the Contract requirements. Any revision to the Detailed Interface Document shall be mutually acceptable by contractors and submitted to the Employer's Representative for review.

3.4 Systems Assurance Plans

- 3.4.1 The Systems Assurance Plans shall be submitted for review to the Employer's Representative in Preliminary and Final forms.
- 3.4.2 The various plans shall be co-ordinated with each other and shall collectively define, describe and encompass the Contractor's proposed methods, procedures, processes, organisation, sequencing of activities, etc. and shall show how these combine together to assure that the Works truly meet the requirements of the Specification in respect of the subjects listed.

3.4.3 Not Used.

3.4.3.1 Quality Plans

The Contractor shall submit for review by the Employer's Representative quality plans in accordance with the requirements of clause 5.2 below.

3.4.4 Safety Plans

3.4.4.1 Site Safety Plan

3.4.4.1.1 The Contractor shall prepare a Site Safety Plan incorporating the requirements of the Project Safety Manual and designed specifically for the various sites (including storage and overseas sites) on which work under the Contract is carried out.

3.4.4.1.2 The Site Safety Plan shall form a part of the Health and Safety Documentation referred to in Chapter 18 below.

3.4.5 RAMS Plan

3.4.5.1.1 The Contractor shall implement a formal Reliability Plan and a formal Maintainability Plan in accordance with the PS.

3.4.5.1.2 The Contractor's Reliability Plan and Maintainability Plan shall include Failure Modes, Effects and Criticality Analysis and the production of a Reliability Critical Items List.

- a) The Contractor shall submit for review by the Employer's Representative the Contractor's Systems Safety Plan. The System Safety plan shall address all the factors referenced in Appendix 2 of this Specification and as required by the PS.
- b) The Contractor shall submit for review by the Employer's Representative the Contractor's Reliability Plan and Maintainability Plan in accordance with the requirements of clause 1.9 above.

3.4.6 Electromagnetic Compatibility Management Plan

- a. The Contractor shall prepare and submit for review by the Employer's Representative an EMC Management Plan which shall, based upon a top-down approach, define the EMC philosophy, activities, means of control for the design processes and EMC submissions to be supplied to demonstrate compliance with the PS and GS.
- b. The EMC Management Plan shall identify a comprehensive list of specifications, standards, method statements and procedures to be submitted to the Employer's Representative for review. The EMC Management Plan shall also include a programme that shall identify the dates for EMC submissions.
- c. The EMC Management Plan shall include an initial list of design documentation, test specifications and test reports with a single paragraph description of each document to indicate compliance with the Specification.
- d. The EMC Management Plan shall include a definition and description of the process and methods used for Verification and Validation that the Works will achieve the required EMC parameters in all respects.
- e. The Contractor shall co-ordinate the levels of interference emissions and

susceptibility of all equipment which are to be designed, manufactured, supplied and installed by the Contractor and its sub-contractors and suppliers. The Contractor shall designate a person as point of contact to deal with EMC matters. Details of the nominated person and any subsequent change of the nominated person shall be subject to review by the Employer's Representative.

- f. The Contractor shall liaise and co-ordinate with all Other Contractors in the exchange of EMC data and related equipment performance characteristics and advises the Employer's Representative when any such information is requested from any Other Contractor. A copy of all EMC related information exchange shall be sent to the Employer's Representative for review.
- g. The Contractor shall comply with the following EMC requirements:
 - (i) The Contractor shall ensure that all electrical and electronic apparatus is designed and constructed to operate without degradation of quality, performance or loss of function in the electromagnetic environment of the Project.
 - (ii) EMC considerations shall be incorporated in the Contractor's procedures for product safety and design Verification.
 - (iii) Detailed requirements in respect of electromagnetic compatibility characteristics are contained in the PS.
 - (iv) The design shall ensure that any electromagnetic interference emissions introduced into the environment do not exceed those detailed in the PS and GS. The Contractor shall ensure that the specified electromagnetic compatibility (EMC) requirements are adequate. Any shortcomings shall be made known to the Employer's Representative immediately and recommendations for corrective action formulated.
 - (v) In respect of the design documentation, the Contractor shall demonstrate by theoretical analysis that the design of the electrical and electronic systems is fully compliant with the EMC requirements identified. The Contractor shall state clearly in the documentation all the assumptions made and parameters used in the analysis.
 - (vi) The Contractor shall detail the methodology, verify and validate any simulation models used in support of the analysis. The Contractor shall prepare and submit to the Employer's Representative for review reports of the Verification and Validation of the models.
 - (vii) Not Used
 - (viii) Not Used
 - (ix) The Contractor shall supply documentation showing how system safety and reliability is ensured. It shall include Failure Modes, system failures, the effect of human intervention and how equipment thresholds have been set in order to keep them above worst case interference levels, and how equipment tolerances and other characteristics in the Specification have been allowed for in designing the system.
 - (x) The Employer's Representative may conduct an independent EMC audit for both the system and its component parts and shall therefore require access to all the relevant design and production information. The

Contractor shall supply sufficient documentation and analysis in a form reviewed by the Employer's Representative.

- (xi) Not Used
- (xii) The Employer's Representative may request at his discretion, attendance at the manufacturing factory prior to delivery to assist in providing confidence that the EMC requirements will be met. However, this will not give design acceptance that can only be given after successful completion of the System Acceptance Tests.
- (xiii) Not Used
- (xiv) The Contractor shall implement corrective actions to rectify any EMC problems identified during design, on-Site testing and when the whole system is in operational service.
- (xv) The Contractor must be fully aware of the EMC requirements and any modifications to systems and equipment carried out by the Contractor during the Defects Liability Period and during DLP period shall not cause the immunity or emission levels of the installed system and equipment to exceed such values. Detailed EMC documentation on all modifications carried out shall be submitted to the Employer's Representative for review. Modification work shall not commence until the respective submission has been reviewed without objection by the Employer's Representative.

3.4.7 Software Quality Assurance Plan

The Software Quality Assurance Plan shall be submitted upon introduction of any new software over and above the software as applicable in JP/JS21 (1B) Contract. The Software Quality Assurance Plan shall address all elements of the design and development of software required as part of the Works.

3.5 Design, Procurement and Manufacturing Plan

The Design, Procurement and Manufacturing Plan shall be configured as a family of "stand-alone" plans and associated documents each covering one of the subjects listed below. The plans shall be co-ordinated with each other and shall collectively define, describe and encompass the Contractor's proposed methods, procedures, processes, organisation, sequencing of activities, etc. and shall show how these combine together to assure that the Works fully meet the requirements of the Specification in respect of the subjects listed.

3.5.1 Design Plan

3.5.1.1 Design shall be undertaken to ensure a smooth flow of information for review by the Employer's Representative. Submissions shall be strictly in accordance with the Design Submissions Programme prepared in accordance with clause 2.5 above.

3.5.1.2 The Contractor shall perform his designs for the Works and prepare a design plan for his design work in accordance with the following design stages. The Contractor shall submit to the Employer's Representative for his review, relevant design information as identified under each stage:

- (1) Not used.
- (2) Preliminary Design Stage

The Contractor shall prepare and submit to the Employer's Representative for his review a System Requirement Specification (SRS) which includes, as a minimum, operational, functional, performance and design requirements of the proposed system.

- a. The System Requirement Specification, serving as a means of system requirement management and the Contractor's top level design document, shall state all the requirements completely and unambiguously and how each requirement can be verified and validated.
- b. The System Requirement Specification shall include a compliance matrix that includes cross-references to the requirements stated in the PS, the System Requirement Specification and the Design Verification Table (DVT).
- c. The preliminary design stage, as a minimum, shall identify the function of each system, sub-system, equipment or other element within the overall SRS and specify the relationships and interfaces between each element of the system, including the systems of the interfacing elements of other Contractors.

Further the preliminary design stage shall address each element of the SRS as developed in the Preliminary Design. Equipment and interconnection specifications, with supporting calculation, shall be developed at this stage. Design of the overall system and elaborating on the proposed system configuration with emphasis on how the interface requirements are to be achieved shall be included in the preliminary design. Manufacturing of production units will only be allowed to commence after receiving a notice of no objection for the relevant design elements

- d. Preliminary electrical and control schematics shall be developed to illustrate how the various operational and functional requirements can be achieved. Software design and development shall also be carried out during this stage.
- e. The submission shall clarify and confirm as necessary all technical aspects of all interfaces with other elements of the Contractor's overall design and of any interfaces with works being supplied by other Contractors.
- f. Ergonomic design shall be developed as part of the preliminary design.
- g. If at any time in the development of the preliminary design, the Contractor wishes to modify the conceptual design by dividing any system or sub-system into a number of smaller systems or by reconfiguring the interfaces or for any other reason, the Contractor shall resubmit the SRS and/or the Preliminary Design for the Employer's Representative's review.
- h. A detailed submission list for the preliminary design shall be submitted to the Employer's Representative for review prior to the start of the preliminary design. The submission shall be in sufficient detail to evaluate the progress and technical adequacy of the selected design approach.

- (3) A series of Design Reviews shall be arranged prior to the conclusion of the

preliminary Design Stage.

Upon completion of the Preliminary Design Stage the Contractor shall submit for review by the Employer's Representative a homogenous Final Design.

(4) Site Design Stage

Installation detail and method statements for various areas and sections shall be released progressively during this stage. Installation works on Site will only be allowed to commence following the Employer's Representative's review of the relevant design information with no objection raised.

3.5.1.3 Separate parts of the design plan shall be prepared for Contractor and subcontractor design activities. The design plans shall define the Contractor's policy for the design of the Works and shall, without limitation, define:

- (1) the organisation of the Contractor's design staff with particular reference to the design interfaces;
- (2) the specific allocations of responsibility and authority given to identified design staff with particular reference to the review and Verification of design specification, drawings and calculations by the Contractor;
- (3) the specific methods of design necessary to identify any relevant method statements and develop those method statements to a sufficient degree of detail reviewed by the Employer's Representative; and
- (4) the list of procedures and work instructions to be applied to manage and control the quality of the design work, including without limitation:
 - a) the design and performance requirements which shall be defined in terms of basic data and design assumptions made; relevant codes, standards and regulatory requirements; safety, reliability, security and environmental requirements; and commissioning requirements;
 - b) the design methods. Software applications to be used in the design, both proprietary and public domain, including any requirements for physical and mathematical model testing;
 - c) the preparation, checking, issue, distribution, indexing and filing of reports, calculations, drawings and specifications together with the means for their revisions;
 - d) the formal design review, authorisation and approval of design documentation; and
 - e) the independent design Verification and Validation.

3.5.2 Design Verification and Validation Plan

3.5.2.1 The Design Verification and Validation Plan, supplementary to the Design Plan, shall be prepared by the Contractor in order that design Verification and Validation activities are properly directed. The plan shall address, but not be limited to, the following:-

- (1) the objectives of each Verification phase and each Validation phase;
- (2) defined input and output criteria for each development phase;
- (3) identification of types and detailed methods of test, Verification and Validation activities to be carried out;

- (4) detailed planning of Verification and Validation activities to be carried out, including schedules, resources and approval authorities;
 - (5) selection and utilisation of the test equipment, and their test environmental conditions; and
 - (6) criteria on which the Verification or Validation is judged to be acceptable. These criteria shall be traceable to the design and performance requirements as referred to in Clause 3.5.1.3 (4) a) above.
- 3.5.2.2 The Contractor shall, by means of a design Verification and Validation process, demonstrate that all requirements within the Specification have been met. The Contractor shall prepare a Design Verification Table (DVT) that identifies the Contractor's proposed methodology for demonstrating compliance.
- 3.5.2.3 The DVT shall be supplied to the Employer's Representative for his review and shall be monitored throughout the design and construction of the Works. Any changes to the DVT must be submitted to the Employer's Representative for review before implementation.
- 3.5.2.4 The DVT shall identify the proposed Verification and Validation process (es) for each specification requirement and the acceptance criteria for achieving the requirement. The DVT does not relieve the Contractor of any other requirements of the Specification in relation to design review, Verification, Validation, conformance or planning.
- 3.5.2.5 For each item in the DVT, the Verification and Validation methods to be used shall be listed by the Contractor. The methods used shall be reviewed by the Employer's Representative. At least one stage of Verification and Validation shall be performed prior to production of an item.
- 3.5.2.6 Subject to review without objection by the Employer's Representative for each application, the Verification and Validation methods listed below are acceptable if implemented (whether singly or in combination):
 - (1) Similarity - equipment and requirement are identical to those successfully applied on other projects.
 - (2) Historical - requirement has been met by numerous previous design.
 - (3) Calculations and Drawings - for review.
 - (4) Design Review - either scheduled or specifically targeted.
 - (5) Development Test - performance testing on equipment or material under development.
 - (6) Type Test - performance testing of the as-built component, assembly or system.
 - (7) Routine Test - test every component, assembly or system.
 - (8) First Article Inspection (FAI) - acceptances of the exact look and fit of equipment.
 - (9) Inspection - formal inspection of the finished item.
 - (10) In Service - for service demonstration requirements only.
- 3.5.2.7 After each Verification or Validation activity, a Verification Report shall be produced including, as a minimum, the following:
 - (1) the Verification or Validation results stating whether the objectives and criteria of the Design Verification and Validation Plan have been met; and
 - (2) the reasons for failure if there is a failure, and proposal for remedial actions.
- 3.5.3 Factory Testing Plan**
- 3.5.3.1 The Contractor shall prepare and submit for review by the Employer's Representative the Contractor's Factory Testing Plan detailing and explaining how the Contractor will plan, perform, and document all inspections and tests that will

be conducted to verify and validate the Works prior to delivery to the Site. The plan shall consist of a narrative description supported by graphics, diagrams and tabulations as required.

The plan shall contain but not be limited to the following topics:

- (1) the Contractor's strategy for inspection and Factory Acceptance Tests of all constituent parts of the Works and how this relates to the sequence of delivery;
- (2) the sequencing and interrelationships of the inspections and tests including:
 - (a) all Quality Hold Points; and
 - (b) all Quality Control Points;
- (3) the type and extent of inspection and Factory Acceptance Tests to be undertaken and the parts of the Works to be proven by that testing;
- (4) the objective of each inspection or test, what particular design and operating criteria the test or inspection will prove and how the success of the test or inspection will be demonstrated or measured;
- (5) organisation chart and CV of key personnel in inspection and test team;
- (6) the plan for the production and submission of the inspection and test procedures to the Employer's Representative for review including the submission of the inspection and test reports and records; and
- (7) Type Tests, Routine Tests, First Article Inspections and any other tests constituting the Factory Acceptance Tests.

3.5.3.2 The Contractor shall arrange for all equipment and systems manufactured for incorporation into the Permanent Works to undergo a Factory Acceptance Test (FAT) before shipment from the place of manufacture. Any particular requirements for inspection and testing at the place of manufacture are prescribed in the PS.

3.5.3.3 The Contractor shall be responsible for re-inspecting and re-testing any failed inspection and Factory Acceptance Test including regression testing on previously passed items.

3.5.3.4 Inspections and tests that are to be witnessed by the Employer or the Employer's Representative shall be sensibly grouped and scheduled so that as many inspections and tests as possible may be witnessed during a single visit.

3.5.3.5 If required, Type Tests as detailed in clause 9.2.6 below shall be performed on all items of equipment to be installed as part of the Permanent Works under the Contract.. The Type testing shall be based on the environmental class of the sites into which the equipment will be installed. Refer to clause 1.11.2 for the different environmental classifications or otherwise as required in the PS.

3.5.3.6 For all production items a First Article Inspection shall be undertaken as detailed in clause 9.2.6.8 below. Routine production testing methods shall be detailed for review by the Employer's Representative. Routine testing shall ensure that all samples of a production item are within the tolerances required for complete interchange ability.

3.5.3.7 The Contractor shall prepare two copies of an inspection or test report immediately after the completion of each inspection or test whether or not witnessed by the Employer or the Employer's Representative. If the Employer or the Employer's Representative has witnessed the inspection or test, he will countersign the inspection or test report to indicate his review of the information and conclusions (i.e. whether or not the equipment being inspected or tested has passed satisfactorily) contained therein. If the Employer or the Employer's Representative has not witnessed the inspection or test (i.e. if a waiver has been granted, or the Employer or the Employer's Representative has not witnessed the inspection or test

for some other reason in accordance with the Contract), the Contractor shall forward two copies of the inspection or test report without delay to the Employer's Representative. The Employer's Representative will countersign the report to indicate his review of the information and conclusions (i.e. whether or not the equipment being inspected or tested has passed satisfactorily) and return one copy to the Contractor. Where the results of the inspection or test do not meet the requirements of the Specification, the Employer or the Employer's Representative may call for a re-inspection or re-test.

3.5.3.8 For standard equipment which is serial or bulk manufactured, manufacturer's type test certificates (or equivalent) may, subject to review by the Employer's Representative, be accepted.

3.5.3.9 Test equipment and instrumentation shall be subject to approved calibration tests within a properly controlled calibration scheme, and signed calibration certificates shall be supplied to the Employer's Representative in duplicate. Such calibration checks shall be undertaken prior to testing and, if required by the Employer's Representative, shall be repeated afterwards.

3.5.3.10 Materials and equipment shall not be released for shipment until all applicable inspections and tests including Factory Acceptance Tests have been satisfactorily completed.

3.5.4 Procurement, Manufacturing and Delivery Plan

3.5.4.1 The Contractor shall prepare procurement, manufacturing and delivery plans in respect of all items and goods. Separate parts of the plan shall be prepared for Contractor or sub-contractor off-Site activities. Each plan shall identify the scope of work to be applied. In relation to such scope of work, it shall, without limitation, define:

- (1) the organisation of the Contractor's staff directly responsible for the day-to-day management of the manufacturing activity on or off the Site;
- (2) the specific allocations of responsibility and authority given to identified personnel for the day-to-day management of the work with particular reference to the supervision, inspection and testing of the work;
- (3) the interfacing or co-ordination required with the Contractor's other related plans;
- (4) the specific methods of manufacture to identify any relevant method statements and develop those method statements to a degree of sufficient detail reviewed by the Employer's Representative; and
- (5) the list of procedures and work instructions to manage and control the quality of work during purchasing, manufacturing and delivery, including without limitation:
 - a) the purchasing of items and goods and ensuring they comply with the requirements of the Specification, including (without limit) purchasing documentation and specific Verification arrangements for Contractor/Employer's Representative inspection of material or manufactured product prior to release for use;
 - b) the manufacturing process so as to ensure compliance with the design;
 - c) the manufacturing process so as to ensure clear identification and traceability of material and manufactured parts;
 - d) the inspection and testing of incoming materials, in process and final product so as to ensure specified requirements for the material and/or manufactured product are met;
 - e) the identification of the inspection and test status of all material and manufactured products during all stages of the manufacturing process to ensure that only products that have

- passed the required inspections and tests are dispatched for use and/or installation;
- f) review and disposal of non-conforming material or product so as to avoid unintended use;
- g) the assessment and disposal of non-conforming material and manufactured product and approval for reworking or rejection as scrap;
- h) the identification of preventive action so as to prevent recurrence of similar non-conformance; and
- i) the handling, storage, packaging, preservation and delivery of manufactured product.

3.5.4.2 The Contractor shall prepare and submit the inspection and testing plans to manage and control any test and inspection activities in accordance with clause 3.5.3 above.

3.5.4.3 The Contractor shall propose a structured set of inspection hold points. The hold points shall be structured such that a formal hold point is allowed for each significant element of the manufacturing process. At each hold point, the Employer's Representative shall hold a formal inspection or advise that the inspection has been waived.

3.5.4.4 Once the inspection and any required remedial actions are completed to the satisfaction of the Employer's Representative, the Employer's Representative shall give a notice of no objection for unit shipment. The Employer's Representative will not withhold his notice of no objection for shipping unreasonably, provided all pre-delivery assembly and testing has been successfully completed.

Any unit delivered without the Employer's Representative's notice of no objection shall be rejected at the Site and all expenses thereby incurred shall be borne by the Contractor.

3.6 Construction and Installation Management Plan

The Construction and Installation Management Plan shall be configured as a family of "stand-alone" plans and associated documents each covering one of the subjects listed below.

The plans shall be co-ordinated with each other and shall collectively define, describe and encompass the Contractor's proposed methods, procedures, processes, organisation, sequencing of activities, etc. and shall show how these combine together to assure that the Works truly meet the requirements of the Specification in respect of the subjects listed.

3.6.1 Construction and Installation Plan

3.6.1.1 The Contractor shall prepare plans for the construction and installation activities on and off the site, as referenced in clause 14.1.1 below, and shall ensure that these are properly related to the subsequent testing and commissioning activity.

3.6.1.2 Separate parts of the plan shall be prepared for other contractor(s) or sub-contractor(s) off-site activities.

3.6.1.3 Each construction plan shall identify the scope of activity to be controlled. In relation to such scope of activity, it shall, without limitation, define:

- (1) the organisation of the Contractor's staff directly responsible for the day-to-day management of the activity on or off the Site;
- (2) the specific allocations of responsibility and authority given to identified personnel for the day-to-day management of the Works with particular reference to the supervision, inspection and testing of the Works;

- (3) the interfacing or co-ordination required with the Contractor's other related plans;
- (4) the specific methods of construction and installation to identify any relevant method statements and develop those method statements to a sufficient degree of detail reviewed by the Employer's Representative;
- (5) a detailed method statement which shall include but not be limited to:
 - a) description of main operations and sub-operations;
 - b) sequence of sub-operations;
 - c) quantities of the work and production rates to be achieved;
 - d) resources to be employed; and
 - e) quality checks to be carried out, supervision being exercised and safety precautions to be employed;
- (6) the list of procedures and work instructions to manage and control the quality of construction and installation works, including without limitation:
 - a) the inspection and testing activities of incoming materials, in process and final product so as to ensure specified requirements for the material and/or product are met;
 - b) the purchasing of materials and ensuring they comply with the requirements of the Specification, including purchasing documentation and specific Verification arrangements for Contractor/Employer's Representative inspection of material or manufactured product prior to release for use/installation;
 - c) the construction processes including Temporary Works so as to ensure compliance with drawings and Specification. In addition, any software to be used in the construction, installation and commissioning process shall be identified and details of the Verification and Validation processes for the software application shall be given;
 - d) the construction and installation process so as to ensure clear identification and traceability of material and manufactured product;
 - e) the identification of the inspection and test status of all material and manufactured products during all stages of the construction and installation process to ensure that only products that have passed the required inspections and tests are despatched for use and/or installation;
 - f) review and disposition of non-conforming material or product so as to avoid unintended use/installation;
 - g) the assessment and disposition of non-conforming material and product and approval for reworking or rejection as scrap;
 - h) the identification of preventive action so as to prevent recurrence of similar non-conformance; and
 - i) the handling, storage, packaging, preservation and delivery of product; and
 - (j) the security control of the Site and the works area for Contractor's accommodation, storage, car park and other works facilities, etc. in accordance with clause 15.10 below.

3.6.1.4 The Contractor shall prepare and submit the inspection and test plans to manage and control any test and inspection activities in accordance with clause 5.7.1 below.

3.6.1.5 Where all or part of the Works is within the JMRC Protection Zone, the Contractor shall follow the guidelines issued by the Employer's appropriate authority. The Contractor shall submit to the Employer's Representative for review his construction method statement and detailed design of any Temporary Works proposed to be erected within this zone adjacent to DMRC properties.

3.6.1.6 Health and Safety Documentation

3.6.1.7 The Contractor shall submit Health and Safety Documentation to fully comply with the requirements of the Project conditions and proposed work activities in accordance with Chapter 18 below.

3.6.1.8 The Contractor shall submit to the Employer's Representative the Health and Safety Documentation for review.

3.6.2 Environmental Qualities Management Plan

3.6.2.1 The Contractor shall submit an Environmental Plan based on the Outline Environmental Plan submitted and adapted during the Tender period. The Environmental Plan shall comprise a set of Environmental Plans as detailed below:

- **Environmental Management Plan;**
- **Environmental Mitigation Implementation Schedule** (if required); and
- **Traffic Management Submissions.** (If applicable)

3.6.2.2 Environmental Plans shall include the Contractor's proposed means of complying with his obligations detailed in the PS in regard to:

- a) The Site Environment as found; and
- b) System Environment as described in the Specification.

The Environmental Plan shall include as required detailed policies, procedures and applicable regulations.

3.6.3 Environmental Management Plan

3.6.3.1 The Contractor shall submit for review by the Employer's Representative, an Environmental Management Plan (EMP) which will set out in detail the approach for dealing with each of the potential environmental impacts arising from the various different construction activities.

3.6.3.2 The EMP shall address all the potential impacts outlined in the Employer's Final Assessment Report and shall follow the EMP Outline contained in Chapter

3.6.3.3 The Contractor shall submit the final EMP, for review by the Employer's Representative, prior to the commencement of construction activities.

3.7 Completion Management Plan

The Contractor shall organise the services required under the Contract to bring the Works into service under one plan. This co-ordinated approach shall allow the Employer's Representative the ability to review all aspects of the Works and services in an integrated manner.

The Completion Management Plan shall be configured as a family of "stand-alone" plans and associated documents each covering one of the subjects listed below.

The plans shall be co-ordinated with each other and shall collectively define, describe and encompass the Contractor's proposed methods, procedures, processes, organisation, sequencing of activities, etc. and shall show how these combine together to assure that the Works truly meet the requirements of the Specification in respect of the subjects listed.

3.7.1 Commissioning Plan

3.7.1.1 The Contractor shall ensure the timely preparation of the Commissioning Plan in a format and to a level of detail in accordance with clause 9.3 below. The

Contractor shall submit the first draft of the Commissioning Plan to the Employer's Representative within 180 days of the Commencement Date of the Works.

3.7.1.2 The Commissioning Plan shall consist of the following:

a. Factory Testing Plan (see clause 3.5.3 above)

b. On-Site Testing and Commissioning Plan

(i) Installation Test Schedule

The Contractor shall submit to the Employer's Representative a comprehensive schedule of Installation Tests as required by clause 9.4.3 below and the PS and in accordance with the Installation Programme as stated in clause 2.7 above. The schedule shall be submitted within the period of time laid down in the PS, or, if none is given, not later than two months in advance of the date for the commencement of the Installation Tests.

(ii) Partial Acceptance Test Plan

The Contractor shall submit to the Employer's Representative a comprehensive Partial Acceptance Tests Plan including all requirements detailed in clause 9.4.4 below and the PS. The plan shall be submitted within the period of time laid down in the PS, or, if none is given, not later than four months in advance of the date for the commencement of the Partial Acceptance Tests.

(iii) System Acceptance Test Plan

The Contractor shall submit to the Employer's Representative a comprehensive System Acceptance Tests Plan including all requirements detailed in clause 9.4.5 below and the PS. The plan shall be submitted within the period of time laid down in the PS, or, if none is given, not later than four months in advance of the date for the commencement of the System Acceptance Tests.

(iv) Integration Testing & Commissioning Plan

The Contractor shall submit to the Employer's Representative a comprehensive Integrated Testing & Commissioning Plan including all requirements detailed in clause 9.4.6 below and the PS. The plan shall be submitted within the period of time laid down in the PS, or, if none is given, not later than four months in advance of the date for the commencement of the Integrated Testing & Commissioning.

3.7.2 Operation and Maintenance Manuals Plan (If Applicable)

3.7.2.1 The Contractor shall develop an Operation and Maintenance Manuals Plan to suit staged commissioning of the system and to ensure the timely preparation of the Contractor's Operation and Maintenance Manuals and the 'As-Built' drawings in a format and to a level of detail reviewed without objection by the Employer's Representative and in accordance with Chapter 11 below.

3.7.2.2 The Contractor shall submit the Operation and Maintenance Manuals Plan by the date stated in the PS

3.7.3 Training Plan(ifrequired)

3.7.3.1 The Contractor shall ensure the timely preparation of the Contractor's Training Plan in a format and to a level of detail reviewed without objection by the Employer's Representative and fulfilling the requirements of clause 10.1 below.

3.7.3.2 The Contractor shall submit the Training Plan by the date stated in the PS, or, if none is given, not less than three (3) months prior to the issue of the Taking Over Certificate for the Works and also to suit the staged commissioning of the relevant systems.

3.7.4 Spares Management Plan

3.7.4.1 The Contractor shall submit for review by the Employer's Representative a Spares Management Plan to furnish a priced, manufacturer-recommended list of spare parts necessary to support continuous operation of all such equipment for a minimum period of 12 months after the commencement of Revenue Operations, in accordance with Chapter 13 below.

3.7.4.2 The Contractor shall submit the Spares Management Plan by the date stated in the PS, or, if none is given, then prior to the issue of the Taking Over Certificate for the Works.

3.7.5 Defects Liability Management Plan

The Contractor shall submit for review by the Employer's Representative a Defects Liability Management Plan to repair, replace and perform any remedial item upon the Works identified by the Employer's Representative during the Defects Liability Period (DLP). The first submission of this plan is required upon 2 months before ROD. The Contractor shall:

- (a) endeavour to complete all necessary work in a timely responsible manner;
- (b) not proceed with any remedial work without the consent of the Employer's Representative;
- (c) submit a plan that details the methods and timing of any proposed work; and
- (d) update the plan monthly, showing progress of the work and the time to completion.

3.7.6 Supervision of Maintenance Plan

The Contractor shall prepare outline plans for the management of the maintenance function in accordance with the requirements of clause 12.2.1 below and submit them for review by the Employer's Representative at least 3 months prior to the scheduled commencement of Service Trial or ROD.

CHAPTER 4

4. DOCUMENTS SUBMISSION AND REVIEW**4.1 Documents, Submissions and Correspondence**

Copies of correspondence relevant to the execution of the Works and not of a confidential nature received from or despatched to Government departments, utility undertakings and Project Contractors employed by the Employer shall be submitted to the Employer's Representative for information as soon as possible but in any case not later than 7 days after receipt.

4.2 Submissions to the Employer's Representative**4.2.1 General requirements**

4.2.1.1 All submissions shall be made to the Employer's Representative in a format reviewed without objection by the Employer's Representative and in accordance with the requirements in:

- (1) the Contract;
- (2) the Computer Aided Design & Drafting (CADD) Manual; and
- (3) the Document Submittal Instructions to Consultants and Contractors.

4.2.1.2 Paper and drawing sizes shall be "A" series sheets.

4.2.1.3 The following software (versions quoted or higher) compatible for use with Intel-Windows based computers shall be used, unless otherwise stated, for the various electronic submissions required and software as specified add or latest:

<u>Document Type</u>	<u>Electronic Document Format</u>
Text Documents	MS Word, Ver. 7.0 or latest
Spread Sheets	MS Excel, Ver. 7.0 or latest
Data Base Files	MS Access, Ver. 7.0 or latest
Presentation Files	MS PowerPoint, Ver. 7.0 or latest
Programmes	Primavera for Windows, Ver. 2.0b or latest
AutoCAD Graphics	CorelDraw, Ver. 7.0/ AutoCAD ver.14 or latest
Photographic	Adobe PhotoShop, Ver.4.0 or latest
Desktop Publishing	QuarkXPress, Ver.3.32 or latest
CADD Drawings	MicroStation SE/95 or latest

Media for Electronic File Submission

One copy shall be submitted unless otherwise stated.

Internet File Formats/Standards

The following guidelines shall be followed when the Contractor uses the Internet browser as the communication media to share information with the Employer.

All the data formats or standards must be supported by Microsoft Internet Explorer version 3 or above running on Windows.

The following lists the file types and the corresponding data formats to be used on Internet. The Contractor shall comply with them unless the Employer's

Representative has previously reviewed without objection the Contractors proposal to adopt an alternative:

File Type	Data Format
Photo Image	Joint Photographic Experts Group (JPEG)
Image other than Photo	GIF or JPEG
Computer Aid Design files (CAD)	Computer Graphics Metafile (CGM)
Project documents	refer to the document type in clause 4.2.1.3 above
Video	Window video (.avi)
Sound	Wave file (.wav)

The following states the standards to be used on Internet when connecting to database(s). The Contractor shall comply with them unless the Employer's Representative has previously reviewed without objection the Contractors proposal to adopt an alternative: Function to be Implemented	Standard to be Complied With
Database connectivity	Open Database Connectivity (ODBC)
Publishing hypertext language on the World Wide Web	Hypertext Mark-up Language (HTML)

- 4.2.1.4 The hard copy of all documents shall be the contractual copy.
- 4.2.1.5 If required, one copy of all internal and external orders placed by the Contractor for equipment or materials required for the Works shall be forwarded to the Employer's Representative at the time of issue. All orders shall state the Employer's Representative's requirements for inspection and testing, shall bear the Contract reference, Contractor's name and address and shall indicate, where applicable, the sub-section of the Works for which the equipment or material is required.
- 4.2.1.6 Distribution of copies of the orders shall be in accordance with the Employer's Representative's instructions.
- 4.2.1.7 The Contractor shall have the obligation to upgrade, at his own cost, all the relevant software to the latest version upon instruction by the Employer's Representative, after the new version of the relevant software has been launched for more than six months in Jaipur.
- 4.2.1.8 The Contractor shall submit a drawing register to the Employer's Representative in electronic copy and hard copy with each submission of drawings and at an interval agreed by the Employer's Representative. The drawing register shall be in a format submitted for review and agreed without objection by the Employer's Representative and shall include each document reference number, version, date, title and data-file name.
- 4.2.1.9 Specific additional requirements in respect of the numbering scheme shall be as defined in the PS.

4.2.2 Content

- 4.2.2.1 Unless otherwise specified or permitted by the Employer's Representative, each submission shall comprise:
- (1) for drawings - one A1 master (signed by the contractor), one paper A1 copy, two paper A3 copies and an electronic data copy of all drawings; and
 - (2) for documents - the unbound original, one bound copy and an electronic copy when applicable.
- 4.2.2.3 Drawings required for RDSO/CMRS/Railway Board submission shall be arranged by contractor in A1/A0 size or as per requirement.

4.3 Records and Reports

- 4.3.1 Reports and records that are to be submitted to the Employer's Representative shall be in a format reviewed by the Employer's Representative. Reports and records shall be signed by the Contractor's agent or by a representative authorised by the Contractor.
- 4.3.2 Within 45 days of the Commencement Date of the Works, the Contractor shall submit a Project document control procedure to the Employer's Representative for review, which shall include but not be limited to the following:
- (1) a document approval system which shall specify the level of authority for approval of all documents and material before submission to the Employer's Representative;
 - (2) a system of issuing documents to ensure that pertinent documents are issued to all appropriate locations;
 - (3) a document change or re-issue system to ensure that only the latest revision of a document can be used; and
 - (4) a submission identification system which identifies each submission uniquely by the following:
 - (a) contract number;
 - (b) discipline;
 - (c) submission number; and
 - (d) revision indicator.
- 4.3.3 Project records will eventually be used by the Employer to manage, operate and maintain the Works after the completion of the Project under construction and for future reference.
- 4.3.4 The Contractor shall submit the documents as required by the Employer's Representative as Project records in full and on time. The Employer's Representative shall determine the adequacy of the Project record.
- 4.3.5 Submission and review procedure**
- 4.3.5.1 Except where specific procedures are given for certain items, all submissions shall be submitted and reviewed according to the procedure laid down in the following clauses.
- 4.3.5.2 Each submission shall be accompanied by a brief introduction to explain which sub-system, part or Section of the Works to which the submission refers, listing the documents enclosed with the submission, and describing in outline how all relevant requirements of the Specification are achieved by the proposals.
- 4.3.5.3 For each stage of submittal, the Contractor shall prepare a Submission Review Request (SRR) carrying the date of submission, the submission reference number as defined in clause 4.3.2 (4) above, the submission title, the stage of submission (e.g. preliminary design, final design, etc.), and the authorised signature of the

Contractor's responsible engineer in the format shown in Appendix 3 of this Specification, to confirm that, in the opinion of the Contractor, the submission:

- (1) complies with all relevant requirements of the Specification;
- (2) conforms to all interface requirements;
- (3) contains, or is based on auditable and proven or verified calculations or design criteria;
- (4) has been properly reviewed by the Contractor, according to the Contractor's QA system, to confirm its completeness, accuracy, adequacy and validity; and
- (5) has taken account of all requirements for approval by statutory bodies or similar organisations, and that where required, such approvals have been granted.

4.3.5.4 The Employer's Representative's response to the submission will normally be made within 30 calendar days of receipt of the submission, provided that the submission is made no later than the date shown on the Submissions Programme described in clause 2.5 above. The Employer's Representative may extend the review period depending on the amount of documentation accompanying the submission.

4.3.5.5 Throughout the design period, the Contractor shall attend monthly design review meetings with the Employer's Representative. At these Employer's Representative's review meetings, the Contractor shall present information, drawings and other documents to the Employer's Representative in respect of all submissions programmed to occur during the following five week period. The Contractor's presentations shall be in sufficient depth to enable the Employer's Representative to obtain a clear understanding of the Contractor's proposals and to discuss the methodology and process used in reaching the proposed design solutions. Unless directed otherwise by the Employer's Representative, all meetings shall be convened in Jaipur.

4.3.5.6 The Contractor shall record all of the Employer's Representative's observations and any agreed actions resulting from the Employer's Representative's review meeting and shall address each of these fully before submission of the respective documents for formal review.

4.3.5.7 If, in the Employer's Representative's opinion, following receipt of a submission there is benefit to be gained from a meeting with the Contractor to clarify or discuss any of the contents of the submission, he will notify the Contractor accordingly with not less than 5 days advance notice, and the Contractor shall attend at the time and place appointed by the Employer's Representative.

4.3.5.8 No submission may be made by the Contractor in respect of the Works or any sub-system, part or Section thereof unless a notice of no objection has been received for the previous stage of the same Works or any sub-system, part or Section thereof.

4.3.6 Employer's Representative's Response

4.3.6.1 The Employer's Representative will respond in one of the following three ways:

- (1) "Reviewed without Objection"
- (2) "Reviewed without Objection, Subject to"
- (3) "Rejected"

4.3.6.2 If the Employer's Representative, having reviewed the submission, has not discovered any non-compliance with the Contract, the SRR will be returned endorsed with the Employer's Representative's signature and the words "Reviewed without Objection". Receipt of such notice of no objection does not in any way imply the Employer's Representative's approval of the submission, nor does it remove any responsibility from the Contractor for complying with the Contract.

Issue of a "Notice of No Objection" entitles the Contractor to proceed to the next stage of the programme of work.

- 4.3.6.3 If the Employer's Representative discovers minor non-compliance, discrepancies, omissions, etc. that, in his opinion, are not of a fundamental nature, he may return the SRR endorsed with the Employer's Representative's signature and the words "Reviewed without Objection Subject to", and including a list of the features that are required to be amended, included or improved to comply with the Contract. Issue of a "Notice of No Objection Subject to" entitles the Contractor to proceed to the next stage of the programme of work provided that all of the Employer's Representative's comments are taken into account fully and implemented exactly.
- 4.3.6.4 If the Employer's Representative issues a "Notice of No Objection Subject to", the Contractor shall resubmit the affected parts of the submission, clearly demonstrating how the Employer's Representative's comments have been taken into account and resubmit amended or corrected material within 15 working days of issue of the Employer's Representative's comments, using the process described in clause 4.3.5 above.
- 4.3.6.5 If the Employer's Representative discovers major non-compliance, discrepancies, omissions, etc. that, in his opinion, are of a fundamental nature, he may return the SRR endorsed with the Employer's Representative's signature and the word "Rejected", and including a list of the features that are required to be amended, included or improved to comply with the Contract. Issue of a "Notice of Rejection" does not entitle the Contractor to proceed to the next stage of the programme of work until all of the Employer's Representative's comments are fully taken into account and a satisfactory re-submission has been made (i.e. one which results in a "Notice of No Objection" or "Notice of No Objection Subject to").
- 4.3.6.6 If the Employer's Representative issues a "Notice of Rejection", the Contractor shall resubmit the complete submission, clearly demonstrating how the Employer's Representative's comments have been taken into account and resubmit amended or corrected material within 15 working days of issue of the Employer's Representative's comments, using the process described in clause 4.3.5 above.

4.4 Records

- 4.4.1 The Contractor shall establish and maintain a place for the storage and archiving of all the documents relating to the Works and not required to be submitted to the Employer's Representative under clause 4.1 above which shall be:
- (1) the same place or office where the Contractor is performing the work and storing documents reviewed by the Employer's Representative, or;
 - (2) at the Site or elsewhere in Jaipur, a records office, which contains all other, documents that the Contractor is required to maintain in accordance with the Contract.
- 4.4.2 All documents shall be filed, indexed and suitably stored to permit easy identification and necessary audits.
- 4.4.3 The Contractor shall maintain in Jaipur his archive of all documents in connection with and arising out of the Contract, until 28 days after the issue of the Final Certificate or until final settlement of all Disputes, whichever is later.

CHAPTER 5

5. QUALITY MANAGEMENT

5.1 Introduction

- 5.1.1 The Contractor shall maintain and implement a Quality Management System that shall remain in effect during the execution of the Works. The Contractor's Quality Management System shall be based on the International Standard ISO 9001:1994 "Model for quality assurance in design, development, production, installation and servicing." The Contractor shall submit its Quality Management System documentation for the Employer's Representative's review as specified in this Chapter.
- 5.1.2 The Contractor shall plan, perform and record all quality control activities to ensure that all work is performed in accordance with the requirements of the Contract and is detailed in the quality plans which are required under this Chapter. Such activities shall include, without limitation, the inspections and/or tests expressly or implicitly required by the Contract.
- 5.1.3 Without prejudice to such requirements, the Employer's Representative may from time to time instruct the Contractor in relation to such further or other inspections and/or tests as are in his opinion appropriate.
- 5.1.4 Quality audits will be conducted by the Employer's Representative to verify the Contractor's implementation and compliance with the quality management system as specified herein.

5.2 General Requirements

- 5.2.1 All quality system documents and plans to be submitted shall embrace all activities of the Contractor and sub-contractors of any tier, including its suppliers and any design consultants.

5.2.2 Quality Plans

- 5.2.2.1 The quality plans to be submitted by the Contractor shall comprise of:

- (1) a Management Quality Plan, for the control of all management related activities;
- (2) a Design Quality Plan, for the control of all design related activities for the Works, including Temporary Works; and
- (3) Site Quality Plan, for the control of activities within each category of work or discrete element of procurement, manufacturing, delivery, construction and installation of the Works, including Temporary Works.

- 5.2.2.2 Within 30 days of the Commencement Date of the Works, the Contractor shall submit for review by the Employer's Representative a Quality Plan.

- 5.2.2.3 The Contractor shall submit separate Site Quality Plan covering all elements of the Works. These shall be in accordance with the specific requirements of this Chapter and shall be submitted to the Employer's Representative for review prior to the commencement of the construction works covered by the quality plans. In addition, the Contractor shall prepare inspection and test plans for the management and control of the inspection and/or testing by the Contractor of the Works identified in each quality plan.

- 5.2.2.4 The Contractor shall promptly supply the Employer's Representative with one controlled copy of his quality manual, quality plans, inspection and test plans and related procedures/instructions/forms upon such documents being reviewed without objection by the Employer's Representative. The Contractor shall maintain such controlled documents throughout the duration of the Contract. For any amendment to quality system documentation, the Contractor shall as soon as reasonably practicable prepare and submit

the proposed amendment for review by the Employer's Representative.

5.2.2.5 The Contractor shall appoint (a) suitably qualified and experienced person(s) as Quality Manager(s), who shall be directly responsible to senior management level and is able to discharge his duties without hindrance or constraint, and provide such other resources as may be required to ensure effective implementation of the Quality Management System and all quality plans. Details of the qualifications, experience, authority and responsibility of the proposed Quality Manager(s) shall be submitted for review by the Employer's Representative.

5.2.2.6 During the Contract period, upon receipt of a Corrective Action Request (CAR) or similar document issued by the Employer's Representative as a result of quality audits, the Contractor shall submit a proposed corrective and preventive action plan within 14 days to the Employer's Representative for review.

5.3 Management Quality Plan

5.3.1 The Management Quality Plan shall define the Contractor's management structure for the execution of the Works and for the control of the quality of the Works and shall, without limitation, define:

- (1) 5.3.1.1 the appointment of a Quality Manager in accordance with clause 5.2.6 above;
- (2) 5.3.1.2 the organisation of the Contractor's managerial staff with particular reference to any joint venture partners and main sub-contractors. An organisation chart shall be produced to illustrate the sub-division of the Works into elements for effective technical and managerial control, the reporting structure and the interface relationship between all parties involved;
- (3) 5.3.1.3 the hierarchy of the overall quality management system documentation to be applied to the Works;
- (4) 5.3.1.4 the quality management system of the Contractor in monitoring and controlling sub-contractors and suppliers; and
- (5) 5.3.1.5 the list of quality system procedures and work instructions to be applied to manage the quality of the Works.

5.4 Design Quality Plan

5.4.1 The Contractor shall prepare a Design Quality Plan for its design works. The Design Quality Plan shall define the Contractor's policy for the design works and shall, without limitation, define:

- (1) the organisation of the Contractor's design staff;
- (2) the specific allocations of responsibilities and authorities given to identified design staff or sub-contractors for particular design work;
- (3) the hierarchy of quality management system documentation for managing and controlling design works, including design works of sub-contractors of any tier; and
- (4) the list of procedures and instructions to be applied to manage and control the quality of the design works.

5.5 Manufacturing Quality Plan

5.5.1 The Contractor shall prepare a Manufacturing Quality Plan for his manufacturing works. The Manufacturing Quality Plan shall, without limitation, define:

- (1) the organisation of the Contractor's staff directly responsible for the day-to-day management of the manufacturing activities on or off the Site;

- (2) the specific allocations of responsibilities and authorities given to identified personnel or sub-contractors for particular manufacturing work;
- (3) the hierarchy of quality management system documentation for managing and controlling manufacturing works, including manufacturing works of sub-contractors of any tier; and
- (4) the list of procedures and instructions to be applied to manage and control the manufacturing works, together with the procedures and instructions which have not been previously submitted for review.

5.5.2 The Contractor shall also prepare inspection and test plans to manage and control any test and inspection activities in accordance with clause 3.5.3 above.

5.6 Site Quality Plan

5.6.1 The Contractor shall prepare a Site Quality Plan for its construction and installation works. The Site Quality Plan shall, without limitation, define:

- (1) the organisation of the Contractor's staff directly responsible for the day-to-day management of the construction and installation activities on or off the Site;
- (2) the specific allocations of responsibilities and authorities given to identified personnel or sub-contractors for particular construction and installation work;
- (3) the hierarchy of quality management system documentation for managing and controlling construction and installation works, including construction and installation works of sub-contractors of any tier; and
- (4) the list of procedures and instructions to be applied to manage and control the construction and installation works together with the procedures and instructions that have not been previously submitted for review.

5.6.2 The Contractor shall also prepare inspection and test plans to manage and control any test and inspection activities in accordance with clause 4.7.1 below.

5.7 Inspection and Test Plans, Records and Reports

5.7.1 Inspection and test plans shall be produced for every activity requiring test and/or inspection. Each inspection and test plan shall identify the quality objectives and include, without limitation:

- (1) the personnel responsible for undertaking and certifying the inspection and/or test;
- (2) the procedure or instructions for the inspection and/or test;
- (3) the test method or a reference to the relevant standard of testing;
- (4) the inspection and/or test required prior to commencement of an activity;
- (5) the inspection and/or test during an activity and its frequency;
- (6) the inspection and/or test required to complete an activity;
- (7) all Quality Control Points, Quality Hold Points and any notices or other documents to be given to the Employer's Representative in relation to Quality Control Points and Quality Hold Points;
- (8) the compliance criteria;
- (9) the method of analysis of test data;
- (10) the procedure for correction or disposal of any work which fails the compliance criteria;
- (11) examples of the documentation to be used for reporting the results of inspections, tests and analysis of test data;
- (12) examples of the documentation to be used for recording the status of inspections and tests in accordance with clause 5.9.1 below; and

- (13) the procedure for the distribution, filing and storage of inspection reports, test reports and reports on analysis of test data.

- 5.7.2 Each report of the inspection and/or test shall be prepared in accordance with clause 9.6.6.1 below.
- 5.7.3 The Contractor shall ensure that a signed copy of each report of inspection and test is filed in his filing system within 3 (three) working days of the date of inspection and test.
- 5.7.4 In relation to all Quality Control Points and Quality Hold Points involving inspection and/or test by the Contractor, the Contractor shall give the Employer's Representative notice of when the relevant work will be inspected and/or tested in accordance with clause 9.8.1 below.

5.8 Review, Verification & Audit

- 5.8.1 The Contractor shall continuously monitor the performance of each quality plan related to the execution of the Works and shall include in each Monthly Progress Report the status of all quality system documentation, an up-to-date audit schedule and status and an up-to-date non-conformity register providing the status of all non-conformities identified by the Employer's Representative and the Contractor. The Contractor shall make an appraisal of such performance and identify in particular any non-conformities or other shortcomings in the quality management system, the actions being taken to dispose of these non-conformities, any necessary corrective action taken or proposed to be taken to prevent the re-occurrence of these non-conformities or shortcomings and, any other items as instructed by the Employer's Representative.
- 5.8.2 The Contractor shall ensure that audits of all the activities in each quality plan are carried out at quarterly intervals, or at such other intervals as the Employer's Representative may require, to ensure the continuing suitability and effectiveness of the quality management system. Reports of each such audit shall be submitted promptly for review by the Employer's Representative.
- 5.8.3 The Contractor shall ensure that the requirements for supervision and verification of work by the Contractor and/or his sub-contractors of any tiers are identified in the quality plans and adequate resources and trained personnel are provided for these activities.
- 5.8.4 The Contractor shall submit for review by the Employer's Representative details of the authority, qualifications and experience of personnel assigned to design verification and to audit activities.
- 5.8.5 The Employer's Representative may, by notice to the Contractor, require external audits of the Contractor's quality management system to be carried out either by the Employer's staff or by his representative. In such case, the Contractor shall afford to such auditors all necessary facilities and access to the records to permit this function to be performed.

5.9 Quality Control Register

- 5.9.1 The Contractor shall provide and maintain at all stages of the Works a quality control register or registers to identify the status of inspections, sampling and testing of the work and all certificates. Such registers shall be updated by the Contractor to show all activities in previous months and shall reach the Employer's Representative's office before the 7th working day of each month. Each register shall:
 - (1) list the certificates received for each batch of goods and materials incorporated in the Works and compare this against the certification required by the Contract and the Contractor's quality plans;

- (2) list the inspection and testing activities undertaken by the Contractor on each element of the Works and compare these activities against the amount of inspection and testing required by the Contract and the Contractor's quality plans;
- (3) show the results of each report of inspection and/or test and any required analysis of these results and compare these results against the pass/fail criteria; and
- (4) summarise any actions proposed by the Contractor to overcome any non-conformity identified in clauses 5.9.1 (1) (2)&(3) above.

5.10 Summaries of Inspection and/or Test

The Contractor shall submit to the Employer's Representative for his information summaries based on quality control register in accordance with the Summaries of Inspection and/or Test described in clause 9.6.11 below.

5.11 Notification of Non-conformities

- 5.11.1 If, prior to the issue of the Taking Over Certificate for the Works or the relevant Section, the Contractor has used or proposes to use or repair any item of the Works which does not conform to the requirements of the Contract, he shall immediately submit to the Employer's Representative such proposal, supplying full particulars of the non-conformity and, if appropriate, of the proposed means of repair which shall include any calculation analysis or other documentation to support the repair or acceptability of the non-conformity.
- 5.11.2 If the Employer's Representative issues non-conformity reports or similar documents to notify the Contractor of any item of the Works which he considers to constitute a non-conformity and which has not been reported in accordance with clause 5.11.1 above, the Contractor shall promptly investigate the matter and, within 14 days of notification by the Employer's Representative, submit to the Employer's Representative for review the remedial measures to be taken and stating the reasons for such measures.

CHAPTER 6

6. SOFTWARE MANAGEMENT AND CONTROL

6.1 Prescriptive Framework

The Software shall be designed, developed and tested according to the Software Quality assurance Plan, and the Software Lifecycle. The Contractor shall define within the Software Quality Assurance Plan what techniques and measures are to be applied for software development

6.2 Software Framework

Software produced or supplied for the project shall be subject to a defined quality framework.

6.3 Software Management Control

The Contractor shall ensure that a full time Software Project Manager and Software Quality Manager are appointed for software development, if software development and/or modification are required under the Contract.

6.4 Status Reporting

The Contractor shall include in the Monthly Progress Report details of the status of the software development/modifications 1 upgrade.

6.5 Auditing

The Employer's Representative shall audit the Contractor in line with Employer's procedures. Further external independent audits may also be arranged at the Employer's Representative's discretion.

6.6 Software Acceptance

Software acceptance shall be based upon the supply of software functioning in a manner reviewed without objection by the Employer's Representative supported by an Operational Safety Report (Software) reviewed without objection by the Employer's Representative. The report shall be provided by the Contractor and submitted to the Employer's Representative for review. The contractor shall ensure that all relevant licences related to software/applications are valid for life time and shall submit a list of all such licences during handing over system to JMRC.

6.6.1 Not Used

6.7 Availability of Development Tools

For COTS, the Contractor shall provide all available documentation for the application and maintenance of that software.

6.8 Re-Use of Existing Software

6.8.1 Where existing software (defined to module level) is to be re-used without modification, the Contractor shall provide evidence acceptable to the Employer's Representative as to why that software is suitable for use in the proposed application. All software developed earlier and intended to be used for the Contract shall meet the requirements laid down in the PS.

6.8.2 The certified evidence of previous satisfactory use in a similar environment and application and cross acceptance from another railway authority shall be

submitted. The Employer's Representative reserves the right to implement an assessment of the developed software by further validation or re-validation by an outside agency nominated by the Employer.

6.9 Application of "Commercial Off The Shelf" Software (COTS)

COTS shall not be applied to any operation software at level SIL2 and above. Where COTS is used, the Contractor shall define within the SQAP, to the review of the Employer's Representative, the software support period following delivery. The software support activities shall include but not be limited to, supply of software and supporting documentation, training and maintenance contracts.

6.10 Millennium Bug

6.10.1 Any software supplied shall:

- (1) correctly handle date information before, during, and after 1st January 2000 accepting date input, providing date output and performing calculation of dates or portions of dates;
- (2) function before, during, and after 1st January 2000 without changes in operation, according to the Specification and the documentation submitted by the Contractor;
- (3) store and provide output of date information in ways that are unambiguous as to century; and
- (4) correctly handle the leap year occurring in the year 2000 and subsequent leap years.

6.10.2 The Contractor shall also ensure that the Year 2000 problem will not have any adverse impact on the Works Programme by using software tools that are Year 2000 compliant.

6.10.3 The Permanent Works shall conform as a minimum to the Year 2000 requirements as described in BSI DISC PD2000-1 (A Definition of Year 2000 Conformity Requirements) published by the British Standards Institute.

6.10.4 The Tests on Completion shall conform to the requirements as described in the document "Definition of Year 2000 Software Product and System Testing Best Practice" published by the National Computer Centre, USA.

6.11 Test Software

All test software, with the exclusion of built-in test software, shall be produced in accordance with a quality system controlled under the requirements of ISO 9000-3.

6.12 Global Positioning System Week-counter Rollover

Any equipment or software that makes use of the Global Positioning System (GPS) shall not suffer from the GPS week-counter rollover problem, which causes the week counter to reset to 0000 every 1024 weeks.

CHAPTER 7

7. MATERIALS AND EQUIPMENT

7.1 Materials and Equipment Provided by the Employer

- 7.1.1 Materials and equipment which are to be provided by the Employer will be as stated in the Contract.
- 7.1.2 Materials and equipment provided by the Employer shall be collected by the Contractor from the locations stated in the Contract and delivered by the Contractor to the Site. The Contractor shall inspect the materials and equipment before taking receipt and shall immediately inform the Employer's Representative of any shortage or damage.
- 7.1.3 Materials or equipment provided by the Employer which are damaged after collection shall be repaired by the Contractor and submitted to the Employer's Representative for review. Materials or equipment which are lost or which in the opinion of the Employer's Representative are not capable of being or have not been repaired satisfactorily shall be replaced by the Contractor.
- 7.1.4 The Contractor shall dispose of crates and containers for materials or equipment provided by the Employer.
- 7.1.5 Equipment / materials provided by the Employer, surplus to the requirements of the Works shall be returned to the locations stated in the Contract.
- 7.1.6 The Contractor shall protect and maintain equipment provided by the Employer while it is on the Site and shall provide operatives, fuel and other consumables required to operate the equipment.

7.2 Materials

7.2.1 General

- 7.2.1.1 Materials for inclusion in the Permanent Works shall be new unless otherwise stated in the Contract or having been reviewed without objection by the Employer's Representative.
- 7.2.1.2 Certificates of tests by manufacturers, which are submitted to the Employer's Representative, shall relate to the material delivered to the Site. Certified true copies of certificates may be submitted if the original certificates cannot be obtained from the manufacturer. A letter from the supplier stating that the certificates relate to the material delivered to the Site shall be submitted with the certificates.
- 7.2.1.3 Materials, which are specified by means of trade or proprietary names, may be substituted by materials from a different manufacturer, provided that the materials are of the same or better quality and comply with the specified requirements and have been reviewed without objection by the Employer's Representative.
- 7.2.1.4 In addition to any special provisions in the Contract for the sampling and testing of materials, the Contractor shall submit samples of all materials and goods which it propose to use or employ in or for the Works. Such samples, if having been reviewed without objection, shall be retained by the Employer's Representative and shall not be returned to the Contractor or used in the Permanent Works unless reviewed by the Employer's Representative. No materials or goods of which samples have been submitted shall be used in the Works unless and until the Employer's Representative shall have reviewed such samples without objection.

7.2.1.5 The Employer's Representative may reject any materials and goods which in his opinion are inferior to the samples previously reviewed and the Contractor shall promptly remove such materials and goods from the Site.

7.2.1.6 If any material required for this Contract is not available in metric specifications from any known sources, at the time the material is required for the Contract, the Employer's Representative may, upon application from the Contractor, give permission to the use of an equivalent material in imperial specifications as a substitute, provided that:

- (1) no statutory specification shall be altered except in accordance with relevant legal provision, if any;
- (2) the Employer's Representative is satisfied that the Contractor has made every reasonable effort to obtain the material in metric specifications;
- (3) in the opinion of the Employer's Representative, the substitute material is suitable for the Works in all respects;
- (4) in the opinion of the Employer's Representative, the substitute material complies with all the specifications for the material substituted, allowing minor discrepancies between the specified metric measurements and the corresponding imperial measurements of the substitute, provided that such discrepancies can be effectively and satisfactorily compensated for by the provision of extra quantity of the material; and
- (5) the Contractor shall be responsible for all extra quantities of the material required for meeting design and specification requirements of the Works due to the use of the substitute.

7.2.1.7 Hardwood shall not be used for Site hoardings, shoring of trenches and pits, falsework or formwork.

7.2.2 Notice of place of manufacture and/or source of supply

The Contractor shall notify the Employer's Representative of the places of manufacture and/or the source of supply of all goods and materials previously reviewed without objection by the Employer's Representative to be incorporated into the Permanent Works. The Contractor shall give reasonable notice (which shall not in any event be less than 56 days) to the Employer's Representative before the start of any manufacturing and/or the supply of goods and materials.

7.2.3 Certificates for Manufactured Goods or Materials

The Contractor shall obtain certificates for each batch of goods and materials incorporated into the Permanent Works. Each certificate shall certify that the materials comply with the requirements of the Contract and shall include all reports of inspections and/or tests carried out at the place of manufacture.

7.3 Equipment

7.3.1 Identification labels

7.3.1.1 Each and every individual item of equipment forming part of the Permanent Works shall be fitted with permanent identification labels in accordance with a system based on the contract identification. In this respect, the term "individual item of equipment" refers to a complete assembly of components and to each removable sub-module within the complete assembly.

7.3.1.2 The proposed labelling system shall be submitted for review by the Employer's Representative at least 1 month before the scheduled date for the shipment of the first item of equipment to site.

7.3.1.3 The identification label shall be permanently attached in such a way that it shall not become detached or illegible during the lifetime of the system from any cause including wear and tear, environmental effects (such as rain, direct sunlight, etc.)

or any other influence. Preference shall be given to embossed or engraved metallic labels mechanically fastened by riveting or similar means to the item to which they refer.

7.3.1.4 All labels shall be easily cleaned to remove dirt and debris (including grease and oil) without disturbing the legibility properties.

7.3.1.5 All labels shall incorporate the inscription "Property of J.M.R.C".

7.4 Electronic Control Racks & Cabinets

7.4.1 Racks & Cabinets

7.4.1.1 Electronic control equipment shall be housed in 19" racking suitably enclosed in metal cabinets of a type acceptable to the Employer's Representative

7.4.1.2 The equipment shall be of modular construction to facilitate maintenance, repair and replacement of parts. Standard commercial parts shall be utilised to the maximum extent possible.

7.4.1.3 Cubicles, Equipment Racks, cable and wiring Termination Racks shall not be filled to greater than 80% of their capacity at the completion of the works.

7.4.1.4 There shall be a minimum walkway of 1000mm between equipment racks. However in case of space constraint requirement of minimum walkway may be revised by employer.

7.4.1.5 The equipment shall be suitable for the environment in which it is to be used and it shall be designed to prevent ingress of all vermin and to minimise the ingress of moisture, dust and dirt.

7.4.1.6 Outdoor equipment shall be sealed against the ingress of dust, moisture and vermin. A minimum IP rating of IP65 under IEC529 is essential.

7.4.1.7 No item of equipment which is removable as part of routine maintenance procedures shall be preferably mounted at more than 2.0m above floor level.

7.4.2 Cables

7.4.2.1 No joints or splices shall be permitted in cables or wires except at recognised termination points.

7.4.2.2 All multi-core cables shall allow 20%, as spares, unless otherwise specified in the PS.

7.4.2.3 All cable cores shall be terminated including all spare conductors, unless otherwise specified in the PS

7.4.2.4 Each cable shall be uniquely numbered and identified with a label giving details of the circuit carried.

7.4.2.5 Terminals carrying voltages exceeding 50 volts shall be uniquely identified and protected against accidental contact by persons, test equipment or other unintended physical contact. Similarly all bus bars shall be suitably identified and protected.

CHAPTER 8

8. PACKAGING, STORAGE, SHIPPING AND DELIVERY

8.1 Storage of Equipment

- 8.1.1 The Contractor shall provide and maintain acceptable storage facilities for the Permanent Works, equipment and materials of all kinds intended for use in carrying out the Works or for incorporation into the Works.
- 8.1.2 The Contractor shall prepare, protect and store in an agreed manner all Permanent Works, Contractor's Equipment, equipment and materials so as to safeguard them against loss or damage from repeated handling, from climatic influences and from all other hazards arising during shipment or storage on or off the Site.
- 8.1.3 Secure and covered storage shall be provided by the Contractor for all Permanent Works, Contractor's Equipment, equipment and materials which are other than those having been reviewed without objection by the Employer's Representative as suitable for open storage

8.2 General Precautions

- 8.2.1 Spare parts shall be tropicalised in their packing for prolonged storage in accordance with equivalent International /Indian standard and shall be suitably and individually labelled to indicate following (unless not required or applicable):
- (1) shelf life and date of manufacture;
 - (2) type or condition(s) of storage and special handling information;
 - (3) description of item and relevant part number;
 - (4) serial number, if applicable;
 - (5) inspection/test certificate number and batch number; and
 - (6) Contract number, variation order number and item number.
- 8.2.2 Tubes, cable, conductor and rigid OHE ends and other similar openings shall be properly sealed and blanked off to prevent ingress of dirt or moisture. Flanged ends shall be protected by adhesive tape or jointing material covered by a properly secured wooden blank not smaller than the flange itself. Plain tube ends shall be closed off with bungs or plugs or suitable materials firmly fixed in position.
- 8.2.3 Appropriate precautions in accordance with the Contractor's safety regulations, the regulations of the Employer, and statutory regulations shall be taken in respect of all hazardous, toxic, inflammable, etc. materials.

8.3 Packaging Procedures

- 8.3.1 All required inspection/test certificates shall be supplied and packed together with individual material. All packaging materials and procedures shall be subject to review by the Employer's Representative.
- 8.3.2 All empty cases, crates or packages, whether or not returnable, shall be removed from the Site by the Contractor or stored by the Contractor in such a way that they do not interfere with the progress of the works of Project Contractors.

8.4 Shipping

- 8.4.1 Two copies of packing lists and quality certificates shall be attached to each case or package to be shipped. One copy shall be placed inside the package and the second

copy shall be enclosed in a watertight enclosure on the outside of each case or package. A copy of packing lists and quality certificates shall be sent to the Employer's Representative after each package of the Works, the equipment, spare parts and other items to be shipped have been shipped.

8.4.2 Without prejudice to any other provisions of the Contract, the Contractor shall be responsible for all legal requirements, duties, dues, taxes and other such requirements and expenditures required for the importation of the Works, the equipment, spare parts and other items to be supplied under the Contract into Jaipur.

8.4.3 The Contractor shall clear the Works, the equipment, spare parts and other items to be supplied under the Contract through Jaipur customs/Indian sea port in accordance with all Government of India Enactments.

8.5 Delivery

8.5.1 The Contractor shall deliver the Works and all items to be supplied under the Contract to the Site.

8.5.2 The Contractor shall unload the Works and all items to be supplied under the Contract at the designated delivery point and positioning or storing them.

8.5.3 Any part of the Works or any item to be supplied under the Contract that is damaged in transit shall not be considered as delivered until repairs or replacements have been made and all necessary spare parts or items have been delivered to the Site.

8.5.4 All documents, manuals, drawings and other deliverables shall be delivered to an address in Jaipur to be designated by the Employer's Representative in writing.

8.5.5 The Contractor shall store and secure the Works, equipment, spare parts and other items until the same have been inspected and are considered delivered at the designated point by the Employer's Representative.

8.5.6 The Contractor shall remove temporary fittings required for shipment and re-assembly of equipment and shall complete this prior to the equipment or parts thereof being inspected and before they are considered delivered.

8.5.7 An item shall be considered delivered when all damage has been repaired and all documentation and post-delivery preparation have been completed to the satisfaction of the Employer's Representative.

CHAPTER 9

9. TESTING AND COMMISSIONING

Testing and Commissioning shall comply with all the requirements of the GCC supplemented, amplified, modified or superseded as applicable by this Specification and the PS.

9.1 General

9.1.1 The Contractor shall perform all testing and commissioning activities to satisfactorily demonstrate the performance of the Works within the framework of the Completion Management Plan.

9.1.2 The Contractor's activities shall include but are not limited to the following:

- (1) provision of all labour and experienced supervision to perform all inspections and tests required to demonstrate the performance of the Works;
- (2) preparation of that portion of the Commissioning Plan that applies to the Works to a level of detail acceptable to the Employer's Representative;
- (3) performance of all duties and responsibilities, as specified in the Commissioning Plan;
- (4) participation in the Commissioning Team that shall develop, review and implement the Commissioning Plan. As a participant of the Commissioning Team, the Contractor shall provide personnel and technical support to the Employer and the Employer's Representative in the Commissioning of the Project;
- (5) performance of the testing and commissioning for all systems forming part of the Works in a manner which is fully co-ordinated with other Contractors, the Employer and the Employer's Representative;
- (6) provision of all required testing and specialised equipment and materials including consumables required to support the testing and commissioning pre-operations activities; and
- (7) removal and appropriate disposal of any toxic or other spoils (e.g. cable drums, depleted filters, oils, and fluids) created as a result of the Contractor's construction, testing and commissioning activities.

9.1.3 The Contractor shall provide full access for the Employer and Employer's Representative to witness any test or inspection.

9.1.4 The Employer and the Employer's Representative will bear their own costs for attendance at witnessed inspections or tests (other than re-tests) scheduled in accordance with the agreed Works Programme and subject to notice in accordance with the Specification.

9.2 Manufacturing Test Plan

9.2.1 The Manufacturing Test Plan is the Contractor's plan for carrying out the necessary procedures to ensure that the items presented for acceptance by the Employer and the Employer's Representative are in compliance with the requirements of the Specification.

9.2.2 During the process of procurement and manufacture of the system components the Contractor shall undertake such testing and inspection as is required by the Quality Plan referred to in clause 5.5 above.

9.2.3 The Employer and the Employer's Representative will not become involved in the Contractor's Manufacturing Tests except in respect of the following:

- **Type Test; and First Article Inspection.**

9.2.4 Before shipment of any items to Site the Contractor shall present the items for the first stage of Acceptance according to the Commissioning Plan as detailed in clause 9.3 below.

9.2.5 Inspection

9.2.5.1 The Contractor shall be wholly responsible for all inward inspection of items to be incorporated into the system as a whole.

9.2.5.2 Equipment issued by the Employer shall not be subject to Type Tests or **First Article Inspection** however the Contractor shall undertake **Inspection** as referenced in clause 7.1 above. Should the Employer's issued equipment be subsequently incorporated into another manufactured item then the whole item shall be subject to both **Type Tests** and **First Article Inspection**.

9.2.6 Type Tests

9.2.6.1 Type tests will not be required in those cases where the Contractor can produce certified evidence that the required type tests have been performed successfully on identical equipment or equipment which is, for practical test purposes, similar and produced in the factory where the equipment offered is to be manufactured.

9.2.6.2 Evidence to this effect submitted during the Tender period shall be resubmitted, this and any further submissions for waiver of Type Testing shall be submitted for review by the Engineer's Representative no later than two months before the scheduled date for shipment of the item to site.

9.2.6.3 Not Used.

9.2.6.4 Type tests are not required if previously independently witnessed tests have been successfully carried out. Where only some of the required tests have been carried out, the Employer's Representative may agree to selected type tests being carried out individually rather than as part of a sequence.

9.2.6.5 The Contractor shall conduct the tests in accordance with the reviewed test procedures, and shall enter the results in the result sheets. Full use shall be made during the tests of operator manuals and other documentation provided by the Contractor, to provide a series of tests of their accuracy.

9.2.6.6 Not Used.

9.2.6.7 For each test, the Employer's Representative will determine whether the item under test has passed or failed. In general, the test will be considered to have failed if either:

- The result of the test is not in accordance with the expected result described in the test procedure, or
- The result of the test is in accordance with the expected result described in the test procedure, but some other unexpected or unexplained event occurred which the Employer's Representative considers to be a fault.

9.2.6.8 If during Type Tests, any failure occurs or the equipment design is changed, it shall be reported to the Employer's Representative who may, at his discretion, require repetition of the previous tests at the Contractor's cost.

9.2.7 First Article Inspection

- 9.2.7.1 FAI shall be performed jointly by the Employer and the Employer's Representative and the Contractor on all major equipment items or sub-systems identified by the Employer's Representative.
- 9.2.7.2 Equipment shall be shipped from the point of manufacture only after a FAI has been completed or the requirement waived in writing by the Employer's Representative.
- 9.2.7.3 The Contractor shall provide a minimum of 15 working days notice to the Employer's Representative before any FAI. Other than the FAI, the Contractor shall give the Employer's Representative notice of all Quality Control Points and Quality Hold Points involving inspections and/or tests by the Contractor in accordance with clause 9.8.1 below.
- 9.2.7.4 At least 15 days prior to each FAI, the latest drawings, inspection and test procedures, specifications and quality documentation required for adequate inspection of the equipment under inspection shall be submitted to the Employer's Representative. The drawings shall be complete to the lowest level replaceable unit.
- 9.2.7.5 The Contractor shall ensure that he and his subcontractors are prepared for all FAIs. The Contractor shall not schedule more than one FAI on the same day without prior notice of No Objection by the Employer's Representative.
- 9.2.7.6 The FAI shall enable the Employer and the Employer's Representative and the Contractor to jointly establish the quality of workmanship for the balance of like components.
- 9.2.7.7 The FAI shall not be conducted until the design drawings of the equipment have been reviewed. If drawings with outstanding comments are used, the Employer's Representative's comments shall be satisfied at the FAI and represented by the inspected equipment.
- 9.2.7.8 Not Used.
- 9.2.7.9 The Contractor shall be responsible for the cost and scheduling, to the Employer and the Employer's Representative's convenience, of any repeat testing of items which fail FAI.

9.2.8 Factory Acceptance Test

- 9.2.8.1 Before shipment all manufactured items or systems shall undergo FAT in accordance with the requirements of the PS. The First Article Inspection Test can also be clubbed as part of FAT, if agreed by the Employer's Representative.

9.3 Commissioning Plan

- 9.3.1 The Commissioning Plan is the Employer and the Employer's Representative's tool for managing and co-ordinating the Testing, Commissioning, Training and Service Trial activities. The Commissioning Plan will be divided into the following sub-plans:

- (1) Factory Testing Plan (see clause 3.5.3 above and PS)
- (2) On-Site Testing and Commissioning Plan

9.3.2 Testing and Commissioning Phases

- 9.3.2.1 Testing and Commissioning activities shall be undertaken in the following phases:

- (1) **Factory Acceptance Test** (which requirements are specified in clause 3.5.3 above);
- (2) **9.4.3 Installation Tests;**

- (3) **9.4.4 Partial Acceptance Tests;**
- (4) **System Acceptance Tests;**
- (5) **Integration Testing & Commissioning; and**
- (6) **Service Trial.**

9.3.3 Items (3), (4), (5) and (6) as required by the PS constitute the Tests on Completion referred to in the GCC.

9.4 On-Site Testing and Commissioning Plan

9.4.1 The Contractor shall prepare and submit for review by the Employer's Representative the Contractor's On-Site Testing and Commissioning Plan detailing and explaining how the Contractor will plan, perform and document all tests and inspections that will be conducted to verify and validate the Works on Site. The On-Site Testing and Commissioning Plan shall consist of a narrative description supported by graphics, diagrams and tabulations as required.

9.4.2 The On-Site Testing and Commissioning Plan shall contain, but not be limited to, the following topics:

- (1) the Contractor's strategy for testing and commissioning all constituent parts of the Works and how this relates to the sequence of construction and installation;
- (2) the sequencing and interrelationships of the inspections and tests.
- (3) the interdependency and interaction with other Contractors and their commissioning programmes;
- (4) the type and extent of testing and commissioning to be undertaken and the parts of the Works to be proven by that testing;
- (5) the objective of each test, what particular design and operating criteria the test or inspection will prove and how the success of the test will be demonstrated or measured;
- (6) organisation chart and CV of key personnel in testing and commissioning team;
- (7) the plan for the production and submission of the testing and commissioning procedures to the Employer's Representative for review including the submission of the testing and commissioning reports and records; and
- (8) the On-Site Testing and Commissioning Plan shall be organised and submitted in the stages described in clauses 9.3.2 above, 9.4.3 below & 9.4.7 below.

9.4.3 Installation Tests

9.4.3.1 The Installation Tests phase is defined as being the final stage of assembly/installation before the start of commissioning itself. The Installation Tests are to be performed by the Contractor under the Contract and may be witnessed by the Employer or the Employer's Representative. During this phase, the Contractor shall perform static testing of components and/or systems in preparation for Partial Acceptance Testing.

9.4.3.2 The particular requirements for Installation Tests are prescribed in the PS. Where performance across interfaces to other Contractors or to other parties is required to be verified, the Contractor shall liaise with the interfacing party to co-ordinate the test procedures and programme in the manner prescribed in clause 3.3.2 above.

9.4.3.3 The Contractor shall prepare one copy of a test report immediately after the completion of each test whether or not witnessed by the Employer or the Employer's

Representative. If the Employer or the Employer's Representative has witnessed the test, he will countersign the report to indicate his agreement to the information and conclusions (i.e. whether or not the equipment being tested has passed satisfactorily) contained therein. If the Employer or the Employer's Representative has not witnessed the test (i.e. if a written waiver has been granted), the Contractor shall forward copy of the test report without delay to the Employer's Representative.

- 9.4.3.4 The Employer's Representative will countersign the report to indicate his agreement to the information and conclusions (i.e. whether or not the equipment being tested has passed satisfactorily). Where the results of the test do not meet the requirements of the Specification, the Employer or the Employer's Representative may call for a re-test.
- 9.4.3.5 Test equipment and instrumentation shall be subject to calibration test, if required by Employer's Representative, within a properly controlled calibration scheme, and signed calibration certificates shall be supplied to the Employer's Representative. Such calibration checks shall be undertaken prior to testing and, if required by the Employer or the Employer's Representative, shall be repeated afterwards.
- 9.4.3.6 The Contractor shall submit to the Employer's Representative a comprehensive schedule of tests as required by the PS giving full details and procedures for each test to be carried out under the Contract and including the pass / fail criteria (i.e. the standards or limits to be achieved).

9.4.4 Partial Acceptance Tests

- 9.4.4.1 Partial Acceptance Tests are defined as the performance of functional tests of sections, areas, or stages of a system. The Partial Acceptance Tests are part of the Tests on Completion to be performed by the Contractor under the Contract in order to achieve Employer's Taking Over of the Works. . On satisfactory completion of the Partial Acceptance Tests, the tested items will be considered available for Systems Acceptance Testing.
- 9.4.4.2 The particular requirements for Partial Acceptance Tests are prescribed in the PS.
- 9.4.4.3 The Contractor shall submit to the Employer's Representative a comprehensive Partial Acceptance Tests Plan including all requirements detailed in the PS. The plan shall be submitted on a logical section-by-section basis, using a "top-down" approach describing the testing and commissioning strategies and processes clearly showing how these serve to provide the full verification of the systems and equipment.
- 9.4.4.4 The Partial Acceptance Tests Plan shall identify a comprehensive list of specifications, standards, method statements, procedures, pass/fail criteria, sample records, resources to be made available, drawings and records to be submitted to the Employer's Representative, and a programme showing the dates for testing and for submission of each test procedure.
- 9.4.4.5 Test procedures shall be carefully planned to ensure that the work can be executed in the time available. If the available time is restricted, this planning shall include contingency plans to be implemented if testing proceeds slower than anticipated or if defects are discovered that necessitate rectification and subsequent repeat testing, etc.
- 9.4.4.6 If any working equipment is relocated or altered by the Contractor during the execution of the Works, thorough re-testing shall be performed to verify that the equipment remains fully functional and operates safely according to its specification. The testing to be performed shall be no less rigorous than the procedures used for the original testing and commissioning of the equipment.

- 9.4.4.7 Not Used.
- 9.4.4.8 The Contractor shall during the execution of the Works prepare such reports and records of design, manufacture, installation, erection and testing as may be required in order that any relevant licences or approvals (including any statutory approvals) may be issued or granted. Such records shall be adequate to enable the system or its respective part to be commissioned and to meet the requirements of the licensing authority or statutory body.
- 9.4.4.9 Immediately following the successful Partial Acceptance Testing of the system or any constituent part, the Contractor shall complete the appropriate Partial Acceptance Tests records in the agreed format and submit a signed copy to the Employer's Representative.
- 9.4.4.10 The Contractor shall include a complete schedule of all Partial Acceptance Tests records and their current status within the Monthly Progress Report.
- 9.4.5 System Acceptance Tests**
- 9.4.5.1 System Acceptance Tests are defined as the tests undertaken to demonstrate that the Works in its entirety is capable of functioning in accordance with the specified requirements in the Contract in all respects. The System Acceptance Tests are part of the Tests on Completion to be performed by the Contractor under the Contract in order to achieve Employer's Taking Over of the Works. The System Acceptance Tests may commence before remote operations capability (if any) is fully functional. . On satisfactory completion of the System Acceptance Tests, the tested items will be considered available for Integrated Testing & Commissioning.
- 9.4.5.2 The particular requirements for System Acceptance Tests are prescribed in the PS.
- 9.4.5.3 The Contractor shall submit to the Employer's Representative a comprehensive System Acceptance Tests Plan including all requirements detailed in the PS. The plan shall be submitted on a section by section basis to demonstrate how the System Acceptance Tests are to be carried out. The plan shall adopt a top down approach and describe the system completion strategy and process.
- 9.4.5.4 System Acceptance Tests shall comprise comprehensive testing of the assembled installation to ensure that it operates in accordance with the requirements of the PS.
- 9.4.5.5 The tests shall include, but not be limited to, the following:
- (1) tests of all functional and performance requirements for the system;
 - (2) tests of behaviour under failure conditions, e.g. changeover to redundant hardware; initiation of re-configuration functions or reverse modes of operation; and recovery of the equipment and system from failure.
- 9.4.5.6 The System Acceptance Test Plan shall identify a comprehensive list of specifications, standards, method statements, procedures, pass / fail criteria, sample records, resources to be made available, drawings and records to be submitted to the Employer's Representative, and programme showing the dates for testing and for submission of each test procedure.
- 9.4.5.7 Test procedures shall be carefully planned to ensure that the work can be executed in the time available. If the available time is restricted, this planning shall include contingency plans to be implemented if testing proceeds slower than anticipated or if defects are discovered that necessitate rectification and subsequent repeat testing, etc.

9.4.5.8 Immediately following the successful acceptance testing of the system, the Contractor shall complete the appropriate commissioning records in the agreed format and submit a copy to the Employer's Representative.

9.4.5.9 The Contractor shall include a complete schedule of all System Acceptance Test records and their current status within the Monthly Progress Report.

9.4.6 Integration Testing & Commissioning

9.4.6.1 Integrated Testing & Commissioning are defined as the final tests to be undertaken before the commencement of Service Trial. The Integrated Testing & Commissioning are part of the Tests on Completion to be performed by the Contractor under the Contract in order to achieve Employer's Taking Over of the Works. The Integrated Testing & Commissioning shall demonstrate the full compatibility between all interfacing systems. On satisfactory completion of the Integrated Testing & Commissioning, the tested items will be considered available for Service Trial.

9.4.6.2 The particular requirements for Integrated Testing & Commissioning are prescribed in the PS.

9.4.6.3 The Contractor shall submit to the Employer's Representative a comprehensive Integrated Testing & Commissioning Plan as required by the PS. The plan shall be submitted on a logical section-by-section basis, using a "top-down" approach describing the testing and commissioning strategies and processes clearly showing how these serve to provide the full verification of the systems and equipment in context of the complete railway system.

9.4.6.4 The Contractor shall co-ordinate with the Employer and the Employer's Representative and with all interfacing parties to ensure that the proposed test programme and schedule truly demonstrate that the full specified performance requirements are achieved.

9.4.6.5 The tests shall include, but shall not be limited to the following:-

- (1) test of all functional and performance requirements for the system;
- (2) test to demonstrate compliance with all interface specifications; and
- (3) test of behaviour under failure conditions (e.g. changeover to redundant hardware, initiation of re-configuration functions or reversionary modes of operation, recovery of systems and equipment from failure, demonstrations of planned emergency procedures, etc.)

9.4.6.6 The Integrated Testing & Commissioning Plan shall identify a comprehensive list of specifications, standards, method statements, procedures, pass/fail criteria, sample records, resources to be made available, drawings and records to be submitted to the Employer's Representative, and a programme showing the dates for testing and for submission of each test procedure.

9.4.6.7 Test procedures shall be carefully planned to ensure that the work can be executed in the time available. If the available time is restricted, this planning shall include contingency plans to be implemented if testing proceeds slower than anticipated or if defects are discovered that necessitate rectification and subsequent repeat testing, etc.

9.4.6.8 Immediately following the successful Integrated Testing & Commissioning of the system or any constituent part, the Contractor shall complete the appropriate commissioning records in the agreed format and submit a signed copy to the Employer's Representative.

9.4.6.9 The Contractor shall include a complete schedule of all Integrated Testing & Commissioning records and their current status within the Monthly Progress Report.

9.4.7 Service Trial

- 9.4.7.1 Service Trial is defined as the final test of the fixed equipment, the rolling stock, and the operational procedures including the final elements of the Tests on Completion to demonstrate that the system in its entirety can operate satisfactorily. The Service Trial is performed by the Employer with attendance by the Contractor under the Contract in order to achieve Employer's Taking Over of the Works. During this phase, the system will be run to the published timetable but without fare-paying passengers. This phase also allows for Validation of the training procedures in a real time environment.
- 9.4.7.2 The Commissioning Team in conjunction with the Employer will develop the Service Trial Plan. Operations Department and will serve to organise and co-ordinate all on-Site activities.
- 9.4.7.3 The particular requirements for tests to be undertaken during the Service Trial are prescribed in the PS.
- 9.4.7.4 The Contractor shall provide special and general attendance to the Employer and the Employer's Representative during the Service Trial period as required by the PS.
- 9.4.7.5 The Contractor shall co-operate with the Employer and the Employer's Representative and with all interfacing parties to ensure that the proposed Service Trial programme and schedule truly demonstrates that the full, specified performance requirements and operating parameters are achieved.
- 9.4.7.6 The Contractor shall review and comment on the Employer's Representative's Service Trial Plan and shall identify specifications, standards, method statements, procedures, pass / fail criteria, to the Employer's Representative for inclusion in the Plan.
- 9.4.7.7 The Contractor shall not interfere with the Service Trial tests and Validations in any manner. Any need for remedial works required to be performed by the Contractor shall be co-ordinated with the Employer and the Employer's Representative in advance.
- 9.4.7.8 Immediately following the successful tests of the system or any constituent part during Service Trial the Contractor shall complete the appropriate commissioning records in the agreed format, submit 3 signed copies to the Employer's Representative and may then apply for the Taking over Certificate in accordance with the requirements of the GCC.
- 9.4.7.9 The Contractor shall include a complete schedule of all Service Trial records and their current status within the Monthly Progress Report.

9.5 Activity of the Employer and the Employer's Representative

- 9.5.1 The Employer and the Employer's Representative will establish a Commissioning Team and a Site Co-ordination Team at appropriate stages of the Project. These teams will comprise representatives of all interested parties including not more than two representatives of the Contractor, subject to review by the Employer and the Employer's Representative. In accordance with the Commissioning Plan, the Commissioning Team shall advise and plan to co-ordinate the activities of the Contractor to ensure the Employer and the Employer's requirements are met.
- 9.5.2 The Contractor shall participate in the activities of the Commissioning Team and Site Co-ordination Team in addition to its own testing and commissioning or as directed by the Employer or the Employer's Representative.

9.6 Records and Reports

- 9.6.1 The Contractor shall submit to the Employer's Representative for review not less than three months before commissioning activities commence his proposed format for the commissioning records. The records shall be appropriately sub-divided to make provision for the various parts of the Permanent Works covered by the Contract.
- 9.6.2 The format of the records shall cover all mechanical and electrical tests, provide positive identification by serial number for assemblies and sub-assemblies of the Permanent Works and show modifications to Employer's Drawings and diagrams or "as built" data to be certified by the Employer or the Employer's Representative in the course of installation, testing and setting to work of the Works.
- 9.6.3 The Contractor shall, during the execution of the Works, prepare such reports and records of design, manufacture, installation and testing as may be required in order that a licence may be issued or statutory requirements may be met or approval given. Such reports or records shall be adequate to enable each part of the Permanent Works to be commissioned and to meet the requirements of the licensing authority or any standing statutory regulations, and shall be reviewed by the Employer and the Employer's Representative.
- 9.6.4 The Contractor shall obtain reports of each inspection and/or test. Such reports shall show the results of all the inspections and/or tests carried out and shall certify that the work has been inspected and/or tested in accordance with the requirements of the Contract and that the work complies with the requirements of the Contract.
- 9.6.5 Any analysis of the results required to confirm that the work complies with the requirements of the Contract shall be compiled and reported to the Employer's Representative in accordance with Chapter 4.
- 9.6.6 A representative of the Contractor who has been allocated the required authority under the relevant quality plans shall sign each report of inspection and/or test.
- 9.6.6.1 Each report of inspection and/or test shall include the appropriate details of:-
- (1) the description of the item or goods subjected to the test or inspection;
 - (2) if applicable, the batch from which the samples were taken for test, the size and description of samples and the method of sampling;
 - (3) the place of testing;
 - (4) the date and time of tests;
 - (5) the environmental conditions;
 - (6) the technical personnel supervising or carrying out the test or inspection;
 - (7) the properties tested or inspected;
 - (8) the method of testing or inspection;
 - (9) all relevant checklists and work sheets used during the inspection and/or test, including the readings and measurements taken during the tests; and
 - (10) the test results, including any calculations and graphs.
- 9.6.7 After Commissioning of a part of the Works, the Contractor shall complete each commissioning record in the agreed format and shall forward copies of the record to the Employer's Representative for review.
- 9.6.8 The Contractor shall submit within its Monthly Progress Report a complete schedule of his commissioning records showing completion dates, target completion dates and status.

9.6.9 Timing for Reports of Inspection and/or Test

The Contractor shall ensure that a signed copy of each report of inspection and test is filed in his filing system within 3 (three) working days of the date of inspection and test.

9.6.10 Quality Control Register

The Contractor shall provide and maintain at all stages of the work a quality control register or registers to identify the status of inspections, sampling and testing of the work and all certificates in accordance with Quality Control Register in Chapter 5.

9.6.11 Summaries of Inspection and/or Test

The Contractor shall submit to the Employer's Representative for his information summaries based on each quality control register showing the type and amount of certification received and the inspection and/or testing undertaken on each element of the Works. Such summaries shall reach the Employer's Representative's office before the 7th working day of the month. The summaries shall identify and demonstrate the compliance of such certification, inspection and/or testing with the requirements of the Contract and shall identify any item which does not conform to the requirements of the Contract.

9.7 Test Equipment and Facilities

9.7.1 The Contractor shall provide all equipment and services required for testing.

9.7.2 All test instruments shall be subject to routine inspection, testing and calibration by the Contractor.

9.7.3 Details of all test instruments shall be submitted for review by the Employer's Representative and, if required by the Employer or the Employer's Representative, shall be calibrated at the expense of the Contractor by an independent standards laboratory.

9.7.4 All test equipment must be capable of operating from the mains supply (230V AC 50Hz).

9.7.5 Not Used.

9.7.6 The Contractor shall ensure that all inspection and test equipment is calibrated in accordance with the specified standards or, if such standards are not applicable to certain test and inspection equipment, with systems and programmes of calibration which have been reviewed without objection by the Employer's Representative.

9.7.7 The Contractor shall ensure that documented evidence of instrument calibration is maintained and made available to the Employer or the Employer's Representative on request.

9.8 Witnessing by the Employer and the Employer's Representative

9.8.1 Notice for Trial, Inspection and/or Test to the Employer's Representative

9.8.1.1 In relation to all Quality Control Points and Quality Hold Points involving inspection and/or testing by the Contractor, the Contractor shall give the Employer's Representative notice of when the relevant work will be inspected and/or tested using the form in Appendix 6 of this Specification. The period of notice shall be as stated in the PS or such period as in the opinion of the Employer's Representative is reasonable and notified to the Contractor. In the absence of any such statement or notice, a reasonable period of notice shall be given by the Contractor provided that:

- (1) in the case of on-Site work, such notice shall be given not less than 72 hours of normal working time before the work is to be inspected and/or tested;

- (2) in the case of work carried out off-Site in Jaipur, such notice shall be given not less than 5 days before the work is to be inspected and/or tested; and
- (3) in the case of work carried out outside Jaipur, such notice shall be given not less than 14 working days before the work is to be inspected and/or tested.

9.8.1.2 In relation to all inspection and/or testing notified by the Contractor, the Employer and the Employer's Representative may elect to witness such inspections and/or tests but the Contractor may proceed with the inspections and/or tests notwithstanding the absence of the Employer or the Employer's Representative or of any response to the said notice.

9.8.1.3 If the Contractor is in any doubt whether inspection and/or testing by the Employer's Representative is required as a Quality Hold Point, the Contractor shall request that the Employer's Representative clarifies his requirements prior to submitting the relevant inspection and testing plan for review, and in any event not later than 30 days.

9.8.2 Timing for Inspection and/or Test by the Employer and the Employer's Representative

9.8.2.1 The Contractor shall allow the Employer and the Employer's Representative a reasonable time to carry out any inspection and/or testing and to assess the result of any inspection and/or test before proceeding with the Works.

9.8.2.2 Unless the Employer's Representative's prior review without objection has been obtained, all inspections and/or tests to be carried out or witnessed by the Employer and the Employer's Representative shall be carried out between 0800 and 1800 hours.

9.8.3 Failure to Notify the Employer's Representative

The Employer or the Employer's Representative may reject the test and test results in question, and require the test to be repeated in the event of any failure by the Contractor to notify the Employer's Representative in accordance with clause 9.8.1.1 above.

9.9 Failures

9.9.1 The Contractor shall correct all faults found during testing, and shall arrange for the relevant tests to be repeated. The relevant tests shall only be repeated when the fault has been remedied and the equipment demonstrated to function correctly.

9.9.2 Where remedial measures involve significant modifications that might, in the Employer's Representative's opinion, affect the validity of earlier tests, the Contractor shall repeat the earlier tests and obtain results satisfactory to the Employer and the Employer's Representative before repeating the test in which the fault was first identified.

9.9.3 The Employer or the Employer's Representative shall have the right to order the repeat or abandonment of any test in the event that results demonstrate that the equipment is significantly non-compliant with the Contract.

9.9.4 The Employer or the Employer's Representative shall have the right to suspend any test in the event that errors or failures have become unacceptable. The Employer or the Employer's Representative shall also have the right to suspend any test if a fault was detected by the Contractor but not reported to the Employer's Representative within 24 hours of the detection. In this event, the suspension shall remain in effect until reporting has been brought up to date to the satisfaction of the Employer and the Employer's Representative.

9.10 Repeat Tests

9.10.1 The Contractor shall correct and re-test every fault detected during the tests.

- 9.10.2 If the test results in a failure of the item under test the provisions of GCC clause 7.5 shall apply.

9.11 Fault Categories

- 9.11.1 The Employer's Representative will allocate a category to each fault, which shall determine the future conduct of tests.

9.12 Fault Log

- 9.12.1 The Contractor shall maintain a fault log throughout each series of tests. Every fault detected during the tests will be entered in the log, together with the actions taken to clear and re-test the fault.
- 9.12.2 The fault log will be retained as part of the permanent quality assurance record for the system and be subject to regular inspection by the Employer's Representative.

9.13 Hardware Failure Reports

- 9.13.1 For each hardware failure that occurs at any stage of testing, the Contractor shall investigate the failure and prepare a report on its cause(s) and design implications, if any, resulting from such failure.
- 9.13.2 All such reports will be retained as part of the permanent quality assurance record for the system, which shall be subject to inspection by the Employer's Representative.

9.14 Software Failure Reports

- 9.14.1 For each software failure that occurs, once the software has been reviewed without objection for inclusion into the system and is subject to configuration control, the Contractor shall generate a software failure report.
- 9.14.2 All such reports will be retained as part of the permanent quality assurance record for the system, which shall be subject to inspection by the Employer's Representative.
- 9.14.3 The report shall clearly show:
- (1) the observed symptoms;
 - (2) the likely cause;
 - (3) the fault category (from Table 9.1); and
 - (4) the operator input.

9.14.4 The report shall also clearly show the following information which shall be entered when the failure has been investigated:

- (1) the actual cause of the failure;
- (2) the corrective action taken; and
- (3) all software modules affected.

CHAPTER 10

10. TRAINING

10.1 Training Requirements

- 10.1.1 The Contractor shall provide comprehensive training to the Employer's staff, IF PROVISION OF TRAINING IS IN THE SCOPE OF CONTRACTOR, to enable all of the systems and equipment supplied, installed or modified as part of the Works to be operated and maintained in the designed manner safely and efficiently so as to achieve the maximum reliability and economy, and to meet the requirements of the Employer's programme.
- 10.1.2 To achieve the objective, it will be necessary to train the Employer's staff, including Employer's Training Instructors (ETI). The Contractor shall submit to the Employer's Representative for review and critique the range of staff for which training is recommended and a Training Plan to be proposed by the Employer and as stated in PS in accordance with clause 3.7.4 above.
- 10.1.3 The recommendation shall include details of training equipment necessary and appropriate to achieve the training objectives.
- 10.1.4 The Training Plan shall provide a structured training programme to educate and train the personnel of the Employer in all aspects of the system operation and maintenance and shall include, but not be limited to, the following:
- (1) schedule of training courses;
 - (2) objective, syllabus, format, class size and duration of each training course;
 - (3) training facilities to be provided by the Employer;
 - (4) list of training materials and documentation to be included with the training course;
 - (5) method of pre- and post- testing to be utilised;
 - (6) qualifications and experience level necessary for the trainees;
 - (7) instructor's qualifications; and
 - (8) course evaluation methods.
- 10.1.5 Courses offered shall be suitable for operations and maintenance staff classified below as distinct from engineering design staff:
- (1) first line and second line maintenance staff undertaking recovery/corrective and routine/preventive maintenance;
 - (2) third line (high skill level) maintenance staff specialised in workshop repair and overhaul of equipment; and
 - (3) technical support staff specialising in fault analysis and investigation techniques associated with the particular type of equipment.
- 10.1.6 Training shall, as a minimum, impart the following techniques to the Employer's staff of the appropriate grades:
- (1) all planned maintenance and overhaul of the systems and equipment supplied, installed or modified under the Contract;
 - (2) fault finding and rectification techniques for the systems and equipment supplied, installed or modified under the Contract. These shall be developed from the Contractor's previous experience with similar equipment and also from the fault tree analysis and other analyses carried out as part of the reliability engineering studies undertaken by the Contractor;

- (3) normal and degraded modes of operation of the systems and equipment supplied, installed or modified under the Contract;
- (4) all rules, regulations, practices and procedures necessary for the safe and efficient operation of the systems and equipment supplied, installed or modified under the Contract; and
- (5) all contingency plans necessary to recover speedily and safely from any mishaps or emergencies that may arise with the systems and equipment supplied, installed or modified under the Contract.

10.1.7 Training shall be carried out in the medium of the English language and supplemented, if necessary, in the Hindi language.

10.2 Training Method

10.2.1 Training shall consist of classroom (theory) training, computer based interactive multi-media training (CBT), simulator training (if applicable), and practical (hands on) training.

10.2.2 The training shall take place in Delhi, unless there are prohibitive reason(s), and shall be related to Permanent Works that are to be or are being installed on the Project.

10.2.3 The training in Jaipur shall be supplemented, where appropriate, by training at the Contractor's own premises and the premises of the major sub-contractors during the manufacturing and factory testing phases of the Works. Maximum use shall be made of the opportunities presented during equipment testing phases of the Contract to demonstrate and practise fault finding and diagnostic techniques.

10.2.4 To meet this need, the Contractor shall supply competent trainers/instructors to carry out training to a high degree of proficiency in areas where the Contractor has the specialised knowledge.

10.2.5 In order to ensure that satisfactory standards are met, the Employer's relevant Operations/Maintenance Department in liaison with the Training Department will monitor all training.

10.2.6 During the Defects Liability Period, when the Contractor is responsible for faultfinding and repair, he shall provide practical hands on training to the Employer's maintenance staff to facilitate the successful handover of this function.

10.2.7 Where applicable, the Employer will pay all of his staff's salaries, travelling, subsistence and other related allowances.

10.3 Employer's Instructor Training

10.3.1 The Contractor shall provide training courses and training materials to train the Employer's Training Instructors (ETI) to a level of competence to allow the ETIs to subsequently train the Employer's staff in all aspects of operation and maintenance of the systems and equipment supplied, installed or modified as part of the Works.

10.3.2 For Maintenance Instructors, this shall include specific training in the use of maintenance documentation, all faultfinding guides and any special gauges, instrumentation or test equipment required in any maintenance or fault finding and analysis.

10.3.3 For Operations Instructors, this shall include training in the operation of the equipment and the various systems/sub systems under both normal and fault conditions.

10.4 Training Plant & Equipment

- 10.4.1 With the prior review of the Employer's Representative, the Contractor may use the Permanent Works being erected, tested or commissioned for the training of the Employer's staff. In general, the Contractor shall not use Contract Spare parts for this purpose.
- 10.4.2 Training course notes shall be entirely compatible, and, where appropriate, cross-referenced to the manuals supplied by the Contractor as part of the Operation and Maintenance documentation.
- 10.4.3 The Contractor shall provide such written or printed matter, functional equipment, samples, models, cutaway equipment, slides, films and other instructional materials as may be necessary for training. Such equipment and material shall remain the property of the Employer and shall be sufficient both for the persons trained by the Contractor and for those to be subsequently trained by the ETI.
- 10.4.4 The Contractor shall provide an instructor's guide for each training course. The guide shall include the course agenda, objectives, list of resources and facilities required, detailed lesson plans, presentation notes, discussion guides, training aids and job aids, test papers, criteria and methodology for testing and assessment, and all other things that will enable the ETI to carry out repeat or refresher courses in the future.
- 10.4.5 All training course notes and instructor's guides shall be submitted to the Employer's Representative for review 3 weeks prior to the commencement of the first training session of the course.
- 10.4.6 All training course notes and instructor's guides shall be in a form that allows for easy reproduction.
- 10.4.7 All training course notes and instructor's guides shall be in a standard format as set out by the Employer.

10.5 Testing and Assessment

- 10.5.1 The Contractor shall, at the conclusion of each training course, issue questionnaires to, and/or set practical tests for all trainees directed at determining the level of satisfaction with the course content and to assess the level of knowledge and understanding of the course content by each trainee.
- 10.5.2 The Contractor shall review the responses to questionnaires and the trainees' test results and forward a summary to the Employer's Representative.
- 10.5.3 If the Employer's Representative considers that the course has not achieved the required objectives, he will advise the Contractor who shall then organise and implement appropriate re-training.

10.6 Training Records

- 10.6.1 The Contractor shall, at the completion of each training course:
- (1) provide the Employer's Representative with a consolidated training record listing the training course title, date of training, name of all trainees, training result and other relevant information; and
 - (2) issue an appropriate certificate to each trainee who has successfully completed the course.

10.7 NOT USED

CHAPTER 11

11. OPERATION AND MAINTENANCE DOCUMENTATION

11.1 General

- 11.1.1 The Contractor shall supply Operation and Maintenance documentation in respect of the systems and equipment supplied or installed or modified under the Contract in accordance with the requirements of the following clauses, except where expressly specified otherwise in the Contract.
- 11.1.2 All Operation and Maintenance Manuals produced by the Contractor shall conform to the requirements of the Employer. The Contractor shall interface with the Employer for the requisite format.
- 11.1.3 The Contractor shall supply all documentation, including Operation and Maintenance Manuals and “as-built” drawings, necessary for operating, maintaining, repairing and modifying the systems and equipment supplied, installed or modified under the Contract.
- 11.1.4 Except where otherwise stated, the Contractor shall provide one electronic copy, 2 bound copies and one unbound copy of all documentation. The unbound copy will be used by the Employer for reproduction purposes. All documentation shall be in the English language.
- 11.1.5 The Operation and Maintenance Manuals shall be provided in the English language.
- 11.1.6 The Contractor shall fully co-ordinate and cross-reference interfaces and areas associated with interconnecting equipment and systems within the Contract. The Operation and Maintenance Manuals shall fully describe the overall operation of all systems incorporating all equipment.
- 11.1.7 The Operation and Maintenance Manuals shall contain no irrelevant or ambiguous information and shall relate specifically to this Contract.
- 11.1.8 The Contractor may use manufacturer’s data and handbooks for individual items of E&M equipment that are a sub-component of the overall system, including printed circuit boards, providing they meet the intent of the Specification, and are integrated by the Contractor into the description of his equipment, and are indexed accordingly in his own general index. All such documentation shall be contained in similar binders.
- 11.1.9 Where a sub-assembly item is of such a nature that local repairs in Jaipur/India cannot be made and it is necessary to be returned to the manufacturer as a unit for overhaul, the specific information concerning its repair and breakdown into component parts shall be provided.
- 11.1.10 The document shall be collated and numbered in proper order and correspond to the contents and index tables. Nomenclature or references to any items of equipment, diagrams, figure numbers or units shall be consistent throughout the text. In order to comprehend the text, diagrams, drawings, sketches and actual photographs shall be added where necessary. All manufacturers’ literature identification codes or stamp markings shall be omitted. Precautions and warnings regarding the safety of life and equipment shall be included where applicable.

11.2 Arrangement and Format of Manuals

- 11.2.1 The Contractor shall arrange all documentation in accordance with the Employer requirements.
- 11.2.2 The Contractor shall provide documentation for all hardware and software for computer systems and other associated electronic equipment to meet the following requirements. Such documents shall include but not be limited to:
- (1) manufacturers' documentation supplied as standard with the equipment;
 - (2) hardware configuration with details of expansion capabilities and options;
 - (3) programme loading instructions, including runtime environment configuration;
 - (4) programme listing including comprehensive 'comment statements' in hard copy and soft format for source code, compilers and development tools necessary to modify and recompile software;
 - (5) flow charts, data flow diagrams and state diagrams as appropriate;
 - (6) description of software modules including purpose, linkage with other modules, error routines and any special considerations;
 - (7) memory maps for both internal and peripheral memory showing description of all programmes, data files, overlay areas, memory available for expansion and the like;
 - (8) loading and operating instructions for diagnostic programmes and specifically developed debugging tools; and
 - (9) programming manuals relevant to operating systems & languages,
- 11.2.3 Not Used.

11.3 Drawings

- 11.3.1 The Contractor shall submit such drawings as may be required for the operation and maintenance and repair of the Permanent Works by the Employer.
- 11.3.2 Information contained on the drawings shall include but not be limited to:
- (1) arrangement drawings for all sub-systems and individual items of equipment;
 - (2) installation and fixing drawings for all sub-systems and individual items of equipment;
 - (3) interface drawings for all sub-systems and individual items of equipment;
 - (4) schematic drawings for all electrical, pneumatic, hydraulic, water and drainage systems;
 - (5) sizes, material and finish of all fixtures and threads;
 - (6) manufacturer's code, drawing and reference numbers;
 - (7) wiring diagrams including internal wiring of sealed unit items;
 - (8) setting dimensions and tolerances; and
 - (9) bill of materials.
- 11.3.3 Where instructed by the Employer's Representative, drawings shall be supplied with Hindi language notation in addition to English. The Employer's Representative will supply such Hindi notation to the Contractor.

11.4 Submissions

- 11.4.1 The Contractor shall deliver all documentation to the Employer's Representative by the date stated in the PS, or, if none is given, not later than two (2) months prior to the issue of the Taking Over Certificate for the Works (for the final draft version), and one (1) month prior to the issue of the Taking Over Certificate for the Works (for the final version). The delivery shall include a copy of the software and licence to operate the software to modify the manuals together with one set of

CADD drawing files. The final manuals shall incorporate comments made by the Employer's Representative on the draft manual.

11.4.2 Drawings shall be submitted to the Employer's Representative as stated in the PS. The submission shall be in accordance with stage commissioning requirements specified in the Works Programme and shall include Compact Disc (CD) for each drawing.

11.4.3 Following the Employer's Representative's review, the Contractor shall make a final submission of the complete Operation and Maintenance Manuals and as-built drawings in a form and in a quantity specified in the PS. The final submission shall be made not later than the date set by the Employer's Representative. The Contractor shall make such amendments to his submissions as may prove necessary during commissioning of the Permanent Works and the Defects Liability Period. Amendments found necessary during commissioning shall be completed within two months after the issue of the Taking Over Certificate for the Works. Subsequent amendments shall be completed two months prior to the issue of the Defects Liability Certificate.

11.5 Operation and Maintenance Manuals

The Employer shall have the right to reproduce any part or the whole of any Operation and Maintenance Manual as he wishes for his O and M requirements.

CHAPTER 12

12. SUPERVISION AND PLANNING OF MAINTENANCE

12.1 Scope

12.1.1 The Contractor shall be responsible for the supervision of maintenance of the equipment supplied under the Contract after the Employer's Taking Over of the Works or Part of the Works. The maintenance personnel shall be provided by the Employer.

12.1.2 The responsibility for the provision of supervision of maintenance shall be based on the number of man-months identified during the Tender period and incorporated into the Contract. The actual utilisation of these man-months shall be at the Employer's discretion and may be at any time up to within TWELVE months after the Employer's Taking Over of the whole of the Works or the last part of the Works.

12.1.3 The scope of maintenance activities shall include all scheduled and unscheduled maintenance required including all routine inspections and service overhauls at trackside, on trains and in workshops. Maintenance work shall include faultfinding following report of incidents and repair of items of equipment changed out in the course of fault rectification but excluding any Contractor's liability for work to be carried out under the requirements of the Defects Liability Period.

12.2 Maintenance Planning & Management Staff

12.2.1 The Contractor shall undertake the necessary tasks in planning the maintenance activities, in consultant with JMRC's O&M department to ensure that the reliability of the operating railway is upheld including but not limited to:

- (i) Provide recommendations in respect of philosophy and procedures for repairs of electronic systems, and the scale of facilities required to be set up in the Depot and Workshops for this purpose.
- (ii) Preparation of detailed operational plan for the routine servicing of any equipment which requires such service. The plan shall ensure that all items in use receive maintenance within the required time cycle by suitably trained and qualified staff and under the personal safety regime appropriate to the location of the equipment being maintained.
- (iii) Preparation of a detailed staffing for each and every different inspection, overhaul and repair activity. The plan shall also identify and quantify resources required by staff and groups of staff in terms of tools, tackle, protective clothing, etc...
- (iv) Preparation of a detailed quality plan, covering all maintenance activities.
- (v) Efficient supervision of the maintenance, overhaul and repair activities of maintenance staff to ensure high quality work and productivity. This shall also include planning and supervision of ongoing training and re-training as required in the correct procedures using the training materials and courses supplied under the Contract. Where the supplied training courses are insufficient the Contractor shall develop additional training courses, manuals and materials to make good the deficiency as part of his Defects Liability responsibilities.

12.3 Supervisory Staff

12.3.1 The Contractor shall provide supervisory maintenance staff who are experts in the first and third line faultfinding, maintenance and repair of the various systems supplied under the Contract

- 12.3.2 The experts provided for supervision of maintenance shall have adequate qualifications and experience in the relevant discipline in the maintenance depots / workshops of existing metro type undertakings.
- 12.3.3 The deployment of the experts may not be continuous and they may be required to supervise the maintenance in short periods at the discretion of the Employer.
- 12.3.4 The experts shall be available in Jaipur at short notice to supervise the Employer's staff at any time during the Normal Operating hours and by arrangement to undertake extended investigations during Non-Revenue hours.

CHAPTER 13

13. SUPPLY OF SPARE PARTS

13.1 Details of supply

13.1.1 The Contractor shall supply to the Employer for the Permanent Works, in accordance with the provisions of this Chapter, as part of the Works:

- (a) spare parts including (but not limited) sub-assemblies and those to be supplied by its subcontractors of any tier ("Spare Parts");

13.1.2 The Spare Parts to be supplied by the Contractor shall consist of:

- (a) Contract Spares (as hereinafter defined);
- (b) Commissioning Spares (as hereinafter defined); and
- (c) Defects Liability Spares (as hereinafter defined).

13.1.3 The Contractor shall submit to the Employer's Representative for review, in the format of a contract spares schedule, in accordance with Chapter 4 above, a list of:

- (a) the Spare Parts to be supplied by the Contractor as part of the Works to suit stage, categorised into individual parts or sealed units; and

13.1.4 Not Used

13.1.5 The information supplied in respect of each spare part shall include, but not be limited to, the following:

- (i) manufacturer / brand name
- (ii) manufacturer's type/model number
- (iii) rating
- (iv) serial number if applicable
- (v) total number of the main assembly/ equipment supplied under the Contract
- (vi) lead time
- (vii) source of supply
- (viii) self-life

13.1.6 Not used

13.1.6.1 primary data

parts catalogue number drawing no.

13.1.6.2 secondary data

- (i) lead times stating whether for ex-stock or for product manufactured upon receipt of order.
- (ii) delivery schedule(s).
- (iii) supplementary information:

- a) special handling instruction, e.g. for fragile materials, hazardous substances, radioactive materials, etc.
- b) storage requirement, e.g. overall dimensions including special packing (if any) for bulky materials, materials with limited shelf life, etc.
- c) statutory requirements, e.g. licences, test certificates, etc.
- d) the source of the Spare Part or Special Tool and Test Equipment, including the manufacturer's name and address together with that of his Jaipur agent

13.2 Manufacture and delivery of Spare Parts

Supplementary sheets to be used for detailed information that is important to the Employer's future procurement.

- 13.2.1 The Spare Parts to be supplied under the Contract shall be manufactured at the same time as the Permanent Works. All Spare Parts shall be manufactured, works tested and inspected in accordance with the relevant quality system, suitably packed and labelled in accordance with Chapter 8 above, and delivered to the Employer by the Contractor. Before the Spare Parts are delivered to the Employer, the Contractor shall submit to the Employer's Representative a shipment advice notifying details such as date of despatch, date of arrival, vessel name, etc. as well as a packing list to indicate the contract number, variation order number, the lot size, quantity and weight. The Spare Parts shall be consigned to the Employer and delivered in accordance with The Employer's Representative's instructions to a programme which shall ensure that sufficient Spare Parts are delivered to facilitate normal routine maintenance of the Permanent Works by the Employer at all stages of completion. The Spare Parts shall be supplied in total not later than the date set out for stage commissioning of the system.
- 13.2.2 Spare Parts shall be fully interchangeable with their corresponding part. All Spare Parts shall be configured to the latest revision during the Defects Liability Period. For Spare Parts such as electronic components, lamps, fuses and other consumable and high-use items, the Contractor shall ensure that a minimum of two alternative sources of supply are available.
- 13.2.3 An adequate supply of Spare Parts shall be available throughout the design life of the Works, from the date of the Employer's Taking Over of the Works. The Contractor undertakes to notify the Employer at least 6 months prior to deleting any item used in the Works from general availability.
- 13.2.4 For any Spare Parts that the Contractor is unable to supply throughout the design life of the Works, or where the Contractor ceases availability support of that item before the end of such design life or if the Contractor ceases trading, the Contractor undertakes to transfer the relevant intellectual property rights, design rights and technology to the Employer and the Employer shall have the full right to manufacturing drawings, schedules, software and any other information needed to manufacture the relevant item. Such rights shall give the Employer complete freedom to manufacture the item in Jaipur or anywhere else world-wide. The Contractor shall also undertake to notify the Employer two years in advance of the intended cessation of spares availability of any item.
- 13.2.5 If any Spare Part is rendered obsolete by a design change or material change during the design life of the Works supplied under the Contract, the Contractor shall design a replacement item to match the identical mechanical and electrical interfaces as the former item.
- 13.2.6 If, as a result of changes in technology, any Spare Part is not completely interchangeable with the original item, or the performance of any Spare Part is different from the original item, then the Contractor shall purchase the same from the Employer, at a price agreed between the parties, such quantities of the obsolete Spare Part as the Employer may possess.

13.3 Contract Spares

- 13.3.1 The quantity of Spare Parts for particular items to be supplied by the contractor to the Employer shall be as detailed in the PS.
- 13.3.2 Notwithstanding the quantities defined in the PS the quantity of Spare Parts shall be enough for the full operation of the Permanent Works for the first one year following the expiry of the Defects Liability Period for the works ("Contract Spares").
- 13.3.3 The Contractor shall supply and deliver the Contract Spares on minimum one month before ROD or just after completion of the Systems Acceptance Test, as required by employer.
- 13.3.4 The Contractor shall submit the contract spares schedules for the Contract Spares in hard copies (including the illustrated parts catalogues) as well as soft copies to the Employer's Representative for review.
- 13.3.5 Not Used
- 13.3.6 All spares quantities shall be rounded up to the nearest deliverable unit e.g. cable shall be delivered in complete drums, liquids in complete sealed containers, small parts in complete packs.

13.4 Commissioning Spares

- 13.4.1 In addition to the Contract Spares, the Contractor shall keep on the Site throughout the installation, erection and commissioning periods, sufficient stocks of Spare Parts to enable immediate replacement of any item in the Permanent Works found to be defective or in any way in non-conformance with the Specification during the installation, erection and commissioning period ("Commissioning Spares").
- 13.4.2 The Contractor shall supply and deliver the Commissioning Spares on or before the commencement of any Partial Acceptance Tests (PAT) or as defined in the PS.
- 13.4.3 The Contractor shall submit to the Employer's Representative for review a list of all Commissioning Spares that shall be made available during the installation, erection and commissioning period.
- 13.4.4 The Contractor shall be entitled to use any of the Contract Spares to replace any item in the Permanent Works during the installation, erection and commissioning periods. However replacement of Contract Spares needs to be done before the completion of the System Acceptance Test.

13.5 Defects Liability Spares

- 13.5.1 The Contractor shall keep sufficient stocks of Spare Parts in an off-site location in Jaipur throughout the Defects Liability Periods to enable rapid replacement of any item in the Permanent Works found to require replacement as part of the Contractor's obligations during the Defects Liability Periods ("Defects Liability Spares").
- 13.5.2 The Contractor shall have the Defects Liability Spares on the commencement of the Service Trial or within 15 days after completion of Integrated Testing.
- 13.5.3 The Contractor shall submit to the Employer's Representative for review a list of all Defects Liability Spares that shall be maintained by the Contractor during the Defects Liability Periods.

13.5.4 The Contractor shall be entitled to use the Contract Spares to replace any item in the Permanent Works during the Defects Liability Periods. However replacement of Contract Spares needs to be done within one month of use.

13.6 Not used

13.7 Annual Maintenance Contract (AMC) Spares (if applicable as per contract)

13.7.1 The Contractor shall keep sufficient stocks of Spare Parts in an off-site location in Jaipur throughout the AMC Periods to enable rapid replacement of any item in the Permanent Works found to require replacement as part of the Contractor's obligations during the AMC Periods ('AMC Spares").

13.7.2 The Contractor shall supply and deliver the AMC Spares at least 3 months before the commencement of the AMC period.

13.7.3 The Contractor shall submit to the Employer's Representative for review a list of all AMC Spares that shall be maintained by the Contractor during the AMC Periods.

13.7.4 The Contractor shall not be entitled to use any of the Employer's Spares to replace any item in the Permanent Works during the AMC Periods.

CHAPTER 14

14. THE WORKS AND CARE OF THE WORKS

14.1 Methods of Construction

- 14.1.1 The Contractor shall, as stated in the PS and in any case not less than 4 weeks before starting the construction of the Works on Site, submit to the Employer's Representative the Construction and Installation Plan as specified in Chapter 3 above.

14.2 Temporary Works

Upon receiving a written application from the Contractor, the Employer's Representative may at his absolute discretion consent to certain Temporary Works of a minor nature being exempted from the requirements of this Chapter. Such exemption shall not relieve the Contractor of any of his obligations under the Contract.

14.3 Normal Working Hours

- 14.3.1 Normal working hours shall be defined as the period between 0700 hours and 1900 hours on all days excluding General Holidays. Work outside normal working hours shall not be carried out unless reviewed without objection by the Employer's Representative and unless the Contractor has obtained any necessary permission or approval from Relevant Authorities.
- 14.3.2 The Contractor shall inform the Employer's Representative 24 hours, or such shorter period reviewed without objection by the Employer's Representative, in advance of any occasion when work outside normal working hours is proposed.
- 14.3.3 Work in the vicinity of existing Indian Railway tracks shall only be possible in non-traffic hours. Non-traffic hours are from the time of passage of the last train at the close of traffic, to the commencement time of running of the next first train.

14.4 Drawings and Schedules

Detailed manufacturing drawings for the Permanent Works will not normally be required to be submitted to the Employer's Representative for review but shall be available on the Contractor's or his sub-contractor's premises if required. The Contractor shall also maintain at the Site a comprehensive and up-to-date set of drawings properly indexed and catalogued, which shall include complete sets of detailed working and, where applicable, manufacturing drawings and shall permit free access to such drawings by the Employer's Representative at any reasonable time.

14.5 Notification and Inspection of Works

- 14.5.1 The Works will be the subject of a formalised system of written applications for inspection.
- 14.5.2 Work that is carried out without being appropriately sanctioned by the Employer's Representative could be classified as defective work.

14.6 Construction Restraints

- 14.6.1 The Contractor shall design and implement Temporary Traffic Management (TTM) (if applicable) in accordance with the provisions of the Enactments.

14.6.2 The Contractor shall ensure that the design, construction and performance of all Temporary Works and the design and construction of all Permanent Works shall be such that any ground movements in and around the Site will not result in settlement and/or subsidence of the ground that will cause damage to any buildings, structures, rail, roads, footpaths, slopes or utilities.

14.6.3 The Contractor shall ensure that the method of installation of any part of the Permanent Works (prior to dewatering and excavation) minimises settlements in the adjacent ground or buildings. Dewatering of an excavation will not be permitted unless a closed perimeter of impermeable wall is complete.

14.6.4 The Contractor's design of dewatering methods shall as far as possible avoid lowering of the water table outside the excavations. The reduction in piezometric pressure shall in no case be greater than 2 metres in adjacent ground, unless the Contractor can clearly demonstrate that buildings, structures, roads, footpaths and utilities within the influence of the dewatering will not be damaged by the proposed dewatering. Pumping shall be confined within the boundaries of the excavation and the water level within the excavation shall not be lowered by more than two metres below the formation level.

14.7 Protection from Water

14.7.1 Unless otherwise reviewed by the Employer's Representative, all work shall be carried out, as near as may be practicable in the circumstances, in dry conditions, except where the work is required to be carried out in or with water or other fluids.

14.7.2 The Permanent Works, including materials for use in the Permanent Works, shall, where necessary and as near as may be practicable, be kept free of water and protected from damage due to water. Water on the Site and water entering the Site shall be disposed of by temporary drainage or pumping systems or by other methods capable of keeping the Works free of water and protected from damage due to water. Traps shall be provided by the Contractor to intercept silt and debris before water is discharged from the Site.

14.7.3 The discharge points of the temporary drainage and pumping systems shall be as those having been reviewed without objection by the Employer's Representative. The Contractor shall make all arrangements with and obtain the necessary approvals and inspections from the Relevant Authorities for discharging water to drains watercourses etc. The relevant work shall not start until the arrangements for disposal of the water previously reviewed without objection by the Employer's Representative have been implemented.

14.7.4 Measures shall be taken to prevent flotation of new and existing structures.

14.8 Protection from Weather

14.8.1 Work shall not be carried out in weather conditions that may adversely affect the work unless protection by methods reviewed without objection by the Employer's Representative is provided.

14.8.2 The Permanent Works, including materials for the Permanent Works, shall be protected by methods reviewed without objection by the Employer's Representative from exposure to weather conditions which may adversely affect the Permanent Works.

14.9 Protection of Work

Finished work shall be protected by methods reviewed without objection by the Employer's Representative from damage that could arise from the execution of adjacent work. Work shall be carried out in such a manner that work carried out by others, including Government departments, utility undertakings, Relevant Authorities and Project Contractors, is not damaged.

CHAPTER 15

15. SITE ESTABLISHMENT AND ATTENDANCE

15.1 Use of the Site

- 15.1.1 The Site shall not be used by the Contractor for any purpose other than for executing the Works or carrying out other work which is associated with the Works and having been reviewed without objection by the Employer's Representative.
- 15.1.2 Entry to and exit from the Site shall be obtained only at the locations stated in the Contract or other locations having been reviewed without objection by the Employer's Representative.
- 15.1.3 All materials and equipment stored on Site shall be adequately protected against loss or damage due to any cause such as climatic effects, vandalism, shock and vibration, etc. according to the nature of the articles stored and the local Site condition.
- 15.1.4 The particular use to which the Site is put shall be submitted to the Employer's Representative for review with the following particulars:
Drawings showing the layout within the Site of the Contractor's accommodation, access roads and major facilities required early in the Contract;

15.2 Survey of the Site

15.3 Fences and Signs on the Site

- 15.3.1 Hoardings, fences, gates and signs on and at the Site shall be maintained in a clean, stable and secure condition.

15.4 The Contractor's Site Accommodation

- 15.4.1 The Contractor's offices, sheds, stores, mess rooms, latrines and other accommodation on the Site shall be maintained in a clean, stable and secure condition. Living accommodation shall not be provided on the Site. The Contractor's personnel shall not be allowed to live on the Site. It will be the contractor's responsibility to ensure safety of the equipments and the office. For this proper arrangement of fencing and guards shall be done by the Contractor
- 15.4.2 The Contractor shall provide and maintain all necessary offices, sheds / stores, mess rooms, latrines and other accommodation and remove the same from the Site on the Employer's Taking Over of the Works. These shall be to the satisfaction of the Employer's Representative and shall be kept in a clean and sanitary condition. No structure shall be erected by the Contractor within the Site without the written consent of the Employer's Representative and such consent will not relieve the Contractor of the responsibility of siting temporary structures clear of the Works.
- 15.4.3 A copy of the plan showing the extent and position of all offices, stores, sheds, etc. shall be prepared by the Contractor and retained for inspection in the Site office.
- 15.4.4 Not Used
- 15.4.5 The Contractor shall not erect or operate canteen and kitchen facilities on the Site except with the consent of the Employer's Representative and, where appropriate,

the Relevant Authorities. Any such facilities shall, in particular but without limitation, conform to all regulations and standards to the extent required by the concerned city authorities of Jaipur.

15.5 Site Utilities and Access

15.5.1 The Contractor shall make all arrangements for Temporary water, electricity, telephone, sewerage and drainage facilities etc for his site office / storage space.

15.5.2 Access roads and parking areas shall be provided by the Contractor within the Site as required and shall be maintained in a clean, passable and stable condition.

15.6 Not Used.

15.7 Clearance of the Site

Temporary Works, which are not to remain on the Site after the Employer's Taking Over of the Works, shall be removed on the Employer's Taking Over of the Works or at such other time(s) as instructed by the Employer's Representative. The Site shall be cleared and reinstated to the lines and levels and to the same condition as existed before the Works started except as otherwise stated in the Contract.

15.8 Attendance

15.8.1 Not Used

15.8.2 Attendance on the Employer or the Employer's Representative

The Contractor shall provide all necessary assistance to the Employer or the Employer's Representative, including adequate and safe means of access to all parts of the Site to assist him in carrying out his duties and responsibilities under the Contract. Such assistance shall not include the provision of full-time attendance upon the Employer or the Employer's Representative

15.8.3 Attendance on the Commissioner of Rail Safety or other inspecting authorities

15.8.3.1 The Contractor shall afford all necessary attendance upon the Commissioner of Rail Safety or other inspecting authorities Inspectorate during their inspections including adequate and safe means of access to appropriate parts of the Site.

15.8.3.2 The Contractor shall provide all documents, drawings, manpower etc. necessary for inspection as are requested by the above authorities.

15.8.4 Attendance on the Fire Services Department

The Contractor shall afford all necessary attendance upon the Fire Services Department to enable them to carry out such tests and inspections as are required by the Jaipur fire service of Practice for Inspection and Testing of Installations and Equipment and the requirements of any Other Contractors. Such attendance shall include adequate and safe means of access to all parts of the Site.

15.8.5 Attendance on Other Contractors

15.8.5.1 The Contractor shall provide general and special attendance on Other Contractors who will be carrying out the execution of electrical and mechanical and other

works on the Site. Reference shall be made to the PS to determine the full extent of such attendance.

15.8.5.2 General attendance shall include but not be limited to providing for accepting deliveries, unloading and storing materials for the Other Contractors on the Site and allowing the Other Contractors space for their site offices, and all reasonable access and facilities for the proper execution of their work including the free use of access roads, craneage, scaffolding, ladders, stores, messrooms, sanitary and welfare facilities provided that these facilities are normally available on the Site at the time.

15.8.5.3 The Contractor shall allow the use of his Site services including ventilation, temporary water supply, temporary electricity supply, background lighting, pumping, watchmen, etc. by the Other Contractors. The Contractor shall ensure that his Site services referred to above shall be available for use by the Other Contractors until the commissioning of the relevant permanent installations or until the issue of the Taking Over Certificate for the Works, whichever is the later.

15.8.5.4 Special attendance shall include but not be limited to cutting of holes and other openings, forming chases, providing built-in sleeves, grouting in bolts, anchors, brackets, base plates, frames and the like, including making good to the disturbed work and cleaning after completion of the disturbed work.

15.8.6 Attendance by Other Contractors

15.8.6.1 Where provided for under the Contract, the Contractor shall receive attendance from Other Contractors. The Contractor shall ensure that by receiving such attendance, it does not hinder, obstruct or otherwise frustrate the Other Contractor that is providing the attendance in any way.

15.9 Contractor's Equipment

The Employer's Representative reserves the right to order the immediate removal and replacement of any Contractor's Equipment that, in his opinion, is unsatisfactory for its purpose.

15.10 Security

15.10.1 The Contractor shall be responsible for the security of the works area for Contractor's accommodation and shall provide and maintain fencing.

15.10.2 The Contractor shall provide adequate training to its security staff to ensure that they are able to discharge their security duties properly.

15.10.3 The Contractor shall establish and maintain contingency plans to cope with emergency situations such as fire, flooding, serious damage to the Works, etc.

15.10.4 The Employer's security staff will conduct inspections and security audits on the Site and the works area for Contractor's accommodation from time to time. The Employer's Representative will give recommendations for improvement arising from the inspections and security audits to the Contractor. However, managing the security of the Site and the works area for Contractor's accommodation remain the Contractor's responsibility.

CHAPTER 16

16. LIAISON WITH OTHERS

16.1 Liaison with Others

- 16.1.1 The Contractor shall make all necessary arrangements with and obtain the necessary approvals from Government departments, utility undertakings and other duly constituted authorities for the execution of the Works.
- 16.1.2 The Contractor shall maintain close liaison with Other Contractors and other contractors employed by the Employer, utility undertakings or other authorities who are carrying out work on or adjacent to the Site. The Contractor shall ensure as far as possible that the progress of the Works is not adversely affected by the activities of such other entities.

16.2 Work by Other Contractors

- 16.2.1 The contractor shall keep note of the works which may be proceeding on various adjacent areas by others include, but is not limited to, those listed in the PS. The Employer's Representative will keep the Contractor informed of forthcoming work by Other Contractors in the proximity of the Site.
- 16.2.2 The Contractor shall provide reasonable access to such contractors and any other adjacent contractors and shall where necessary liaise with the appropriate contractors, utility undertakings and other duly constituted authorities on details of interdependent phasing. The Contractor shall notify the Employer's Representative and other concerned entities at least 14 days in advance should he wish to alter these access arrangements during the course of the Works.

16.3 Interface Management

- 16.3.1 The Contractor shall co-ordinate with Relevant Authorities and Other Contractors in the execution of the Works.
- 16.3.2 The Contractor shall interface and liaise with Other Contractors to ensure the effective and compatible co-ordination of all aspects of the design, installation and testing of the Works. The Employer's Representative shall be kept fully informed at all stages of the Works.
- 16.3.3 The Contractor shall assign a person as the interface contact for each Other Contractor to actively manage the progress of each interface to ensure adherence to the jointly developed Interface Management Plan.
- 16.3.4 Throughout the design process, the Contractor shall liaise with Other Contractors to develop interface designs in conjunction and co-operation with the designers of interfacing systems. Interfacing systems include, but are not limited to, those listed in the PS. These interface designs will be monitored and reviewed by the Employer's Representative but the Contractor shall work directly with the Other interfacing Contractors to develop designs which are mutually acceptable to all parties. The Employer's Representative will provide details of the Other Contractors as contracts are awarded.
- 16.3.5 The Employer's Representative may, at his discretion, attend the Contractor's meetings with Other interfacing Contractors. The Contractor shall give the Employer's Representative a minimum of 7 days notice of all meetings to be held with any Other interfacing Contractors, or 14 days notice if the meeting is to be outside Jaipur. If insufficient notice is given to the Employer's Representative, he may require the meeting to be postponed to a later date to enable him to attend.

- 16.3.6 The Contractor shall provide the Employer's Representative with copy of the minutes of all meetings within 14 days of each meeting and also copy of all correspondence with any Other Contractor.
- 16.3.7 The Contractor shall attend co-ordination/design meetings chaired by the Employer's Representative at no greater than monthly intervals to discuss and ensure that designs are correct and that conflicts in E&M services requirements between the Contractor and Other Contractors are identified and resolved.
- 16.3.8 The Contractor shall co-ordinate his installation activities with the Other Contractors. The Contractor shall ensure that there is no interference to the work of the Other Contractors and shall maintain close co-ordination with Other Contractors working on or adjacent to the Works to ensure that their work can progress in a smooth and orderly manner.
- 16.3.9 The Contractor shall be given access to the various parts of the Site by the dates relative to the Works Programme defined in the ITT and the PS as Access Dates. The ITT and the PS specify certain Key Dates by which the Contractor shall complete certain parts of his Works to enable work to be undertaken by the Other Contractors. These dates may be subject to adjustment by the Employer's Representative in consultation with the Contractor and the Other Contractors to ensure the progress of the Project.
- 16.3.10 The Contractor's responsibility shall include provision of and receipt from Other Contractors or the Employer's Representative of information required for construction of the Works and the installation of the Works and Contractor's Equipment, insofar as that requirement is specified in or can reasonably be inferred from the Contract. Where the execution of work by a Other Contractor depends upon the Contractor's Site management or upon information to be given by the Contractor, the Contractor shall provide the Other Contractor with either the required services or the correct and accurate information required to enable the Other Contractor to meet his programme for the construction or installation of his works.
- 16.3.11 In the event of any disagreement as to the extent of services or information required to be exchanged between the Contractor and Other Contractor, the Employer's Representative shall determine the requirements and this determination shall be final and binding on the Contractor and the Other Contractor.
- 16.3.12 The Contractor shall co-ordinate his testing and commissioning activities with the Other Contractors. The Contractor shall ensure that there is no interference to the work of the Other Contractors and shall maintain close co-ordination with Other Contractors working on or adjacent to the Works to ensure that their testing and commissioning work can progress in a smooth and orderly manner.

CHAPTER 17

17. THE SITE

17.1 Access to Site

The Contractor will be given access to the Site in accordance with following conditions.

17.2 Site Restrictions

17.2.1 The particular use to which the Site is put shall be submitted to the Employer's Representative for review within 60 days of the Commencement Date of the Works and the Contractor shall:

- (1) confine his use of the areas of the Site to purposes having been reviewed without objection by the Employer's Representative who reserves the right to extend, amend or restrict the uses to which areas of the Site will be put;
- (2) where required under the Contract, provide and maintain fencing and lighting around and within the areas of the Site when or where necessary for the safety and convenience of the public or others or as directed;
- (3) refrain from depositing rubbish or causing nuisance or permitting nuisance to be caused and, except where reviewed without objection by the Employer's Representative, depositing earth on or removing earth from areas of the Site;
- (4) on the Employer's Taking Over of the Works, or earlier if so instructed by the Employer's Representative, remove all Temporary Works except where permitted and reinstate the areas of the Site to the extent, standards and details indicated in the Contract or as directed by the Employer's Representative;
- (5) refrain from obstructing manholes, utility access points and the like; and
- (6) refrain from felling trees, other than those specifically identified in the Contract to be felled, and refrain from depositing earth around the trunks of trees and protect all trees remaining on Site to the satisfaction of the Employer's Representative.

17.2.2 Work other than that necessary for completion of the Works shall not be carried out on the Site.

17.2.3 While the Contractor is being given access to the Site, he shall provide means of distributing loads imposed by Contractor's Equipment and prevent damage to utility services.

17.2.4 Except where otherwise provided, the Contractor shall not permit any person to reside on the Site.

17.2.5 Unless otherwise stated, the Contractor shall pay all rates and charges of any nature whatsoever arising out of his use of the Site and all work areas provided therein under the Contract.

17.2.6 The location and size of stockpile material, including excavated material within the Site, shall be submitted to the Employer's Representative for review. All stockpiles shall be maintained at all times in a stable condition.

- 17.2.7 The Contractor shall not allow animals to be brought onto or kept on the Site.
- 17.2.8 The Contractor's attention is drawn to the Waste Disposal Regulation currently prevalent in Jaipur, regarding storage, transportation and disposal of chemical waste. The Contractor's proposed methods and chemicals to be used in cleaning shall be submitted for review by the Employer's Representative.
- 17.2.9 No rock crushing or screening facilities shall be set up on Site unless reviewed by the Relevant Authorities and reviewed without objection by the Employer's Representative.

17.3 Site Services

- 17.3.1 Where required under the Contract, the Contractor shall provide all Site services as necessary and appropriate for the construction of the Works, which shall include, but not necessarily be limited to:

- (1) electricity; (see Chapter 22 below)
- (2) water;
- (3) compressed air;
- (4) Site communication facilities; and
- (5) temporary drainage and sewage disposal.

- 17.3.2 The Contractor shall provide such services for use solely in connection with the proper execution of the Works. The Contractor shall comply with all regulations of the utility companies and Government departments concerned. The Contractor shall provide and maintain installations associated with such services and in relation thereto and shall take all reasonable precautions to safeguard the safety and health of all persons and the security of the Site. The Employer's Representative may demand the immediate disconnection or alteration of such installations or portions thereof he considers as being prejudicial to safety, health or security. As soon as any or all of the Contractor's installations are no longer required for the execution of the Works, they shall be entirely removed to the satisfaction of the Employer's Representative.

- 17.3.3 All installations shall comply fully with all appropriate statutory requirements. Pipes, tubes, ducts or cables crossing highways, footpaths or rights of way shall be ramped over or recessed below the surface. Specific services shall comply with the following:-

- (1) Electricity
The electricity supply shall comply with the requirements of Chapter 22 below.
- (2) Water
An adequate supply of potable water shall be provided at the Site, including provision to the satisfaction of the Water Authority of any storage tanks so that sufficient potable water is always available for the execution of the Works.
- (3) Compressed Air
- (4) Site Communication Facilities
Where required under the Contract, the Contractor shall install efficient means of Site communications including messenger, telephone and, where appropriate, two-way radio to the satisfaction of the Employer's Representative.
- (5) Temporary Drainage & Sewage Disposal
Where required under the Contract, adequate provision shall be made for the discharge or disposal from the Site of all water, surplus fluid sewage and waste products and the method of disposal shall be submitted to the Employer's Representative for review. The Site shall be kept well drained and free from standing water. Where

existing channels and gullies cannot be maintained, temporary drainage arrangements shall be provided.

17.3.4 Not Used.

17.4 Site Cleanliness

17.4.1 The Site shall be maintained in a clean and tidy condition. Materials, including materials required for Temporary Works shall be stored in an orderly manner. Rubbish, debris, cement bags, disused formwork and the like shall be disposed of at least once a day and the work area cleaned by flushing with water as necessary so that the Site is kept constantly clean and tidy

17.4.2 The Contractor shall ensure that no earth, debris, rock or empty cable drums are deposited on public or private rights of way as a result of the Works, including any deposits arising from the movement of Contractor's Equipment. All roads, both within and external to the Site which are affected by the Works shall be kept in a clean condition by the Contractor. All haul roads shall be regularly graded and watered, as necessary to minimise dust nuisance.

17.4.3 Where required under the Contract, the Contractor shall provide and maintain a patrol unit for the duration of the Contract. The unit shall comprise 1 foreman and 2 labourers whose services shall be allocated full-time to the unit. The main duties of the patrol unit shall include the upkeep of lighting, signage and security as well as other related duties as instructed from time to time by the Employer's Representative.

17.4.4 The patrol unit shall be required to work outside the Contractor's normal working hours if so required by the Employer's Representative.

17.4.5 The Contractor shall provide all necessary protective clothing, safety equipment, hand tools, ladders, trestles, power supply, replacement equipment and the like for the exclusive use of the patrol unit.

17.5 Engineering Conditions for Temporary Land Allocation

The Contractor shall comply with the obligations, requirements and restrictions described in the PS in respect of the Contractor's work areas if any.

17.6 Attendance by Civil Works Project Contractor

17.6.1 Where supplies of electricity, water, compressed air, temporary ventilation, temporary lighting, etc. are installed by the Civil Works Project Contractor for use during construction of the structural components of the Project, these services may be made available to the Contractor for his own use during erection, installation and testing of the Works in accordance with Chapter 22 below.

17.6.2 The Contractor shall supply the Employer's Representative with its requirements (if any) for such services within 90 days of the Commencement Date of the Works. Upon receipt of the Contractor's declaration, the Employer's Representative will ascertain whether any of these requirements can be satisfied by the installations installed by the Civil Works Project Contractor. The Employer's Representative will subsequently notify the Contractor of the result of these investigations.

17.6.3 Where services are required and are not available from the Civil Works Project Contractor, the Contractor shall provide, test, maintain and subsequently remove the services.

17.6.4 Background lighting to an average level of 50 lux at the walkway level will be provided in the tunnels by the Civil Works Project Contractor. The Contractor shall provide any additional lighting he may require to facilitate his own work or for reasons of safety.

17.7 Access to the Site by Other Contractors

Confidential

- 17.7.1 Due to the multi-discipline nature of the Project, several different parties may require access to the same portion of the Site during the construction phase for the installation, erection and testing of the Works. To facilitate the organisation and co-ordination of access and occupation requirements, including the use of Works Trains, if any, the Employer's Representative will issue and maintain a TRIP as referred to in clause 2.13 above.
- 17.7.2 The TRIP will be developed from the declared requirements of all Project Contractors and others having need of access and occupancy, at the weekly Works Train Meeting. The TRIP will be subject to revision and updating to reflect changing circumstances during the progress of the Project.
- 17.7.3 The Contractor shall work in accordance with the arrangements prescribed by the TRIP.
- 17.7.4 The Contractor shall ensure that his working arrangements on the Site conform to the agreements made with the Employer's Representative during establishment of the TRIP requirements. In particular, the Contractor shall ensure that his occupancy does not extend either physically or chronologically beyond the agreed boundaries.

17.8 Transportation to Site

- 17.8.1 The Contractor shall use such routes and rights of entry to the Site as may be decided by the Employer's Representative from time to time. Routes for very large or very heavy loads shall be discussed with the Employer's Representative in advance of the need arising and all arrangements there for shall be submitted for review by the Employer's Representative.
- 17.8.2 In this context, the definition of the terms "very large" and "very heavy" refer to articles that cannot be transported by normal road vehicles or be handled by readily available methods. Where doubt exists, it shall be the responsibility of the Contractor to notify and discuss the nature of the load in question with the Employer's Representative.
- 17.8.3 The Contractor shall comply with the requirements of the Commissioner of Transport and /or the Commissioner of Police and / or any other Relevant Authority regarding any special traffic arrangements that may be necessary. The Contractor's attention is drawn to the Road Traffic (Regulation and Licensing of Vehicles) Regulations and the Road Traffic (Construction and Use) Regulations currently in use at Jaipur.
- 17.8.4 Extraordinary traffic may be moved from docks and between areas of the Site over public highways only by police escort and on a route and at a time determined by the Relevant Authority. The Contractor shall be responsible for obtaining permission from the Relevant Authorities to move extraordinary loads and traffic and for arranging police escorts as necessary.
- 17.8.5 The Contractor shall make all arrangements and assume full responsibility for transportation to the Site of all Contractor's Equipment, materials and supplies needed for the proper execution of the Works.
- 17.8.6 While travelling to and from the Site, the Contractor shall observe all posted speed limits, traffic regulations, stop signs, etc., and adherence to the access route indicated on the Employer's Drawings or as instructed by the Employer's Representative. No employee of the Contractor shall trespass into any part of the Employer's premises other than the Site or the designated route of access.
- 17.8.7 The Contractor shall ensure that all roads and pavements, etc. leading to and around the Site are kept free from obstructions and shall not cause inconvenience or hindrance to traffic or persons either by its vehicles or by its workmen, scaffolding, plant, materials, equipment, etc.

- 17.8.8 The Contractor shall repair damage to existing roads, footpaths, steps, cables, sewers, live drains, etc. and shall reinstate any damage caused by the Contractor's actions.

17.9 Contractor's Own Rolling Stock

- 17.9.1 Where the Contractor is to provide rolling stock (either self-propelled or trailing) for use during the installation and testing of the Works, the requirements of clause 17.10 below shall apply. All the Contractor's own rolling stock shall not exceed the Construction Vehicle Load Gauge as shown in the Specification Drawings except with the Employer's Representative's written consent.
- 17.9.2 The Contractor shall submit full details of any rolling stock that is to be used during the installation and testing of the Works to the Employer's Representative for review within 120 days of the Commencement Date of the Works. Such details shall include a full description and drawings of the rolling stock, details of axle load, stopping distance, fail-safe braking system, kinematic envelope, and operating and maintenance instructions.
- 17.9.3 The Contractor shall maintain its own rolling stock during the installation and testing of the Works. The maintenance work shall be carried out by qualified and experienced personnel, whose qualifications have been reviewed without objection by the Employer's Representative, in accordance with the maintenance procedures that shall have been reviewed without objection by the Employer's Representative.
- 17.9.4 Prior to use, and following each maintenance examination, the Contractor's qualified engineer shall certify the Contractor's own rolling stock as fit-to-run. Thereafter, the Contractor's qualified engineer shall issue a registration tag. The expiry date, i.e. the date of the next inspection, shall be shown on the registration tag. The Contractor's own rolling stock shall not be used without a valid registration tag.
- 17.9.5 The Contractor shall establish a maintenance programme for his own rolling stock and shall submit the maintenance programme for review by the Employer's Representative prior to the delivery of his own rolling stock to the Site. The Employer's Representative will periodically inspect the Contractor's own rolling stock to ensure it is properly maintained to the standards set out in the maintenance programme.
- 17.9.6 If the Contractor's own rolling stock is found to be operating in an unsatisfactory or unsafe condition, it shall be immediately removed until it has been restored to an acceptable condition to the satisfaction of the Employer's Representative.

17.10 Defined Area Working and Works Train Operations

- 17.10.1 When the Project under construction has been made available for track related electrical and mechanical installation works, the area will be classified as a Defined Area within which Works Trains will be operated.
- 17.10.2 All persons whose duties require them to work within a Defined Area must observe safety rules and procedures to be provided by the contractor and reviewed without objection by the Employer's Representative. It shall provide procedures and guidance for the safety of all persons in the Defined Area.
- 17.10.3 The Contractor shall establish communicate the rules and procedures, which shall be published from time to time, to their workers and/or agents on Site, and to ensure all such rules and procedures are being observed in the course of all works and construction activities.
- 17.10.4 Persons working on or near tracks in a Defined Area, either by themselves or supervising a working party, must be suitably trained and qualified by the Employer

or his delegates in the safety provisions of the Works Train Manual. Persons who are not qualified shall not attempt to gain access to the railway tracks unless accompanied by a qualified person.

- 17.10.5 When overhead lines are energised, EMUs may be running at high speed for testing. No work may be undertaken on either the Up or Down tracks when test trains are running. Procedures for gaining access to the energised track will be detailed in the Works Train Manual. The Contractor shall make requests for gaining access to the energised track at the weekly Works Train Meetings.

17.11 Work in Vicinity of Operating Tracks

- 17.11.1 This Paragraph shall apply to works in the vicinity of the existing Indian Railway tracks after the commencement of revenue operations and all ancillary areas which form a part of the operating system, including all depots and sidings.

- 17.11.2 The following words and expressions shall have the meaning hereby assigned to them in this Paragraph:

- (1) "Railway" means the existing rail tracks of the JMRC (if any) and Indian Railway after the commencement of revenue operations and any ancillary areas such as the depots, sidings, stations, and terminus and traction power stations.
- (2) "Railway Representative" means a person, or persons, nominated by the Employer's Representative to liaise with the Contractor and the Employer's representative on matters affecting the operation of the Railway.
- (3) "Restriction" means speed restriction, which is a limitation of the normal permitted speed of rail traffic over a specified length of the Railway.
- (4) "Possession" means possession of the Railway, which is the closing of a specified length of the Railway to rail traffic.
- (5) "Isolation" means isolation and earthing of the electrical equipment, which is the disconnection of a section of such equipment from all sources of electricity supply and the connection of it to the Railway.

- 17.11.3 The Contractor shall have regard to the Specification for work within the vicinity of the Railway and shall comply strictly with the requirements as set out therein. The Contractor shall comply with any instructions given by the Employer or the Railway Representative through the Employer's Representative with regard to planning, methods of working, safety requirements and on any other matters which may affect the operation of the Railway, and also shall comply with all rules, regulations, procedures, manuals and notices which may be published from time to time by the Employer or the Railway Representative. Provided that if a situation occurs which in the opinion of either the Contractor or the Employer or the Railway Representative may give rise to or actually constitute an emergency and either the Contractor or the Employer or the Railway Representative considers that it is not practicable to communicate through the Employer's Representative then the Contractor and the Employer or the Railway Representative may communicate directly and the Employer or the Railway Representative may give a direct instruction to the Contractor and such instruction shall be regarded for the purposes of this Contract as an instruction from the Employer's Representative.

- 17.11.4 Should the Contractor be unwilling or unable at once to conform with a direct instruction from the Employer or the Railway Representative under the provisions of the paragraph above or to carry out any remedial or other work or repair, the Employer or the Employer's representative may by written order to the Contractor suspend the execution of the Works or of any part thereof or authorise the carrying out of such remedial work or other work or repair by a person other than the Contractor.

- 17.11.5 The Contractor shall notify the Employer's Representative as soon as possible of any direct instruction received from the Employer under the provisions of this Paragraph.
- 17.11.6 Where any part of the Works has to be carried out during the period of a Restriction and/or Possession and/or Isolation and the period of such Restriction and/or Possession and/or Isolation is prescribed in the Contract, the Contractor shall plan and execute that part of the Works so that such period is not exceeded and so that no further periods are required.
- 17.11.7 If no such period is prescribed, the Contractor shall before commencing any work hold discussions through the Employer's Representative with the Employer who will decide whether any part of the Works is to be carried out during a period of a Restriction and/or Possession and/or Isolation and the Employer's Representative will notify the Contractor accordingly.
- 17.11.8 After the method of carrying out the work has been agreed with the Employer (and taking into account any provisional arrangements which have been made) the Contractor shall in all cases other than for emergency works submit written notice of his programme of work, which shall include details of any Restriction and/or Possession and/or Isolation previously notified by the Employer as being necessary, to the Employer at least 10 (ten) weeks in advance of the proposed commencement of work on or near the Railway and shall at the same time submit a copy thereof to the Employer's Representative.
- 17.11.9 Where a Restriction and/or Possession and/or Isolation is necessary, the Contractor shall initiate the necessary action to obtain the requisite approval for such Restriction and/or Possession and/or Isolation from the Employer. The Contractor shall be solely responsible for all delays caused through failure to submit the necessary application for approval, late submission of any such application or submission of inadequate information.
- 17.11.10 The Contractor shall so organise the execution of the work during any period of Restriction and/or Possession and/or Isolation that he will be able to give up such Restriction and/or Possession and/or Isolation at the time prescribed in the Contract or agreed by the Employer. Should the Contractor in the opinion of the Employer or the Employer's Representative not make sufficient or adequate arrangements (including the provision of standby plant) for completing the whole or any stage of the work within the time allowed in the programme or agreed with the Employer, the Employer may in his discretion cancel the Restriction and/or Possession and/or Isolation, or the Employer may employ labour, plant and materials to assist the Contractor to finish the work or to carry out such work as is necessary, or may himself carry out such work as is necessary, to enable the Restriction and/or Possession and/or Isolation to end at the earliest possible moment.
- 17.11.11 A period of Restriction and/or Possession and/or Isolation cannot normally be extended. If the Contractor fails to carry out the work during any such period, then Contractor shall be required to re-apply to the Employer for a further period of Restriction and/or Possession and/or Isolation.
- 17.11.12 All expenses which in the opinion of the Employer's Representative are properly incurred by the Employer as a result of the Employer making necessary arrangements to assist the Contractor or carrying out any necessary work in accordance with clause 17.11.10 above shall be a debt due from the Contractor to the Employer.
- 17.11.13 The Contractor shall on demand pay to the Employer any loss of revenue and additional expenditure which in the opinion of the Employer's Representative has been incurred by the Employer by reason of the rescheduling of services by the Employer due to the Contractor obstructing the Railway or interfering with the control or signalling system or electrical equipment other than for a period for which a Restriction and/or Possession and/or Isolation has been given.

17.11.14 In the event that damage is caused by the Contractor to the Railway such that rescheduling/suspension of services by the Employer has to be made, then the Contractor shall on demand pay to the Employer any loss of revenue and additional expenditure which in the opinion of the Employer's Representative has been incurred by the Employer in making good the damage and in rescheduling/suspending the services.

17.11.15 The Employer shall have the right to cancel or alter the date and the timing of any agreed period of Restriction and/or Possession and/or Isolation if this proves necessary for the safety or uninterrupted running of rail traffic by notice to the Contractor which shall be deemed to be an instruction issued by the Employer's Representative, but in such an event the Employer's Representative shall make alternative arrangements as soon as practicable.

17.11.16 Not Used.

17.12 Rodent Control

17.12.1 The Contractor shall at all times take effective measures to prevent damage by rodents to the Permanent Works and constituent parts thereof, such as cables, electronic cards, etc., during the execution of the Works and shall advise the Employer's Representative of such measures taken accordingly.

CHAPTER 18

18. HEALTH AND SAFETY

18.1 Health and Safety Philosophy

18.1.1 The health, safety and welfare of all personnel working on the Project, the general public and the avoidance of damage to property are of paramount importance to the Employer. Prime consideration shall be paid to construction activities to ensure that all operations shall be conducted in such a manner as to eliminate the risks to persons and property. The Contractor shall treat safety measures as the first priority in all his activities with respect to executing the Works.

18.1.2 The Contractor will be issued with the following Metro documents: Corporate Safety Standards, Safety Policy, Safety Plan, Safety Procedure Rule Book and Joint Operating Procedure as they become available. These documents set out the minimum standards to be achieved by the Contractor but do not relieve the Contractor of his liabilities and obligations under the Enactment. Where there is a discrepancy in the documents or with this GS, the higher or stricter standards shall be applied.

18.2 Health and Safety Management

18.2.1 The Contractor shall be fully responsible for safety on the Site, for the Works, his personnel, sub-contractors' personnel, the public domain and all persons directly or indirectly associated with the Works, on or in the vicinity of the Site.

18.2.2 The Contractor shall submit reports, notices and information to Government bodies where there is a statutory requirement to do so.

18.2.3 The Contractor shall and will ensure that, his sub-contractors of any level, all persons employed by him on the Site and any person authorised by him to be on the Site shall comply in every respect with the provisions of relevant statutory requirements and the Employer's safety documents as listed in clause 18.1.2 above.

18.2.4 The provisions of the GS regarding health and safety shall apply to the Contractor and his sub-contractors of any level for any part of the Works.

18.2.5 The Contractor shall ensure that proper and adequate provisions to ensure compliance are included in all sub-contracts placed by him and into all sub-contract documentation.

18.2.6 The safety standards of the sub-contractors are to be properly assessed prior to the placing of contracts and the Contractor shall employ only sub-contractors with a track record of maintaining the highest safety standards.

18.2.7 The Employer's representative reserves the right to order the immediate removal and replacement of any item of Contractors equipment or temporary works, which in his opinion, is unsatisfactory for its purpose or is in an unsafe condition.

18.3 Legislation, Codes of Practice, Standards, etc

18.3.1 The Contractor shall comply with all current and future Enactments, Codes of Practice and Safety Guides approved by the Commissioner for Labour relating to the Works.

18.3.2 Where identified specifically in the GS, Indian Standards are also to be complied with.

18.4 Breach of Health and Safety Obligations

18.4.1 Serious or repeated breaches of the Employer's safety documents as listed in clause 18.1.2 above, statutory regulations, or other disregard for the health and safety of any person, may be reasons for the Employer's Representative to exercise his authority to require the removal from the Site of any employee of the Contractor or a sub-contractor of any level.

18.4.2 Once removed from the Site at the request of the Employer's Representative, that person shall not be re-employed on the Contract, allowed on the Site or on any other DMRC related project.

18.5 Contractor's Health and Safety Documentation

18.5.1 Sub-contractors documentation

18.5.1.1 The Contractor's and his Sub-Contractors health and safety documentation shall be consistent. As new sub-contractors are mobilised on site the Contractor shall ensure that each is issued with copies of the Corporate Safety Documents and each sub-contractor complies with the established health and safety documentation procedures.

18.5.1.2 The Contractor shall submit to the Employer's Representative for review a Works specific copy of his Health and Safety Manual and his Health and Safety Plan for review within 30 days of the Commencement Date of the Works.

18.5.1.3 The Contractor shall provide his sub-contractors with copies of the Health and Safety Manual and the Health and Safety Plan, risk assessments and method statements.

18.5.2 Health and Safety Manual

The Contractor's Health and Safety Manual shall contain the procedures required for carrying out the work activities on the Project and is to be regularly reviewed and up-dated to reflect changes to work practice and changes to Enactment. Copies of proposed changes are to be submitted to the Employer's Representative for review prior to inclusion and implementation.

18.5.3 Site Safety Plan

18.5.3.1 The Contractor shall devise and implement a Site Safety Plan developed from the Outline Safety Plan submitted and developed during the Tender period.

18.5.3.2 The Site Safety Plan shall fully comply with the Health and Safety requirements of the Project conditions and proposed work activities, the GS, the Employer's safety documents as listed in clause 18.1.2 above and all relevant Enactment, Regulations, Codes of Practice, Safety Guides and relevant Indian Standards. The plan shall be prepared and submitted to the Employer's Representative for review within 112 days of the date of Notice to Proceed.

18.5.3.3 The Site Safety Plan shall include a policy statement signed by the chief executive officer of the Contractor (or other senior officer) declaring that occupational health and safety shall be given the highest practicable priority in all aspects of the Contract and in the discharge of his contractual obligations. In the event that the Contractor is a consortium, partnership or joint venture, a policy statement signed by the chief executive officer (or other senior officer endorsed by the chief executive officer and agreed by the Employer's Representative), from each of the companies comprising the consortium, partnership or joint venture shall be submitted.

18.5.4 Risk Assessments

18.5.4.1 The Contractor shall carry out a detailed risk assessment covering the occupational health and safety aspects of the Works.

18.5.4.2 The documentation arising from this exercise shall contain a comprehensive schedule of all perceived risks and the proposed resolution or mitigation measures necessary to reduce these risks to a minimum.

18.5.5 Method Statements

18.5.5.1 In order to ensure that health and safety has been properly considered at the planning stage, the Contractor shall submit to the Employer's Representative for review, detailed method statements for each construction task as the Employer's Representative requires.

18.5.5.2 Method statements shall be logical construction guides designed for the use by the Employer's Representative on Site. They shall contain a detailed risk assessment, which shall include the task or operation, a hazard analysis and methods for preventing injury, including personal protective equipment and any pertinent safety measures to be adopted.

18.5.5.3 Detailed programme showing what method statements will be written and when they will be submitted shall be produced and submitted to the Employer's Representative within 30 calendar days of the Commencement Date of the Works or at a date reviewed by the Employer's Representative.

18.5.5.4 Method statements shall be reviewed by the Employer's Representative prior to any work commencing on the task described. Accordingly, the Contractor shall ensure that such statements are prepared in sufficient time to allow a review before the proposed programmed start date for the relevant task.

18.5.5.5 Before formal issue to the Employer's Representative, the engineer in charge of the described works and the Contractor's authorised representative shall sign the method statement.

18.5.5.6 After review by the Employer's Representative, a copy will be held in the safety office to facilitate monitoring of the work and a further copy shall be given to the engineer supervising the work. The original shall be retained in the Contractor's files for audit purposes.

18.6 Contractor's Safety Arrangements

18.6.1 Co-ordination of work activities

18.6.1.1 The Contractor shall ensure that work is to be co-ordinated throughout the Project to ensure that the activities of one group of workers does not affect the safety of another group, e.g., scaffolders working above cable layers, etc.

18.6.1.2 Daily meetings are to be held to co-ordinate the work activities and permits to work are to be issued as and when required.

18.6.2 Safety inspections

18.6.2.1 The Contractor shall conduct formal, documented Site safety inspections (at least once a month) which are to be attended by the Contractor's most senior Site staff and safety staff.

18.6.2.2 A report of each safety inspection shall be made and shall include the actions taken to resolve any problems or shortcoming discovered during the inspection. The report shall be made available for audit purposes and be discussed at the relevant meetings.

18.6.2.3 A comprehensive health and safety inspection check-list for the use of the Contractor's Site staff when inspecting the Site is to be formulated and submitted for review by the Employer's Representative.

18.6.2.4 The checklist shall indicate the standard to be achieved on any particular aspect of health and safety and be compiled in such a way that allows the inspector to enter his or her actual findings for comparison against the said statement and subsequent rectification.

- 18.6.2.5 When completed, the checklist shall be kept for record purposes and be made available to the Employer's Representative for audit purposes.
- 18.6.2.6 A grading system is to be established which grades the area inspected as either "Very Good", "Good", "Acceptable", "Poor" or "Un-acceptable".
- 18.6.2.7 Where an area receives a grading below "Acceptable", immediate action is to be taken to rectify the problems raised and a further audit shall be conducted after 7 days to assess the conditions.
- 18.6.2.8 The Contractor is to advise the Employer's Representative of the date of the monthly inspection. The Employer's Representative may send a representative to assess the thoroughness of the inspection.
- 18.6.3 Safety audits**
- 18.6.3.1 The Contractor will be subject to the Employer's Safety Performance Measurement Scheme, which is based upon a series of audits carried out or to be carried out, the extent, scope and at a frequency determined by the Employer's Representative, to measure the Contractor's compliance with the provisions of the Employer's safety documents as listed in clause 18.1.2 above, the Enactments, Contractor's Health and Safety Manual and Health and Safety Plan.
- 18.6.3.2 The Employer's audit will be graded as follows: "Very Good", "Good", "Acceptable" or "Un-acceptable".
- 18.6.3.3 Where the Contractor receives a grading of "Un-acceptable", immediate action shall be taken to rectify the problems raised and a follow up audit shall be conducted within 30 days to assess conditions and ensure that remedial action has been taken.
- 18.6.3.4 The Contractor shall continue to be audited, every 30 days, until such time as a grade of "Acceptable" or above has been achieved.
- 18.6.3.5 The Employer's auditors shall be used for the follow up audit(s) and the Contractor shall be liable for the full costs incurred of all additional follow up audits.
- 18.6.3.6 The Contractor shall conduct regular (at least every 3 months) internal safety audits on both the safety management system and the physical Site conditions. The internal safety audits shall be performed to the same criteria and using the same grading and benchmarking as the Employer's audits.
- 18.6.3.7 The internal safety audits shall be conducted by person(s) reviewed without objection by the Employer's Representative, who are qualified and competent to carry out safety audits. The documentation generated by the audit process, including score sheets, shall be made available to the Employer's Representative for audit purposes.
- 18.6.3.8 The internal safety audits shall include the work of sub-contractors of all levels.
- 18.6.3.9 The Contractor shall advise the Employer's Representative of the date of the internal safety audit. The Employer's Representative may send a representative to assess the thoroughness of the internal safety audit.
- 18.6.4 Reporting of accidents, incidents and dangerous occurrence**
- 18.6.4.1 The Contractor shall notify the Employer's Representative immediately of any dangerous occurrences or accidents, which result in death, serious bodily injury or incapacity for more than 3 days. Such initial notification may be verbal but shall in any event be followed by a preliminary written report, in a format reviewed without objection by the Employer's Representative, within 24 hours of the occurrence/accident and a detailed written report shall be submitted within 7 days. Copies of all accident, incident and dangerous occurrence reports shall be kept on file and made available for audit purposes.

- 18.6.4.2 The Contractor's attention is drawn to the reporting requirements set out in the Factories and Industrial Undertakings Regulations, Occupational Safety and Health Ordinance and the Mines (Safety) Regulations.
- 18.6.4.3 The Contractor shall deliver to the Employer's Representative, within 48 hours of the incident, a copy of any Form 2 or 2a or other statutory reports he submits to Government departments under these Regulations.
- 18.6.4.4 The Contractor shall submit to the Employer's Representative at the end of each week, a list of persons who are on sick leave following an accident. The list shall be circulated to other DMRC projects being carried out at that time to ensure that no person having been granted sick leave is working on another project during the duration of the said sick leave period.
- 18.6.5 Monthly reports**
- 18.6.5.1 The Contractor shall, as part one of each Monthly Progress Report, submit a Site Safety Report duly signed by the Contractor's director responsible for the Contract.
- 18.6.5.2 The Site Safety Report shall comprehensively address all relevant aspects of occupational safety and health and shall contain certain standard forms and information, as directed by the Employer's Representative, for statistical analysis.
- 18.6.5.3 The Contractor shall submit reports or accident analysis, in a format reviewed without objection by the Employer's Representative, as and when required by the Employer's Representative.
- 18.6.6 Safety staff**
- 18.6.6.1 The Contractor shall ensure that their safety staffs have the necessary authority given to them to suspend any work where there is imminent danger of accident or injury. He shall also in consultation with the Employer's Representative deploy adequate number of Safety Supervisors.
- 18.6.7 Safety promotion and incentive schemes**
- The Contractor shall actively promote and encourage the standards of health and safety on the Site and implement safety incentives and award schemes at all levels of management, supervisors, foremen, workers, etc. The Contractor shall be able to demonstrate to the Employer's Representative that this requirement is being carried out to the Employer's Representative's satisfaction.
- 18.6.8 Safety information**
- 18.6.8.1 The Contractor shall display in each of his Site offices, workshops and canteens a copy of the document on "A Guide to the Construction Sites (Safety) Regulations" published by the Government or a similar approved document. This document shall be translated into languages, which are understood by labour engaged by the Contractor or sub-contractors.
- 18.6.8.2 The Contractor shall ensure that safety, rescue and occupational health matters are given a high degree of publicity to all persons, regularly or occasionally on Site. Posters in English, Hindi and other languages understood by the workers, drawing attention to Site safety, rescue and occupational health, shall be made or obtained from appropriate sources and shall be displayed prominently in relevant areas of the Site.
- 18.6.8.3 Posters in both English and Hindi drawing attention to safety shall be obtained from the Labour Department and displayed prominently throughout the Site.
- 18.6.8.4 The Contractor shall keep on Site a complete and up-to-date set of all relevant occupational health and safety legislation, relevant Codes of Practice and any

relevant guides and safety pamphlets published by the Labour Department and the Occupational Safety and Health Council or similar authorities or reference.

18.6.8.5 The Contractor shall keep a working stock of all relevant statutory forms to be used in compliance with the occupational health and safety legislation.

18.6.9 Safety meetings

18.6.9.1 The Employer's Representative shall establish a monthly Site Safety Management Committee to formally review the safety management of the Contractor and monitor the implementation of the Health and Safety Plan. The Employer's Representative shall act as chairman of this committee with members of the Employer's Representative's staff attending as appropriate.

18.6.9.2 Attendance from the Contractor shall include, but not be limited to, the Senior Manager on Site and the Safety Manager/Officer/Supervisor.

18.6.9.3 The Contractor shall act without delay upon such decisions or recommendations as may be made by the committee on matters of health and safety.

18.6.9.4 The Employer's Representative as appropriate may invite representatives from third parties including statutory bodies.

18.6.9.5 The Contractor shall establish a tier of monthly safety meetings and shall ensure that all level of staff, all disciplines and all work areas are covered so that the dissemination of information is carried through to all levels of staff and workers.

18.6.9.6 The Contractor shall hold monthly meetings at which representatives from all sub-contractors shall attend.

18.6.9.7 Minutes of all tiers of Contractor safety meetings shall be issued to the Employer's Representative for information.

18.6.10 Safety training

18.6.10.1 The Contractor shall ensure that induction training courses shall be provided for construction site workers or equivalent.

18.6.10.2 The induction course shall be conducted by suitably qualified persons and repeated at six-month intervals.

18.6.10.3 All workers must receive induction training before they are allowed to commence work on the Site.

18.6.10.4 The Contractor is to issue all Site workers with a Site pass once they have attended the induction course. The pass is to include the worker's name, ID card no., photograph, types of courses attended and expiry date of the card (maximum 6 months). The pass is to be carried at all times when on the Site.

18.6.10.5 The Contractor shall keep records of such training for health and safety audit purposes. Upon completion of their training, the Contractor's Site staff shall sign a copy of their assigned safety responsibility statement, which shall be kept by the Contractor for audit purposes.

18.6.10.6 The Contractor is to report the number of training sessions and employees trained each month, at the Site Safety Management Committee meeting and in the Monthly Progress Report.

18.6.10.7 **Not Used**

18.7 Site Conditions

18.7.1 Emergency procedures and facilities

18.7.1.1 The Contractor shall establish and implement emergency procedures which detail the organisation of rescue and/or damage limitation teams to deal with emergency

situations on the Site such as, but not limited to, fire, loss of power, typhoon, flooding, stranding or the evacuation of a seriously injured person(s) from a remote or difficult Site location, etc. The emergency procedures shall specify what equipment is needed, where it will be located and who is responsible for its maintenance.

- 18.7.1.2 The Contractor shall carry out regular (at least every 3 months) emergency evacuation exercises from their offices and Site area. This requirement includes evacuation of tunnels as a joint Fire Services Department exercise where applicable.

18.7.2 First aid facilities

- 18.7.2.1 The Contractor shall provide, or have access to, sufficient first aid provisions, including trained personnel and facilities appropriate to the Site conditions as per Appendix 8 of this Specification. Arrangements for transporting the injured (ambulance, stretcher, etc.) shall be provided.

- 18.7.2.2 A trained First-Aider is required at all times at the Site of working, as detailed in Appendix 8.

- 18.7.2.3 The Contractor shall maintain a register of all persons attending the clinic or receiving first aid treatment. Records are to be in a comprehensive format as required by the appropriate authority and shall be kept for audit purposes.

- 18.7.2.4 First aid kits, up to the standards required by the appropriate authority shall be carried in supervisor's vehicles and made available where work is in remote areas.

18.7.3 Lifting appliances and lifting gear

- 18.7.3.1 The Contractor shall prepare and maintain an up-to-date Site register of lifting equipment containing test certificates of all lifting and hoisting equipment used on the Works. The register shall be available on Site, from the commencement of construction, for inspection by the Employer's Representative and Relevant Authorities.

- 18.7.3.2 A system is to be devised and implemented, such as colour coding, to identify the expiry of the certification of lifting appliances and lifting gear. This system is to be displayed in the cabs of all lifting appliances.

- 18.7.3.3 A trained banks man shall be in attendance at each lifting appliance or hoisting operation.

- 18.7.3.4 The banks man shall be equipped with a radio link to the crane or hoist operator and shall be easily identifiable from other workers.

- 18.7.3.5 Competent operators with certificates issued by a recognised training body shall be provided to operate all mechanical plant particularly all lifting and hoisting equipment.

- 18.7.3.6 The operators of shaft hoisting gear shall be in communication with the top and bottom of the shaft and each intermediate landing.

- 18.7.3.7 All crane hooks and other lifting devices used on or around the Site shall be fitted with a safety catch or other device to stop the lifting gear being detached.

- 18.7.3.8 The safe working load shall be clearly and indelibly marked on all lifting equipment, either by stamping or by the addition of permanently secured tag labels. Stamping shall not be permitted on any stress bearing part.

- 18.7.3.9 Slings, shackles and such-like equipment used in lifting shall be colour coded for identifying lifting gear which requires re-inspection or disposal.

18.7.4 Fire precautions

Confidential

- 18.7.4.1 The Jaipur Fire Service Ordinance and any relevant regulations made thereunder and other requirements laid down in the Specification or as laid down from time to time by the Employer's Representative shall be observed at all times.
- 18.7.4.2 The Contractor shall thoroughly assess the risk of fire throughout the Site and shall develop a comprehensive fire control strategy as a part of the Health and Safety Plan, which will extend to all aspects of the Works. The fire control strategy shall be discussed regularly and reviewed with the Employer's Representative.
- 18.7.4.3 Adequate and suitable fire extinguishers are to be positioned throughout the Site, with particular attention paid to offices, flammable storage areas, tunnels, workshops, etc.
- 18.7.4.4 Adequate and suitable fire extinguishers are to be provided at all hot work locations.
- 18.7.4.5 The Contractor shall ensure that all persons on the Site are trained in and undergo regularly refresher courses in the use of fire extinguishers.
- 18.7.4.6 Fire points are to be clearly designated.
- 18.7.5 Dangerous goods, hazardous substances**
- 18.7.5.1 The Contractor shall obtain the requisite licenses for the manufacture, storage, handling and use of all dangerous goods.
- 18.7.5.2 The Contractor shall ensure that all explosives, compressed gases, petrol and other dangerous substances, shall be stored and handled in accordance with the relevant Ordinance.
- 18.7.5.3 Before being brought on to Site, any materials proposed by the Contractor shall be assessed by the Contractor for their occupational health and environmental compatibility. Any material that is toxic, explosive or inflammable or may otherwise create a hazard shall, whenever possible, be replaced by a less hazardous product. Where this cannot be done, the Contractor shall conduct a risk analysis and produce a method statement specifying the safe method of use and all associated precautions including personal protective equipment.
- 18.7.5.4 Not Used
- 18.7.6 Excavations and floor openings**
- 18.7.6.1 Before the commencement of any excavation work, sufficient information shall be obtained from the utility companies to identify the locations of buried services. Buried services are to be located using a cable detector, digging hand dug trial pits and by reference to the relevant drawings, before mechanical digging takes place.
- 18.7.6.2 Excavations shall be carried out by trained and experienced workers who shall be fully instructed on the possible dangers and safety precaution to be taken, before work is commenced.
- 18.7.6.3 The Employer's Representative shall be notified immediately of any damage or interruption to a utility.
- 18.7.6.4 A Permit to Dig system shall be established and implemented prior to excavation starting.
- 18.7.6.5 The Contractor shall ensure that all temporary covers/decking to the trenches and barriers at the edges of excavations are safe and securely installed at all times, especially during adverse weather conditions.
- 18.7.6.6 Where there is a danger to the public, extra care must be taken to properly cover all temporary openings and adequately barrier and sign the excavation. Flashing warning lights, signs and adequate lighting is to be installed where required.

18.7.7 Site transport

18.7.7.1 The Contractor shall ensure that all Site vehicles are regularly maintained and kept in a safe condition with fully working brakes, lights, exhaust, windscreen, windows and doors, etc.

18.7.8 Personal protective equipment (PPE)

18.7.8.1 The Contractor shall make available on Site at all times adequate provision of safety equipment including, but not limited to, safety helmets, goggles, ear protectors, safety belts, respiratory protection, safety equipment for working in sewers, drains and enclosed spaces, equipment for rescue from drowning, fire extinguishers, first aid equipment and other necessary safety equipment.

18.7.8.2 The Contractor shall ensure that safety footwear is worn at all times inside the tunnels and actively encourage the wearing of safety footwear on other areas of the Site. Where safety footwear is not worn, the Contractor is to ensure that strong shoes are worn.

18.7.8.3 High visibility vests shall be worn at all times when in the tunnels.

18.7.8.4 Not Used

18.7.9 Tunnel and underground work

18.7.9.1 The Contractor shall establish and implement a tagging system, which shall clearly and accurately record the number of persons entering and leaving the tunnel, their name, Company and ID card no.

18.7.9.2 All work associated with tunnels shall be performed in accordance with BS6164.

18.7.9.3 The Contractor shall ensure that there is sufficient clean airflow, to the requirements of BS6164, at all times.

18.7.9.4 Before entry into such areas, remote atmosphere monitoring shall be carried out to ensure that adequate ventilation and a breathable atmosphere exist.

18.7.9.5 No person shall enter such areas unaccompanied and without adequate ventilation being in operation.

18.7.9.6 All diesel-driven plant used underground shall be provided with efficient and properly maintained exhaust smoke washers.

18.7.9.7 Petrol driven plant or machinery shall not be used in any underground working.

18.7.9.8 No person under the age of 18 years shall enter or work in the tunnels or confined spaces.

18.7.9.9 Hot work will only be carried out under the control of a Hot Work Permit.

18.7.9.10 All vehicles and plant entering the tunnels and any machinery being used in the tunnels or underground work shall be fitted with a fire extinguisher of a suitable capacity and type.

18.7.10 Ladders, temporary access

18.7.10.1 The Contractor shall provide, register, maintain and use only ladders, which are purchased as proprietary products, on the Site. Site made ladders are not to be used under any circumstances.

- 18.7.10.2 All ladders shall be free from patent defects, secured against movement and installed in accordance with the relevant construction regulations and Codes of Practice.
- 18.7.10.3 Wooden access steps with handrails are to be installed and maintained as access where the uses of mobile access staircases are impractical.
- 18.7.10.4
- 18.7.11 Temporary electricity**
- 18.7.11.1 Temporary electricity supplies shall comply with Chapter 22 below.
- 18.7.11.2 Switchbox construction shall be robust, corrosion proof, water proof and be of coated metal and shall be mounted on an integral frame at least 1000mm off the ground. In coming cables shall be secured by a waterproof gland.
- 18.7.12 Housekeeping**
- 18.7.12.1 The Contractor shall clean the Site area on a daily basis and maintain it in a safe, tidy and sanitary condition.
- 18.7.12.2 Sufficient waste bins are to be provided throughout the area of work and a daily disposal regime is to be established and implemented.
- 18.7.12.3 The Contractor is responsible for enforcing the standards of housekeeping of its sub-contractors and their areas of work.
- 18.7.13 Site services**
- 18.7.13.1 The Contractor shall provide, maintain and ensure the installation to the required standards, of all services entering and being used on Site.
- 18.7.13.2 All Government and utility company regulations and requirements shall be complied with.
- 18.7.13.3 The Employer's Representative may require the immediate termination or alteration to an installation if he considers that they are prejudicial to safety or health.
- 18.7.13.4 The Contractor shall ensure that services used on the Site are designed so that there is no possibility of the users of such services surrounding the Site, being affected by loss of supply, contamination, power surges, etc.

CHAPTER 19

19. DAMAGE AND INTERFERENCE

19.1 Damage and Interference

19.1.1 Work shall be carried out in such a manner that, as far as is practicable, there is no damage to or interference with the following, other than such damage as is necessitated to enable the execution of the Works:

- (1) watercourses or drainage systems;
- (2) utilities;
- (3) structures, roads including street furniture, or other property;
- (4) public or private vehicular or pedestrian accesses;
- (5) trees, graves or burial urns; and
- (6) existing railways and railway systems.

The Contractor shall obtain prior approval of the concerned authority or party, if so required, for any work near properties under their ownership or management.

The Contractor shall inform the Employer's Representative as soon as practicable of any item, utility or thing which is not stated in the Contract as requiring diversion, removal or relocation but which the Contractor considers as requiring diversion, removal or relocation to enable the Works to be executed. The Contractor shall not divert, remove or relocate any such item, utility or thing without such diversion, removal or relocation having been reviewed without objection by the Employer's Representative.

19.1.2 Items which are damaged or interfered with as a result of the Works being carried out and items which are diverted, removed or relocated to enable the Works to be carried out, shall be reinstated to the same condition as existed before the Works started or to such condition as may be reviewed without objection or instructed by the Employer's Representative.

19.1.3 The Contractor shall excavate by hand where damage may be caused by the operation of mechanical plant adjacent to any utilities.

19.1.4 Except with the prior approval of the Jaipur Fire Services, no damage or interference with existing fire hydrants and valves shall be caused.

19.1.5 Prior to trench excavation, the Contractor shall carry out investigations to locate utilities by means of hand-dug inspection pits. The locations and number of inspection pits required in meeting the Contractor's obligations to establish the location of existing utilities and underground features shall be determined by the Contractor. The Contractor shall note that many existing pipes/ducts/cables may not be shown in the records kept by the utility undertakings, and may only be exposed as the excavation proceeds. The trench excavation shall be carried out by hand where there are utilities adjacent to or within the excavation works and the Contractor shall have allowed in his programme the time required for the exposing, temporary support and diversion of these recorded or unrecorded utilities. Should any pipes/ducts/cables or cover tiles be exposed, the respective utility undertaking shall be contacted to determine if all the utilities have been located. Cover tiles and utilities shall only be removed by the utility undertakings concerned.

19.1.6 Where the Employer's Representative has conducted utility and ground investigation on behalf of the Employer, the Contractor may obtain the data obtained from the investigations from the Employer's Representative in accordance

with clause 1.6.2 above and subject to the condition of clause 19.3 below.

19.2 Watercourses and Drainage Systems

19.2.1 Existing watercourses and drainage systems shall be temporarily diverted as required to enable the Works to be carried out. Particulars of the proposed diversions shall be submitted to the Employer's Representative for review at least 14 days before the relevant work starts. Diversions shall be constructed to the satisfaction of the Employer's Representative with such alignment and in such manner that the flow is discharged adequately and effectively without causing flooding or erosion to the adjacent area. The diversions shall be maintained while the work is being carried out and shall be reinstated, including the removal of any obstructions to flow, as soon as practicable after the work is complete.

19.2.2 Measures shall be taken to prevent excavated material, silt or debris from being deposited in existing drainage systems, watercourses or the river.

19.2.3 Not Used

19.3 Utilities

19.3.1 The details of existing utilities are given by the employer for information only and the accuracy of the details is not guaranteed. The Contractor shall make his own enquiries and shall carefully excavate trial holes to locate accurately the utilities indicated to him by the utility undertakings.

19.3.2 Temporary supports and protection to utilities shall be provided by methods reviewed without objection by the Employer's Representative. Permanent supports and protection shall be provided if instructed by the Employer's Representative.

19.3.3 The Contractor shall inform the Employer's Representative and the utility undertakings without delay of the following:

- (1) damage to utilities;
- (2) leakage of utilities;
- (3) discovery of utilities not shown on any drawings; and
- (4) diversion, removal, repositioning or re-erection of utilities which is required to enable the execution of the Works.

19.3.4 The Contractor shall take all steps necessary to enable the utility undertakings to proceed in accordance with the programme agreed between the Contractor and the utility undertakings under clause 2.2.2 above. The Contractor shall maintain close liaison with the utility undertakings and shall inform the Employer's Representative of any delays in works by the utility undertakings.

19.3.5 The Contractor shall keep records of existing utilities encountered on the Site and a copy provided for the Employer's Representative. The records shall be submitted for review by the Employer's Representative and shall contain the following details:

- (1) location of utility;
- (2) date on which utility was encountered;
- (3) nature and size of utility;
- (4) condition of utility; and
- (5) temporary or permanent supports provided.

19.3.6 The Contractor shall co-ordinate the activities of the utility undertakings in connection with the diversion of utility services necessary for the execution of the Works.

- 19.3.7 The Contractor shall set up and manage a Utilities Liaison Group for the duration of the Contract, if utilities are required to be diverted. The Group shall meet at a frequency to be as instructed by the Employer's Representative but at least once a month, and shall discuss and resolve matters associated with utility undertakings on programming, co-ordination and action. The Contractor shall ensure that all relevant utility undertakings and the Employer's Representative are represented at the meetings.
- 19.3.8 The Contractor shall inform the Employer's Representative of the date, time and place of every meeting with utility undertakings and he shall copy all correspondence and minutes of meetings to the Employer's Representative.
- 19.3.9 The programme for any section of work to be carried out by a utility undertaking shall be confirmed in writing by the Contractor to the utility undertaking no more than four weeks and no less than one week before the agreed scheduled start date for that section of Works, such confirmation to be notified to the Employer's Representative.
- 19.3.10 The Contractor shall monitor the progress of utility undertakings against the agreed programmes and shall notify the Employer's Representative of any slippage to these programmes. The agreed programmes shall mean those programmes agreed in writing by the Contractor and the various utility undertakings described in 19.3.9 above.
- 19.3.11 In the event of any such slippage, the Contractor shall prepare and execute a plan of action with the relevant utility undertaking to redress the slippage. Such a plan may, if necessary, include provision of Contractor's labour resources, materials and/or plant to the utility undertaking.
- 19.3.12 Not Used.
- 19.3.13 Hand digging method shall always be employed where there are utilities adjacent to or within the trench excavation works. Portable mechanical tools may be used but shall be restricted to the breaking of the pavement surface. Due care shall be exercised to prevent damage to the underground cables, water pipes, gas pipes or other utility installations.
- 19.3.14 Exposed utility installations shall be adequately supported and protected from accidental damage.
- 19.3.15 Smoking and use of naked flames shall be prohibited if gas pipes are present, or pipes the uses of which are not identified are present.

19.4 Structures, Roads and Other Property

- 19.4.1 The Contractor shall immediately inform the Employer's Representative of any damage to structures, roads or other property that is not required for the execution of the Works.

- 19.4.2 Not Used

19.5 Access

Alternative access shall be provided if interference with existing public or private vehicular or pedestrian access is necessary to enable the execution of the Works. The arrangements for the alternative access shall be as reviewed without objection by the Employer's Representative. The permanent access shall be reinstated as soon as practicable after the work is complete and the alternative access shall be removed as soon as practicable after it is no longer required.

19.6 Spoil Disposal

- 19.6.1 The Contractor shall make his own enquiries and arrangements regarding the location and the availability of spoil disposal areas and reclamation and shall pay all costs of complying with all regulations and requirements of Relevant Authorities in connection with the use of such areas. These areas are not within the control of the Employer and no claims will be entertained in respect of non-availability of a particular areas or changes in the costs of arrangements for the use thereof.
- 19.6.2 The Contractor shall be responsible for all necessary liaison to ensure compliance with the requirements of unproductive disposal of any surplus excavated rock or soft material which is suitable for filling

CHAPTER 20

20. ENVIRONMENTAL PROTECTION REQUIREMENTS

20.1 GENERAL

20.1.1 The Contractor shall conform to the Indian Environmental Laws and codes as applicable. The current national standards established by the Ministry of Environment and Forest, Government of India and other government agencies for control of environmental pollutants such as air, water, noise and visual impacts/aesthetics shall be followed for compliance during project construction.

20.1.2 The Contractor shall comply with all enactment which shall include but are not limited to:

1. Environment Protection Act, 1986
2. Air (Prevention and control of Pollution) Act, 1981
3. Water (Prevention and Control of Pollution) Act, 1974
4. Requirements of Urban Arts Commission and Central Vista Committee

20.1.3 The provisions listed herein regarding Environmental Protection shall apply to and be binding upon the Contractor for any works on the site and the persons employed by sub-Contractors. The Contractor shall ensure that proper and adequate provisions to this end are included in all sub-contracts placed by him.

20.1.4 The provisions of this Chapter however, shall not be applicable in the case of emergency works necessary for saving of life and property or safety of the Works.

20.1.5 The Contractor has been issued with the Employer's Environmental Quality Management Manual. Within 20 weeks of notification of acceptance of the Tender, the Contractor shall submit for review by the Employer's Representative, a draft of his own contract specific Site Environmental Plan based on the Employer's Environmental Quality Management Manual and his construction methodology. He shall submit a final version prior to the commencement of the works (along with "Design Co-ordination Submission").

20.1.6

20.1.7 This contract specific Site Environmental Plan of the Contractor, as referred to in Chapter 3 above, shall be consistent with the provisions of the Environmental Management Plan outline, as given in the Employer's Environmental Quality Management Manual. The Contractor is however not required to undertake air monitoring.

20.1.8 The Contractor shall ensure that audits of all the activities detailed in his Site Environmental Plan are carried at such intervals as the Employer's Representative may require ensuring the continuing effectiveness and compliance with the Site Environmental Plan. The Contractor shall make available on request any document, which relates to his recent internal audits.

20.1.9 Not Used

20.2 NOISE

20.2.1 General

- (1) The Contractor shall consider noise as an environmental constraint in his design, planning and execution of the Works. The Contractor shall, at his own expense, take all appropriate measures to ensure that work carried out by the Contractor

and by his sub-Contractors, whether on or off the Site, will not cause any unnecessary or excessive noise which may disturb the occupants of any nearby dwellings, schools, hospitals, or premises with similar sensitivity to noise.

- (2) Without prejudice to the generality of the foregoing, noise level reduction measures shall include the following:
 - (a) the Contractor shall ensure that all powered mechanical equipment used in the Works shall be effectively sound reduced using the most modern techniques available including but not limited to silencers and mufflers.
 - (b) the Contractor shall construct acoustic screens or enclosures around any parts of the Works from which excessive noise may be generated.
- (3) The Contractor shall ensure that noise generated by work carried out by the Contractor and his sub-Contractors during day time and night time shall not exceed the maximum permissible noise limits, as given in the Employer's Environmental Quality Management Manual , In the event of a breach of this requirement, the Contractor shall immediately re-deploy or adjust the relevant equipment or take other appropriate measures to reduce the noise levels and thereafter maintain them at levels which do not exceed the said limits. Such measures may include without limitation the temporary or permanent cessation of use of certain items of equipment.
- (4) The noise monitoring requirements are given in the Employer's Environment Quality Management Manual.

20.2.2 Construction material should be handled and transported in such a manner as not to create unnecessary noise as outlined below.

CHAPTER 21

21. NOT USED

CHAPTER 22

22. TEMPORARY ELECTRICITY SUPPLY

22.1 The Contractor shall make his own arrangement for Temporary Electrical supply, for Installation & Preliminary Testing.

22.2 Applicability

22.2.1 Where the Contractor is required to provide temporary electrical supplies, or to use, extend or expand on temporary supplies installed by others, all such activity shall be executed in accordance with clauses 22.3 to 22.20 inclusive.

22.2.2 When the Contractor makes use of temporary electrical supplies provided by other, viz. Project (Civil) Contractors, he will observe and comply with the requirements of this Chapter, and pay directly to the provider for the electricity consumed.

22.3 Work on Site

22.3.1 The Contractor shall nominate a representative whose name and qualifications shall be submitted in writing to the Employer's Representative for review not later than 4 weeks before the appointment and who shall be solely responsible for ensuring the safety of all temporary electrical equipment on Site. The Contractor shall not install or operate any temporary Site electrical systems until this representative is appointed and has commenced duties.

22.3.2 The name and contact telephone number of the representative having been reviewed without objection by the Employer's Representative shall be displayed at the main distribution board for the temporary electrical supply so that he can be contacted in case of an emergency.

22.3.3 The Contractor shall submit schematic diagrams and the details of the equipment for all temporary electrical installations, and these diagrams together with the temporary electrical equipment shall be submitted to the Employer's Representative for review.

22.3.4 Not Used.

22.4 Electrical General

Temporary electrical Site installations and distribution systems shall be in accordance with:-

- (1) Indian Electrical Regulations;
- (2) The Power Companies' Supply Rules;
- (3) Electricity and its subsidiary Regulations;
- (4) IEE Wiring Regulations (16th Edition);
- (5) Any other applicable national standards

22.5 Materials, Appliances and Components

All materials, appliances and components used within the distribution system shall comply with BS 4363 and BS 7375 Appendix A.

22.6 Design Considerations

22.6.1 Distribution equipment utilised within the temporary electrical distribution system shall incorporate the following features:-

- (1) flexibility in application for repeated use;
- (2) suitability for transport and storage;
- (3) robust construction to resist moisture and damage; and
- (4) safety in use.

22.6.2 All cabling shall be run at high level whenever possible and firmly secured to ensure they do not present a hazard or obstruction to people and equipment.

22.6.3 The installation on Site shall allow convenient access to authorised and competent operatives to work on the apparatus contained within.

22.7 Mains Voltage

22.7.1 The Site mains voltage shall be as the Electricity Companies' Utility supplies, 415V 3-phase 4 wire system.

22.7.2 Single-phase voltage shall be as the Electricity Companies' Utility supplies, 230V supply.

22.8 Types of Distribution Supply

22.8.1 The following voltages shall be adhered to for typical applications throughout the distribution systems:

- (1) fixed plant - 415V 3 phase;
- (2) movable plant fed by trailing cable - 415V 3 phase;
- (3) installations in Site buildings - 230V 1 phase;
- (4) fixed flood lighting - 230V 1 phase;
- (5) portable and hand held tools - 115V 1 phase;
- (6) Site lighting (other than flood lighting) - 115V 1 phase; and
- (7) portable hand-lamps (general use) - 115V 1 phase.

22.8.2 When the low voltage supply is energised via the Employer's transformer, any power utilised from that source shall be either 415V 3 phase or / 230V single phase as appropriate. The contractor shall carry out any conversion that may be necessary to enable him to use power from that source.

22.9 Protection of Circuits

22.9.1 Protection shall be provided for all main and sub-circuits against excess current, residual current and earth faults. The protective devices shall be capable of interrupting (without damage to any equipment or the mains or sub-circuits) any short circuit current that may occur.

22.10 Earthing

22.10.1 Earthing and bonding shall be provided for all electrical installations and equipment to prevent the possibility of dangerous voltage rises and to ensure that faults

are rapidly cleared by installed circuit protection.

22.10.2 Earthing systems shall conform to the following standards:-

- (1) IEE Wiring Regulations (16th Edition);
- (2) BS Standards ;
- (3) IEEE Standard 80 Guide for Safety in AC Substation Grounding.

22.11 Plugs, Socket Outlets and Couplers

Low voltage plugs, sockets and couplers shall be colour coded in accordance with BS 7375, and constructed to conform to BS EN 60309. High voltage couplers and 'T' connections shall be in accordance with BS 3905.

22.12 Cables

22.12.1 Cables shall be selected after full consideration of the conditions to which they will be exposed and the duties for which they are required. Supply cables up to 3.3KV shall be in accordance with BS 6346. The cable armouring shall be used as the earth return in conditions where the cable is continuously extended and not subject to continuous movement after installation.

22.12.2 For supplies to mobile or transportable equipment where operation of the equipment subjects the cable to flexing, the cable shall conform to one of the following standards appropriate to the duties imposed on it:

- (1) BS 6708 flexible cables for use at mines and quarries;
- (2) BS 6007 rubber insulated cables for electric power and lighting; and
- (3) BS 6500 insulated flexible cords and cables.

22.12.3 Where low voltage cables are to be used, reference shall be made to BS 7375. The following standards shall also be referred to particularly for underground cables:-

- (1) BS 6346 for armoured PVC insulated cables; and
- (2) BS 6708 Flexible cables for use at mines and quarries.

22.12.4 All cables which have a voltage to earth exceeding 65 V (except for supplies from welding transformers to welding electrodes) shall be of a type having a metal sheath and/or armour which shall be continuous and effectively earthed. In the case of flexible or trailing cables, such earthed metal sheath and/or armour shall be in addition to the earth core in the cable and shall not be used as the sole earth conductor.

22.12.5 Armoured cables having an over-sheath of polyvinyl chloride (PVC) or an oil resisting and flame retardant compound shall be used whenever there is a risk of mechanical damage occurring.

22.12.6 For resistance to the effects of sunlight, overall non-metallic covering of cables shall be black in colour.

22.12.7 Cables which have applied to them a voltage to earth exceeding 12 V but not normally exceeding 65 V shall be either one of the type or alternatively of a type insulated and sheathed with a general purpose or heat resisting elastomer.

- 22.12.8 All cables that are likely to be frequently moved in normal use shall be flexible cables.

22.13 Lighting Installation

- 22.13.1 Lighting circuits shall be run separate from other sub-circuits and shall be in accordance with BS 7375 and BS 4363.
- 22.13.2 Voltage shall not exceed 55 V to earth except when the supply is to a fixed point and where the lighting fixture is fixed in position.
- 22.13.3 Luminaries shall have a degree of protection not less than IP 54. In particularly bad environments where the luminaries are exposed to excesses of dust and water, a degree of protection to IP 65 shall be employed.
- 22.13.4 Where the Employer's Representative requires Site inspection of the Works, the Contractor shall upgrade the lighting level to a minimum of 200 lux by localised lighting in all areas.
- 22.13.5 Use of wire guards or other such devices shall provide mechanical protection of luminaries against damage by impact whenever risk of damage occurs.

22.14 Electrical Motors

- 22.14.1 Totally enclosed fan cooled motors to BS 4999: Part 105 shall be used.
- 22.14.2 Motor control and protection circuits shall be as stipulated in BS 6164. Emergency stops for machinery shall be provided.

22.15 Inspection and Testing

Electrical installations on Site shall be inspected and tested in accordance with the requirements of the IEE Wiring Regulations (16th Edition).

22.16 Identification

Identification labels of a type reviewed without objection by the Employer's Representative shall be affixed to all electrical switches, circuit breakers and motors to specify their purpose.

22.17 Maintenance

Strict maintenance and regular checks of control apparatus and wiring distribution systems shall be carried out by an electrician (duly qualified to carry out the said checks) to ensure safe and efficient operation of the systems. The Contractor shall submit for review by the Employer's Representative details of his maintenance schedule and maintenance works record.

22.18 Maintenance Record

All portable electrical appliances shall be permanently numbered (scarf tag labels or similar) and a record kept of the date of issue, date of the last inspection carried out and the recommended inspection period.

22.19 METERING

- 22.19.1 For the purposes of the clause 22.19 above, “construction works” shall mean the Works excluding both the Contractor's on and off Site, fabrication facilities, workshops, work-yards, offices and stores.
- 22.19.2 The Contractor shall install a separately metered and invoiced supply or supplies of electricity for:-
- (1) Site fabrication facilities;
 - (2) Site workshops and work-yards; and
 - (3) Site offices and stores.

22.20 INABILITY TO SUPPLY

Wherever, the Project Contractor is not in a position to supply construction power and water supply to the system wide Contractor, he (the system-wide Contractor) shall arrange for his own separate construction power and water supply.

Appendix 1

1. MONTHLY PROGRESS REPORT

1.1 Topics

1.1.1 The Monthly Progress Report required under clause 2.17 of the GS shall include as a minimum the following sections and topics:

- (1) Executive Summary, highlighting any matters of concern and explaining corrective action to be taken
- (2) Safety and Quality issues (including any necessary corrective action taken or proposed to prevent the re-occurrence of the non-conformities)
- (3) Programme and overall progress
- (4) Physical progress report (see Paragraph 2.19 of the General Specification)
- (5) Achievement of Key Dates and Milestone Dates
- (6) Design status
- (7) Design and design co-ordination progress
- (8) Design submission and Employer's Representative's response status (list of all design submissions showing current status to be appended)
- (9) Manufacturing status
- (10) Materials ordered / in process
- (11) Equipment manufactured / procured
- (12) Factory acceptance test status report
- (13) Delivery status
- (14) Shipping / transportation activity
- (15) Deliveries to DMRC (including release certificate reference)
- (16) Free issue items (where applicable)
- (17) Installation / erection on Site
- (18) Site surveys (where applicable)
- (19) Equipment installation and erection
- (20) Completion of remedial works / Site acceptance
- (21) Safety audit and safety report
- (22) Test and Commissioning
- (23) Commissioning activity
- (24) Planned vs. Actual Table
- (25) Remedial works
- (26) System integration tests
- (27) Documentation

- (28) Functional design
- (29) Operation manuals (if applicable)
- (30) Maintenance manuals (if applicable)
- (31) Training manuals (if applicable)
- (32) As-built drawings
- (33) Spares / Test equipment
- (34) Training (if applicable)
- (35) Employer's Taking Over of Works (part or whole of Works)
- (36) Taking Over Certificate
- (37) Maintenance issues
- (38) Defects Liability
- (39) Contractual / Commercial
- (40) Payments / invoices
- (41) Employer's Representative's instructions and variation orders
- (42) Claims / potential claims
- (43) Contractor's resources (details of all staff and sub-contractors engaged on the Works)
- (44) Progress photographs
- (45) Labour Law Compliance Status.

1.2 Details

- 1.2.1 The programmes shall show current status to provide a comparison between the Works Programme and reported progress.
- 1.2.2 Actual progress shall be reported for each activity in the Works Programme in the following terms:
 - (1) the percentage of the work which is complete;
 - (2) the remaining duration of the work;
 - (3) the actual start date; and
 - (4) the actual completion date.

1.3 Copies

The Contractor shall submit 1 unbound original and 1 bound hard copies of all Monthly Progress Reports and of the accompanying documents plus one copy in electronic format on PC compatible.

Appendix 2

2. CONTRACT SYSTEMS SAFETY MANAGEMENT

2.1 Safety Assurance Programme

- 2.1.1 The Contractor shall within 60 days of Notice to Proceed, submit his proposed Safety Assurance Programme Plan for review and acceptance by the Employer's representative.
- 2.1.2 The Safety Assurance Programme Plan shall cover design, manufacture, testing, integrated testing, and commissioning to ensure safe routing, spacing, movement and control of trains and meet the requirements as stipulated in the PS.
- 2.1.3 The Safety Assurance Programme Plan shall also address reliability, maintainability and availability of the system. This shall ensure the system has a high degree of reliability and minimise down time during routine and failure repair.
- 2.1.4 The Safety Assurance Programme Plan shall include an EMC/EMI Control Plan that shall evaluate the requirements for electro-magnetic compatibility and interference, in this specification for all appropriate elements of the system, and ensure they are met.
- 2.1.5 The Safety Assurance Programme Plan shall include a Fire Control Plan which shall evaluate and ensure *inter-alia* that the fire loading of the materials proposed to be used, and potential sources of combustion in case of failure are compatible with currently accepted international practice.
- 2.1.6 The Safety Assurance Programme Plan shall describe procedures required to perform the specific tasks necessary to achieve safety, reliability and maintainability requirements. These procedures shall be incorporated within the Contractor's Quality Assurance System, and shall be subject to review by the Employer's Representative

2.2 Hazard Analysis

- 2.2.1 The Contractor shall take the lead role in the interface Hazard Analysis for trackside equipment, to which the system is interfaced, provided by other contractors.
- 2.2.2 The Contractor shall produce the Hazard Analysis Schedule for his complete system including all interfacing systems and shall interface principally with the Rolling Stock, Signalling, Communication, Power Supply, Civil and Depot Contractor as well as any other Designated Contractors to obtain the information necessary, from their hazard analyses, to complete the analysis.
- 2.2.3 The Contractor shall, as part of the safety analysis, prepare analyses to identify Hazards and ensure their satisfactory resolution. The analyses shall be prepared and submitted by the Contractor for the Employer's representative acceptance.
- 2.2.4 Not Used.
- 2.2.5 The Contractor shall compile a list of critical and catastrophic items identified as a result of hazard analysis.

- 2.2.6 All hazard resolution by procedural control shall be cross-referenced from the Critical and Catastrophic Items List to the appropriate manuals.
- 2.2.7 The qualitative measures of hazard severity are defined as follows:
- (i) Hazard Category I - Catastrophic: Operating conditions such that personnel errors, environment, design deficiencies, subsystem or component failure or procedural deficiencies may cause death or system loss. The safety target shall be based on internationally accepted standards.
 - (ii) Hazard Category II - Critical: Operating conditions such that personnel errors, environment, design deficiencies, subsystem or component failure or procedural deficiencies may cause severe injury to personnel, severe occupational illness or major system damage. The safety target for the occurrence of all Category II hazards summed together shall again be based on internationally accepted standards.
 - (iii) Hazard Category III - Marginal: Operating conditions such that personnel errors, environment, design deficiencies, subsystem or component failure or procedural deficiencies, may cause minor injury to personnel, minor occupational illness or minor system damage.
 - (iv) Hazard Category IV - Negligible: Operating conditions such that personnel errors, environment, design deficiencies, subsystem or component failure or procedural deficiencies will not result in injury to personnel occupational illness or damage to the system.
- 2.2.8 The Contractor shall prepare a Fire Safety Design Report for review and acceptance by the Employer's representative. This shall be submitted within 2 months after Notice to Proceed and revised and updated for the completion of the preliminary, pre-final and final design stages. Materials used in the Permanent Works of the system shall conform to fire safety requirements of international standards, subject to the acceptance of the Employer's Representative.

2.3 Results

- 2.3.1 Source of all failure rates employed shall be indicated in the Hazard Analyses.
- 2.3.2 All hazard analyses submitted to the Employer are to be standardised by the Contractor such that format and forms employed by all sub-contractors are the same.
- 2.3.3 The following targets shall be employed for the Fault Tree Analysis
- (i) No single point failure shall lead to death.
 - (ii) No combination of undetected failure and double point failures shall result in death.
 - (iii) No combination of undetected failure and single point failure shall result in major injury.
- 2.3.4 The procedures for Operation, Maintenance, Training and the Contractor's Quality Assurance manuals shall incorporate resolution of hazards identified from this hazard analysis.

Appendix 3

3. SUBMISSION FOR REVIEW REQUEST FORM

SUBMISSION FOR REVIEW REQUEST

Reference No. _____ (see Paragraph 4.3.2) Date: _____

Programme reference and scheduled date: _____

Submission stage _____ (see paragraph 3.5.1.1)

Title _____

We hereby submit for review by the Employer's Representative the documents or articles listed below:

(Introduction and list of items submitted – see Paragraph 4.3.5.2 - continue on separate sheet if necessary)

I confirm that the material is in full compliance with contract.

Signed _____ (Contractor's responsible engineer)

Employers Representative Response

Dated__

The material submitted has been review and the following decision is given:

"No objection"/"No Objection Subject To"(See below)/ "Rejected" (see below)

The following comments are made and a re-submission is to made by the contractor within 10 working days demonstrating fully how all of these are taken into account:

(Employer's Representative's comments)

Signed _____ (Employer's Representative)

Appendix 4

4. SCHEDULE OF ITEMS TO BE SUBMITTED BY CONTRACTOR

This Appendix lists the principal items to be submitted by the Contractor for review by the Employer's Representative. This list is not exhaustive and the Contractor is reminded to satisfy itself of the requirements for all submissions whether or not they are included within this Appendix.

Article	Reference Paragraph(s)	To be submitted
Availability, Reliability and Maintainability deliverables	1.9	In accordance with RAM deliverables described.
Initial version of the Works Programme	2.4.1.1	As stated in the PS
Works Programme	2.4.1.2	As stated in the PS
Design Submissions Programme	2.5.1	As stated in the PS
Design, Procurement and Manufacturing Programme	2.6.1	As stated in the PS
Material Control Schedule	2.6.5	As stated in the PS
Factory Testing Programme	2.6.8	Factory Testing Programme shall support all aspects of the Factory Testing Plan.
Installation Programme	2.7.1	As stated in the PS or as directed by the Employer's Representative
Testing & Commissioning Programme	2.7.7	As stated in the PS or as directed by the Employer's Representative
Monthly Progress Report and supporting documentation	2.10.1	The 5 th day of each month.
Physical Progress Report (baseline)	1.1.1.1	Within 30 days of the Commencement Date of the Works (LOA).
Contractor's Project Plan	3.3.1	As stated in the PS, or if none is given, within 60 days of the Commencement Date of the Works (LOA).
Particulars of agent/Contractors Manager	3.3.1.6(6)	30 days before the Commencement Date of the Works
Interface Management Plan	3.3.1.7(b)	Within 60 days of notification from the Employer's Representative of the identity of each Project Contractor
Detailed Interface Document	3.3.1.7(d)	Within 60 days of notification from the Employer's Representative of the identity of each Project Contractor
EMC Management Plan	3.4.6	As stated in the PS or along with Preliminary Design Documents
Software Quality Assurance Plan	3.4.7	As stated in the PS or along with Preliminary Design Documents
Design Plan	3.5.1	As stated in the PS
Design Verification and Validation Plan	3.5.2	As stated in the PS

Article	Reference Paragraph(s)	To be submitted
Contractor's Factory Testing Plan	3.5.3	As stated in the PS
Test Reports	3.5.3.7	Immediately after the completion of Factory Testing
Procurement, Manufacturing and Delivery Plan	3.5.4	As stated in the PS
Contractor's Health and Safety Documentation	3.6.1.6	Within 30 days of the Commencement Date of the Works
Environmental Management Plan	3.3.1.6 (6)	30 days prior to the commencement of construction activities
Commissioning Plan	3.7.1.1	As stated in the PS
Installation Test Schedule	3.7.1.2 b.(i)	As stated in the PS or if not given, not later than two months in advance of the Date scheduled for commencement of respective tests
Partial Acceptance Tests Plan	3.7.1.2 b.(ii)	As stated in the PS or if not given, not later than four months in advance of the Date scheduled for commencement of Partial Acceptance Tests
System Acceptance Tests Plan	3.7.1.2 b.(iii)	As stated in the PS or if not given, not later than four months in advance of the Date scheduled for commencement of System Acceptance Tests
Integration Tests & Commissioning Plan	3.7.1.2 b.(iv)	As stated in the PS or if not given, not later than four months in advance of the Date scheduled for commencement of Tests on Completion
Operation & Maintenance Manuals Plan	3.7.2	As stated in the PS or if not given, not later than Two months prior to the issue of the Taking Over Certificate for the Works
Defects Liability Management Plans	3.7.5	Two months before the ROD.
Project Document Control Procedure	4.3.2	Within 45 days of the Commencement Date of the Works
Quality Manual	5.2.2.2	Within 30 days of the Commencement Date of the Works
Quality System Procedures	5.2.3	Within 30 days of the Commencement Date of the Works
Details of Quality Manager	5.2.6	Quality Manager(s), who shall be directly responsible to senior management level
Proposed Corrective & Preventive Action Plan	5.2.2.6	Within 14 days of issue of CAR
Management Quality Plan	5.2.2.1(1)	The Management Quality Plan shall define the Contractor's management structure for the execution of the Works
Design Quality Plan	5.4	The Contractor shall prepare a Design Quality Plan for its design works
Manufacturing Quality Plan	5.5	The Contractor shall prepare a Manufacturing Quality Plan for his manufacturing works
Site Quality Plan	5.6	The Contractor shall prepare a Site Quality Plan for its construction and installation works

Article	Reference Paragraph(s)	To be submitted
Reports of Quarterly Quality Audits	5.8.2	Every Three months
Quality Control Register	5.9	7 th working day of every month
Software Deliverable	6.1	As stated in the PS
Operational Safety Report (Software)	6.6	Software acceptance shall be based upon the supply of software functioning in a manner reviewed without objection by the Employer's Representative
Packaging Materials & Procedures	8.3.1	As stated in the PS
Latest drawings, test procedures, specifications and quality documentation for inspection of equipment	9.2.7.4	At least 15 days prior to each First Article Inspections (FAI)
Installation Tests Reports	9.4.3.3	Immediately after the completion of each test
Partial Acceptance Tests Records	9.4.4.9	Immediately following the successful Partial Acceptance Tests
System Acceptance Tests Records	9.4.5.8	Immediately following the successful System Acceptance Tests
Integration Tests & Commissioning Records	9.4.6.8	Immediately following the successful Tests on Completion of the system
Service Trial Records	9.4.7.8	Immediately following the successful Service Trial of the system
Summaries of Inspection and/or Test	9.6.11	7 th day of the following month
Construction & Installation Plan	14.1.1	As stated in the PS
Particular Uses of Site	17.2.1	Within 60 days of the Commencement Date of the Works
Method Statements Programme	18.5.5.3	Within 30 days of the Commencement Date of the Works or at a date reviewed by the Employer's Representative
Detailed written report of accidents, incidents and dangerous occurrence	18.6.4.1	Within 7 days of occurrence/accident
Name and qualification of safety representative for temporary site electricity	22.3.1	Not later than 4 weeks before appointment

Appendix 5

5. TYPICAL TYPE TEST REQUIREMENTS

5.1 Electronic and Electrical Equipment

The initial visual inspection shall be carried out to ensure that the equipment is of sound construction and, so far as can be ascertained, meets the requirements of the Specification.

5.1.1 Initial Performance Test

- i. The initial performance tests shall consist of a comprehensive series of measurements of the characteristics of the equipment to demonstrate that its performance is in accordance with its functional requirements, including detailed requirements of the Specification.
- ii. This test shall normally be performed at an ambient temperature of 40°C +5°C while supplied at its normal voltage and frequency, if relevant.
- iii. This test shall extend to demonstrating compliance with any limitation on self-generated vibration or interference as stated in the Specification.

5.2 Mechanical Tests

5.2.1 Drop Test

- i. The drop test is intended to be carried out on units and sub-assemblies that are portable. It is not intended that it be carried out on complete racks of equipment.
- ii. Casings or dust covers, which have to be removed for servicing, shall be removed after subjecting equipment to this test to inspect for damage. The test is designed to reveal any weakness of assembly and to ensure that the component mountings are of adequate strength. It is not designed to check whether doors or windows made of glass will fracture and to this end meters, glass windows, etc., may be removed.
- iii. The equipment shall not be deemed to have failed the drop test if externally accessible components such as control knobs or connectors are damaged. The Employer's Representative however reserves the right to ask for some form of guard, to prevent such damage, to be fitted at the Contractor's cost.

5.2.2 Vibration Test

The vibration test is designed to reveal any parts or components of the equipment that may be prone to any resonance severe enough to cause

possible damage or malfunctioning.

5.3 Environmental Tests

5.3.1 Dry Heat Test

- i. The dry heat test shall be carried out on each complete piece of equipment or assembly, with all doors and covers being in place and closed as in normal operation.

5.3.2 Low Temperature Test (in case applicable for Jaipur ambient temperature range)

The low temperature test shall be carried out on each complete piece of equipment or assembly, with all doors and covers being in place and closed as in normal operation.

5.4 Electrical Tests

5.4.1 Supply Variations

Measurements of equipment performance and maximum VA consumption shall be made, for supply voltage and frequency variations in all possible combinations of upper limit, normal and lower limit as detailed in the Specification. Throughout these tests, the equipment shall function in accordance with the Specification.

5.4.2 Supply Interruptions

- i. The supply input to the equipment under test shall be interrupted for periods of 10 ms.
- ii. The tests shall be performed ten times at random for ac supplies and three times at random for dc supplies.
- iii. The equipment shall be capable of withstanding these interruptions of supply input without damage, interruption or resetting by the operator and shall continue to function and operate correctly in accordance with the Specification.

Appendix 6

6. REQUEST FOR INSPECTION OF WORKS FORM

JAIPUR METRO RAIL CORPORATION

CONTRACTORREQUEST FOR INSPECTION OF WORKS

To the) Date
 Employer's) will be ready for your inspection
 Representative) on
 *Description of Works) at prior to
) on at hrs

Signed for Contractor. Received by
 For Employer's
 Representative date
 Time

Filled in by Engineer Mr. Please arrange inspection
 Mr. Please check setting out

Signed
 Filled in by Inspector The above work was inspected and permission was given/not given to proceed with next operation.
 • The following remedial works were required
 • Contractor informed verbally (to MR _____
 By Mr _____ on _____ at
 _____ hrs)
 • Remedial works inspected and permission given to proceed with next operation on _____ at
 _____ hrs)
 as supervised by
 Signed
 Date Time

Verbal or written permission by the Employer's Representative or his staff shall in no way relieve the Contractor of his responsibilities under the Contract.

*To be completed if applicable.

Appendix 7

7. NOT USED

Appendix 8

8. FIRST AID REQUIREMENTS

8.1 Not Used

8.2 Provisions by the Contractor

- 8.2.1 The Contractor shall supply portable first aid boxes maintained fully equipped at each local site offices and any work locations where 20 or more persons work at a time.
- 8.2.2 In each site office and work location at least one of the Contractor's employees shall be trained in first aid and should be available at all working hours for purpose of attending to emergencies.
- 8.2.3 The Contractor shall be responsible for making his employees aware of the location and access route to the nearest first aid base and if necessary shall provide facilities for evacuating a workman by stretcher from the worksite.
- 8.2.4 The Contractor shall keep the first aid base personnel informed of the number and identity of staff working within the area of responsibility of each first aid base.

Appendix 9

9. Not Used



Procurement of Works

JAIPUR METRO RAIL CORPORATION LIMITED

BIDDING DOCUMENT

for

Procurement on International Competitive Bidding Mode

of

ICB No.- JP/JS 21 (Phase-1B)

**DESIGN, MANUFACTURE, SUPPLY, INSTALLATION, TESTING &
COMMISSIONING OF AUTOMATIC FARE COLLECTION SYSTEM
FOR JMRC PHASE 1B**

PART - II REQUIREMENTS

Section 6 – Employer's Requirements

Volume – II Particular Specifications

**3rd Floor, RAJSICO Building, Udhog Bhawan, Tilak Marg,
C- Scheme, Jaipur (Rajasthan) PIN-302005
Country: India**

Section 6 – Employer's Requirements

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**DESIGN, MANUFACTURE, SUPPLY, INSTALLATION, TESTING AND
COMMISSIONING
OF
AFCSYSTEM
JP/JS21 (1B)**

1. GENERAL SPECIFICATION

**DESIGN, MANUFACTURE, SUPPLY, INSTALLATION, TESTING AND
COMMISSIONING**

OF

AFCSYSTEM

JP/JS21 (1B)

2. PARTICULAR SPECIFICATION

**DESIGN, MANUFACTURE, SUPPLY, INSTALLATION, TESTING AND
COMMISSIONING
OF
AFCSYSTEM
JP/JS21 (1B)**

3. DRAWINGS

(Separately provided in CD) Bidder to submit signed hardcopy with the bid.

**DESIGN, MANUFACTURE, SUPPLY, INSTALLATION, TESTING AND
COMMISSIONING
OF
AFCSYSTEM
JP/JS21 (1B)**

4. SITE AND HEALTH SAFETY REQUIREMENTS

**Safety, Health & Environment (SHE) provided at Section-6 Volume-III (Part-II
of Bid Document)**

**DESIGN, MANUFACTURE, SUPPLY, INSTALLATION, TESTING AND
COMMISSIONING
OF
AFC SYSTEM
JP/JS21 (1B)**

5. FORM OF COMPLETION/TAKING OVER CERTIFICATE

5.1 Form of Completion Certificate

Contract: [. . . .insert name of contract and contract identification details. . . .]

Date:

Certificate No.:

To: [. . . .insert name and address of contractor. . . .]

Dear Ladies and/or Gentlemen,

Pursuant to GCC Clause 24 (Completion of the Facilities) of the General Conditions of the Contract entered into between yourselves and the Employer dated [. . . .insert date. . . .], relating to the [. . . .brief description of the Facilities], we hereby notify you that the following part(s) of the Facilities was (were) complete on the date specified below, and that, in accordance with the terms of the Contract, the Employer hereby takes over the said part(s) of the Facilities, together with the responsibility for care and custody and the risk of loss thereof on the date mentioned below.

1. Description of the Facilities or part thereof: [. . . .description]
2. Date of Completion: [. . . .date]

However, you are required to complete the outstanding items listed in the attachment hereto as soon as practicable.

This letter does not relieve you of your obligation to complete the execution of the Facilities in accordance with the Contract nor of your obligations during the Defect Liability Period.

Very truly yours,

[. . . .Signature]

Employer.

AUTOMATIC FARE COLLECTION SYSTEM

SECTION 6 EMPLOYER'S REQUIREMENTS – PARTICULAR SPECIFICATIONS

BIDJP/JS 21 (1B):

**DESIGN, MANUFACTURE, SUPPLY, INSTALLATION, TESTING AND
COMMISSIONING OF AFC SYSTEM FOR PHASE-1B OF JAIPUR
METRO**

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LIST OF ABBREVIATIONS

AFC	Automatic fare collection
AG	Automatic Gates
CC1	Existing Central System (of Phase 1-A)
CC2	Central System for Phase 1-B(if applicable)
CS	Central System
COTS	Commercially Off The Shelf
CSC	Contactless smart card
CST	Contactless smart token
DLP	Defect Liability Period
EOD	Equipment Operating Data
FAT	Factory Acceptance Test
GS	General Specification
NFC	Near Field Communication
OCC	Operation Control Center
POM	Passenger Operated Machine
PS	Particular Specification
PTD	Portable Ticket Decoder
SC	Station Computer
SDC	Software Development Center
TOM	Ticket Office Machine
TR	Ticket Reader
TVM	Ticket Vending Machine

CHAPTER 1

INTRODUCTION

1.1 GENERAL

- 1). Jaipur Metro Rail Corporation Ltd. (JMRC) has implemented Automatic Fare Collection system (AFC) for the Phase-I-A consisting of 9 stations. The Jaipur Metro Rail Corporation (J.M.R.C.) is extending the EW corridor of Jaipur Metro to include two new stations beyond Chandpole station. The additional network comprising of the following Corridor, is referred as Phase 1B of JMRTS.

Corridor	Description	Route length in km (between dead ends)		
		Underground	Elevated	Total
Corridor-1 B	Choti Chouper to Badi Chouper	2.34	0	2.34

- 1.2 The work consists of Automatic Fare Collection system work of phase1B, extending from Choti Chouper to Badi Chouper (Underground stations).

1.3 Corridor Description

- 2). The East-West Corridor extension, referred to as Corridor 1B extends from Choti Chouper in the West to Badi Chouper in the East and is approximately 2.34 km long and is referred to as EW-B Corridor.

1.5 RELEVANT DOCUMENTS

- 3). This Particular Specification (PS) shall be read in conjunction with the Special Conditions of the Contract, General Conditions of Contract, the General Specification (GS) and any other document forming part of the contract. In the event of a conflict between the GS and PS, the requirements of the PS shall prevail.
- 4). In the event of a conflict between the PS and any other standards or specifications quoted in the PS, the requirements of the PS shall prevail.
- 5). Notwithstanding the precedence specified in above paragraph, the Contractor shall always immediately seek advice from the Employer's engineer in the event of conflicts between specifications.
- 6). The drawings attached with the tender document are for general information only. The contractor shall interface with station contractor / DDC for final station level AFC requirements.

1.6 SYSTEM DESCRIPTION

- 1) Jaipur Metro Rail Corporation AFC system uses recyclable contactless smart token(CST) as single journey ticket and contactless smart card for multiple journey. The JMRC AFC system is capable of processing Mifare Type 'A' technology.
- 2) The station equipments send the data to AFC Station computer (SC) through LAN for processing. SC further uploads this data to Central computer for end-of-day processing and revenue and traffic reports. A brief overview of Phase 1-A system is given in appendix 1.1.
- 3) The Central computer system(CC1) is designed to monitor operation of the whole AFC system and process equipment data such as transaction data, revenue data and operation status data generated by AFC equipment.
- 4) It is envisaged that the existing AFC system consisting of CC1 & 9 stations shall be expanded to include stations of Phase 1-B. Station equipment of Phase 1-B shall be integrated with CC1, either directly or through any other acceptable solution, for example via a separate Central server(referred to as CC2 hereinafter) as depicted in Figures below or through any other solution.
- 5) The bidder shall submit the salient features, technical details and integration methodology of proposed technical solution highlighting its advantages over the solutions listed above vis-à-vis ease of implementation, requirement of current system's details, maintenance etc.
- 6) JP/JS21(1B) contractor shall be provided access to the documents as listed in appendix 1.2 and source code of existing AFC system by the employer to aid in integration with CC1. Any other requisites required for integration shall be arranged by the contractor. The bidders are advised to visit & examine the site and obtain the necessary information before bid submission.

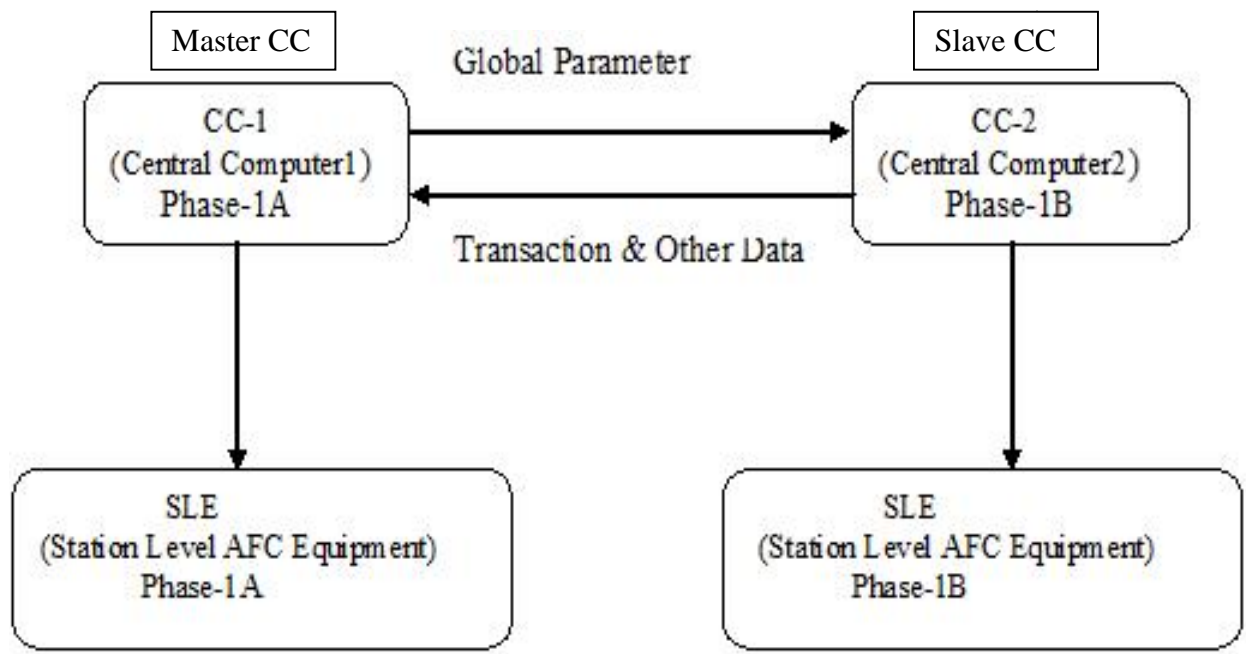


Figure:1

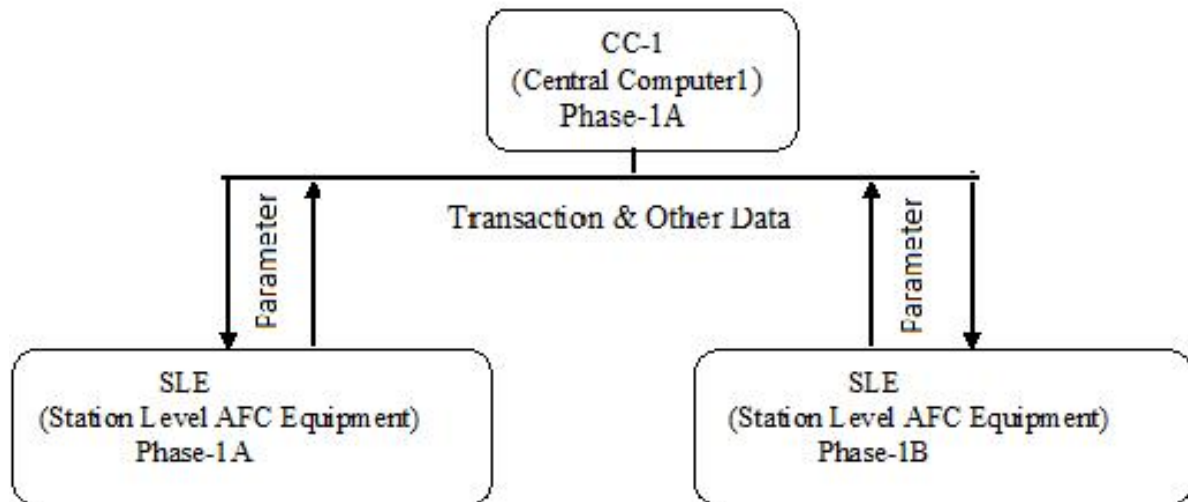


Figure:-2

CHAPTER-2

SCOPE OF WORKS

2.1 SCOPE

2.1.1 The scope of the works includes:

- a. Design, manufacture and supply of AFC equipments for 2 stations of Phase-1B. This also includes supply of local items, installation, testing and commissioning of AFC equipments for 2 stations of Phase-1B.
- b. It includes expansion of existing AFC system of JMRTS by adding two new stations, either directly or through any other acceptable technical solution e.g. via a separate central server(CC2). The contractor shall interface with Phase-1A central computer for seamless integration between Phase-1B & Phase-1A AFC system. The proposed solution shall work in synchronization with existing AFC system of Phase 1-A of JMRC.
- c. Station wise list of equipments are given in Appendix '2.1, 2.2, 2.3 & 2.4'. The delivery includes all the items which have not been included in this list but are a part of proposed solution and are required for implementation at all levels: Central level, Station or Equipment level.
- d. Necessary upgradation of station level equipments of Phase 1A section to accommodate expansion of 2 station of Phase 1B for seamless travel of passengers.

2.1.2 If applicable:

The AFC system design shall meet the Jaipur Metro requirement for handling at least 2 stations. The Central system should be scalable and integrable for Jaipur Metro future extensions (for data handling capacity as well as number of lines / stations / equipments and smart cards by addition of extra hardware/upgradation of existing hardware).

2.1.3 The system shall support inter-operability for smart card with different operators using the same smart card, to the extent applicable.

2.1.4 The system shall integrate with the existing merchant bank. The contractor shall interface with the banker for ensuring provision of all banking services as being used in Phase 1A to be applicable for Phase 1B.

2.1.5 The Contractor shall follow the schedules of works and supply and shall complete the sections of the works by the key dates set out in the bid document. Schedule of key dates and access dates are at Appendix '15.1 & 15.2' of PS.

2.1.6 Phase 1B AFC system shall meet existing JMRC business rule placed at Appendix 12.1 and shall be designed keeping in view further business tools expansion/modification requirements.

2.2 GENERAL REQUIREMENTS

- 1). The system shall be designed to attain the Employers requirements as required in this Specification.
- 2). AFC System shall be capable to process contactless smart cards (including those operational in Phase 1-A i.e. Mifare Desfire EV1), tokens (including those operational in Phase 1-A i.e. Mifare Ultralite) & NFC.
- 3). Jaipur Metro seeks a Solution compatible with Phase 1-A system, for the AFC system with following elements:
 - a). Adherence to International and National standards and practices for the industry. (published and maintained by organizations such as ISO, CEN, ISI etc).
 - b). Inter-operability - To ensure that Phase 1-B equipment will be able to participate in other transit systems subject to commercial rights agreements between parties utilizing Clearing house or other relevant models.
 - c). The proposed solution (hardware and software) to the extent ensure:
 - Vendor-independent delivery of modules / equipments as far as possible. Use of Standard Commercial off the Shelf products and software, encouraging use of non-proprietary items.
 - Proven hardware platform.

Contractor shall highlight above aspects in its technical offer in detail.

- 4). The system needs to be flexible and configurable designed to allow future adaptation in a multi-operator environment and government policies.
- 5). The attainment of the reliability, availability, maintainability and safety requirements of the system will be verified by analysis, testing and system demonstrations as required in the Specifications.

2.3 SYSTEM AND EQUIPMENTS

2.3.1

- 1). The scope of supply shall include all necessary hardware / equipments, software, accessories, materials, documentation and facilities necessary to meet all requirements of the Phase-1B AFC system for the required stations.
- 2). The proposed AFC System comprises of all equipment associated with AFC system including (but not limited to):
 - a). Central System.(if applicable)
 - b). Requisites for interfacing proposed Phase 1-B equipment with existing Central system.
 - c). Station Computers.
 - d). Ticket Office Machines (Standard PC based, with Reader/Writer Type A capable of processing Ph 1-A CSC and NFC and other accessories).
 - e). Passenger operated Ticket Vending Machines.(with Reader/Writer Type A capable of processing Ph 1-A CSC and NFC and other accessories)

- f). Ticket Readers/add value machine(with Reader/Writer Type A capable of processing Ph 1-A CSC and NFC and other accessories)
 - g). Retractable Flap type AFC Gates (Entry, Exit& Reversible wide Gates for disabled). (with Reader/Writer Type A capable of processing Ph 1-A CSC and NFC and other accessories)
 - h). Complete Central , as required, and Station level networking works and network equipments like Switches, Routers including Ethernet / OFC cables, ties, conduits, legends, terminations, other accessories, power supply distribution panels, power / control cables and all fixing and termination accessories. The contractor shall provide any necessary equipment at central level required for integrating Phase 1-B equipment with existing Central Computer System.
 - i). All equipment / items associated along with any interfaces required to ensure operation within the performance requirements.
 - j). All equipment and paraphernalia necessary to carry out factory and on site testing and commissioning.
 - k). Spare parts.
 - l). All software and hardware required for AFC including licenses of all applications and Operating System software etc.
 - m). NFC cards for testing purposes (5 no.)
 - n). Swing barriers
 - o). The software supplied for Station Computer, Gate, TOM, EFO, Ticket Reader cum Add Value Machine, TVM shall be re-deployable by JMRC for its own use for later expansions with no additional license or cost requirement.
 - p). All equipment and paraphernalia necessary to carry out factory and on site testing and commissioning.
 - q). Any other item require for completion of Phase 1B contract /works.
- 3). The contractor shall transfer to Jaipur Metro all requirements specifications, design documents, interface specifications etc. except software source code whether specifically prepared or modified for this project or not, only with the exception of codes for Commercially Off the Shelf (COTS) software packages belonging to parties other than the Contractor. All this information is to be provided prior to the taking over of works, to allow Jaipur Metro to maintain and enhance the system thereafter. The source code (latest version) will be provided after completion of DLP. Contractor will do complete demonstration of validation by compiling the source code before hand over. The cost, if any, shall be borne by the contractor.
- 4). Contractor shall provide detailed interface specifications for following interfaces(API's, DLL's Documentation), but not limited to:
- a). Card / token to Reader/Writer

- b). Equipment to SC
 - c). SC to CC1 or CC2 if applicable
 - d). Reader/Writer to respective equipments
 - e). Ticket Reader(TR) cum Add Value Machine(AVM) to CC
- 5). Contractor shall interface with other designated contractors of Jaipur Metro as per Ch-7- 'Interfaces' of this PS.

2.3.2 SERVICES

The Services to be performed by the Contractor shall include, but not limited to, the following:

- 1). Design, manufacture, delivery, assurance & integration of Phase 1-B equipment with existing AFC network of Phase 1-A . The contractor shall expand/ upgrade the existing AFC system of Phase 1A to integrate stations of Phase 1-B.
- 2). Installation, interfacing, testing and commissioning of the AFC System for all Phase 1-B stations/ OCC.
- 3). Presentations, meetings, reviews and audit support as specified in the Specification.
- 4). Project management of the implementation of the system.
- 5). Quality management, provision of reliability and maintainability demonstration test.
- 6). Overall site supervision and management.
- 7). Decommissioning, removal and disposal of Temporary Works, if any.
- 8). Operation and maintenance support services during DLP period. Efficient management of contractor's spares during DLP.
- 9). Contractor shall ensure system security from fraud possibilities, falsification of data, computer virus etc. during DLP period.
- 10). Preparation and submission of documentation (hard / soft copy).
- 11). Interface management.
- 12). Providing necessary support and documents for getting necessary approvals from Indian authorities viz Railway Board/ RDSO, and Commissioner of Railway Safety.
- 13). Setup Contractor's Premises (Project Office & Storage Space).
- 14). Training & Transfer of Knowledge.
- 15). Any other work/ services to meet the Employer's requirements or necessary for integration with existing AFC system of Phase 1A to allow the introduction of future services without disruption to existing operation services.

2.4 INTERFACE WITH BANK

The employer has setup an interface with bank for top-up of CSC through JMRC website via credit/debit cards and similar banking instruments. The Contractor shall upgrade as per requirement this interface with the existing banker to ensure all functionalities as available in Phase 1A are available for Phase 1B stations.

CHAPTER 3

OPERATIONAL REQUIREMENTS

3.1 GENERAL

- 1). This chapter describes basic operational requirements, which will govern the AFC system.
- 2). When implementing the operational requirements, the contractor shall ensure that all associated security/ frauds problems are addressed.
- 3). The AFC system for Jaipur Metro will be a system which requires checking of tickets at entry and exit gates.
- 4). Contractor should supply AFC Equipment so as to aid maintainability and reduce the requirement for spares. All AFC Equipments shall use interchangeable modules. Modules shall be accessible for prompt exchange or repair. Modules performing identical or similar functions in AFC Equipment shall be mounted in the same location within each cabinet and shall be physically and electrically interchangeable as far as possible.

3.2 TICKETS

- 1). All tickets issued from JMRC existing CC1 (Ph-1A) should be acceptable in the system supplied by JS21 (1B) contractor. It means the passenger can use same ticket to enter JMRC system from Ph-1A system and exit from Ph-1B system and vice versa.
- 2). Tokens issued for single journey should allow entry and exit from any station of JMRC as per JMRC Business Rules.
- 3). Data on the tickets shall include all the parameters as in currently issued tickets in JMRC AFC system. The JMRC ticket layout shall be shared during design phase.
- 4). **Types of Fare Media** - AFC system shall be compatible with following type of recyclable tickets in the system of Jaipur Metro:
 - a). Contactless smart token (CST Type A& NFC)
For single journey ticket collected on exit.
Any Type A token (Minimum 64 bytes) compliant to ISO 14443 including Mifare Ultralite.
 - b). Contactless smart card (CSC Type A & NFC)
For multiple journey, Staff pass and other tickets retained by the passenger.
 - i). Any Type A card (Minimum 4KB) compliant to ISO 14443 A and ISO 18092 (Minimum EAL4 Security Criteria for combined hardware and software) including that operational in Ph 1-A i.e. Mifare Desfire (minimum 4 KB) EV1.

The contractor shall demonstrate compatibility of supplied hardware with NFC. Supply of 5 no. of NFC cards for testing purposes shall be under the scope of contractor.

3.3 Description of Fare Products

3.3.1 Contactless Smart Token (CST)

- a). Tokens shall be collected in containers at the exit gates and recycled for issue from TOM, EFO & TVM of same / different station.

- b). The anti-collision feature for token will be taken care of by the gate software.
 - c). Anti-Passback mechanism to prevent unauthorized access in system.
 - d). Should ensure transaction integrity (anti tearing).
 - e). MAC calculation algorithm for token data integrity shall be implemented at equipment level
(Same as in existing Phase-1A system).
- 1). Single Journey Ticket (SJT): SJT shall be valid for travel only on the day of issue and good for one journey. On exit, the remaining value shall be encoded to zero value and the ticket is captured.
 - 2). Child Ticket: to be finalized in the design phase.
 - 3). Paid Exit
 - 4). Free exit

3.3.2 Contactless Smart card

- 1). Stored Value Card (SV)
 - a). There shall be provision of not less than sixteen (16) SV ticket types. Each SV type shall be allocated a set of fares and shall be capable of change by means of downloadable parameters.
 - b). The value of a journey shall be subtracted from the value stored in the SV ticket during processing at the exit gate. The passenger information display in each gate shall indicate the remaining value of the SVs tickets at the start and the completion of each journey.
 - c). SVs shall have an expiry date (after last top-up) determined by an operating parameter at CC1.
- 2). Tourist Ticket (Tour)

The system shall have provision for CSC to be used as:

 - a). Tourist card (unlimited journeys during limited validity) : Features shall be as per current JMRC Business rules.
 - b).
- 3). Staff / Employee Pass (EP)
 - a). This smart card based pass shall be valid for an unlimited number of journeys on any operational day. The pass shall be good for use in any manner of entry or exit and the entry/exit code shall not be checked for correct sequence. The EP shall also not be subject to the Time-in-System check as required.
 - b). System shall however keep all records of such usage for scrutiny, if required.
- 4). Test Ticket (TT)

This ticket (CSC or CST) shall be used to test the functionality of all AFC equipment for maintenance purposes only. Test tickets shall be issued only when the equipment is in maintenance mode.
- 5). Group Ticket (GT)
 - a). Paper slip issued from TOM / EFO printed from TOM printer. To be used for booking a large group (say 30-40 persons) on a single ticket.
 - b). This ticket will not be processed at AFC Gates and will be manually checked.
 - c). Amount and traffic generated by group tickets shall be accounted in the AFC reports.
- 6). Prepaid Card: Date of validity will start from the date of first use of card on the AFC Gate.

- 7). Weekly/Monthly Pass: Unlimited Journey during validity.
- 8). Trip Pass: Limited number of trips in a defined period.
- 9). Promotional Ticket: may be issued during festival times. This may have option to give more discounts/free trip etc.

3.4 Blacklisted tickets

- 1). Ticket Blacklisting shall be done at existing CC1 (Ph-1A). These tickets IDs shall be downloaded to the AFC equipment at stations from existing CC1 (Ph-1A) as blacklist parameter.
- 2). Tickets Blacklisted by CC1 or CC2 if applicable shall be rejected / blocked by AFC gates. AG should not allow entry/exit and auto top-up.
- 3). TOMs/TVM/AVM shall not accept blacklisted tickets for add value functions and display the reason to inform the operator. Every detection of blacklisted tickets shall be recorded at the SC / CC1 or CC2 if applicable.
- 4). Size of Blacklist downloaded to devices to be finalized at design stage to match with existing CC1 (Ph-1A), however not less than 50000 in any case.

3.5 Special Modes

It shall be possible to operate the system in following special modes through SC, CC1 or CC2 if applicable and gate:

- | | |
|--------------------------|---|
| 1. Time mode override | Time check in system is bypassed |
| 2. Entry / Exit override | Entry/exit check in system bypassed |
| 3. Station Close | Entry gates are closed |
| 4. Emergency Mode | All gates become open |
| 5. Incident Mode | No amount deducted from SV Smart Cards. No entry/exit bit is marked. For tokens, all checks are bypassed at gate and tokens are accepted. Partially used token can be refunded from EFO (Paid side) |
| 6. High Security Mode | Any card can be put in High Security list. When this card is displayed at gate, some indication must appear like buzzer/light. |

3.6 CONFIGURATION PARAMETERS

- 1). The Contractor shall ensure that all Configuration Parameters provisioned in CC1 are available to be downloaded from CC1 to AFC equipment at new stations. For exact parameter exchange, contractor shall interface with existing JMRC CC1 (Ph-1A) and take Employer's engineer approval. Also, the contractor shall provide a final document having the list of all configuration parameters available in the system for download.
- 2). The operating features of the system shall be fully parameterized to provide flexibility for modification of operational parameters / conditions. Such changes shall be done at the Central computer/station and downloaded to the equipment to be effective at a future date. There should be provision to transfer EOD Parameter to one station/a few station / all stations from

CC1. An acknowledgement from the equipments should be sent to SC and CC1 (through CC2 if applicable) automatically for the acceptance and validation of new EOD parameters

- 3). System will accept global EOD parameters from CC1 and implement at station level, so as to ensure smooth operation as regards system performance, design functionality, passenger traffic etc.
- 4). The total time required to download from CC1/CC2 to all devices shall be maximum 15 minutes. During the download the device shall be able to operate normally and the time elapse to switch to new operational parameters shall not affect the normal operation.
- 5). The station equipment shall keep at least two versions of configuration parameters. It shall be possible to switch back to previous version of EOD.
- 6). Configuration parameters downloaded from CC1 (Ph-1A) system shall be acceptable in the design. Any clarification in this regard can be had from CC1 as part of interface co-ordination during design / execution phase. The Contractor shall obtain the latest Business rules / fare policy from the Employer's engineer during design phase.
- 7). Parameters can be downloaded at all equipments from OCC at the End Of the day or during operation time without affecting the normal operation of equipments. The parameters once downloaded from CC1 (Ph-1A) shall be distributed on all equipments (Phase 1-B) without a change in the meaning and as per CC1 specifications. However, the distribution shall be controlled at CC level to be done automatically or manually and also to be done Equipment wise, station wise or at all equipments/stations at once.
- 8). Fares
 - a). Fares shall be both station-to-station based and zonal system basis with provision for direction based issuance for each type of ticket.
 - b). System shall have provision to support minimum 16 fare zones and 256 stations (configurable) as available in Ph 1-A system. Each ticket type shall have its own downloadable fare tables. For a fare table change, it shall be possible to download the new fare table from the CC1 ahead of the implementation date. The fare shall be derived from:
 - i). Assigned fare for the particular journey.
 - ii). Fare Products
 - iii). Time period - Peak and Off-Peak periods
 - iv). Days of the week shall be classified into 4-day types, namely:
 - Weekdays
 - Saturdays
 - Sundays and
 - Special days / Public Holidays
 - v). System shall have provision to maintain calendar for minimum one year.
 - vi). In the event the calendar expires the system shall continue to operate using the latest set of parameters
- 6). Operating day

For revenue reconciliation, a distinction shall be made between the consecutive operating days (extends from midnight to midnight).

System shall support overnight operation. To avoid inconvenience to passengers who enter the system before midnight and exit the following day after midnight, the tickets issued on previous day (before midnight) shall be usable upto period as permitted by JMRC business rules.

3.7 BUSINESS RULES

The fare media is processed as per Business Rules defined by JMRC in the application software at the equipments.

JMRC business rules are attached at Appendix 12.1 for reference purpose only. Such rules are subject to change as per future operational requirements of JMRC.

CHAPTER - 4

STATION COMPUTER AND CENTRAL COMPUTER SYSTEM

4.1 STATION COMPUTER (SC)

General Functional Requirements

- 4.1.1 The object of the Station Computer System is to collect transaction data and other information at a central point in each station for transmission to the CC1 (existing) either directly or via CC2, if applicable, and to supply AFC equipment with necessary data received from the CC1 either directly or via CC2, if applicable.
- 4.1.2 The SC shall monitor the status and functions of the AFC equipment and provide warnings and alarms.
- 4.1.3 The SC shall be located in a secure area to which unauthorised persons will be denied access. The SC terminals shall be located in the Station Control Room (SCR) at each station.

Data Collection

- 4.1.4 At each station, the SC shall communicate with all station AFC equipments to collect transaction and status information. The SC shall process the transaction data received from station AFC equipment, respond and store the data accordingly.
- 4.1.5 Alarms and equipment status changes shall be reported to the SC and displayed by the SC.
- 4.1.6 At intervals not exceeding 15 minutes, the SC shall conduct a traffic audit by processing traffic data received from the Automatic Gates.
- 4.1.7 Automatic accounting of all machines shall be achieved by the use of the SC. A terminal located in the SCR at each station shall display selected local data and warning signals.
- 4.1.8 Not Used
- 4.1.9 The SC shall record the accounting and user flow data of the AFC equipment regularly, including CSC and CST origin information.
- 4.1.10 The SC shall record the CSC identities received from the entry and exit AG.
- 4.1.11 The SC shall automatically record details of all transactions as well as the total value of all CST and CSC sales. The revenue from each station shall be counted and reconciled with the station level financial reports.
- 4.1.12 Information on the use of Employee Passes at the station shall also be available from the SC.
- 4.1.13 The SC shall ensure that all data is received with no duplication or omission by monitoring transaction IDs.

- 4.1.14 Duplicate transactions shall be rejected. Where the transaction IDs are not consecutive, the SC shall initiate automatic data recovery procedures to obtain the missing transaction data from the originating CSC device.
- 4.1.15 The SC shall automatically record the CSC identities together with details of all transactions received from the entry and exit AG, TVM, TR cum AVM and TOM.
- 4.1.16 The SC shall maintain a current record of passenger flows at the station that will be available for display at all times. This shall be based on traffic data received from each AG and shall be updated at intervals not exceeding 15 minutes.
- 4.1.17 The SC shall be designed to permit the autonomous operation of the various components of the AFC system to ensure that a failure in any one component of the AFC system shall not disrupt the system as a whole.
- 4.1.18 In the event of a failure of either the SC or the local station data transmission network, each item of station level equipment shall operate independently and record all transaction and alarm data for a period of not less than seven days. All data stored shall be transmitted to the SC once the system is fully operational.
- 4.1.19 The SC shall also provide fall-back facilities in the event of prolonged communication failure with the station level equipment. Station configuration data files on the SC shall be copied onto a backup media and downloaded to station level equipment if necessary.
- 4.1.20 Revenue data stored in the station level equipment shall be copied onto a backup media and hand carried to the SC or CC1(& CC2 if applicable) for input. The SC or CC1 (& CC2 if applicable) shall be able to read the station data from the backup media, store the data in temporary files and merge the data with other station data. (In case of degraded mode)

Reporting of Status and Alarms

- 4.1.21 The Station Computer System shall monitor the status of each item of AFC equipment.
- 4.1.22 Whenever a fault or change in status appears, the SC shall record it permanently on file, give an instantaneous printout if required for use in the station if the operating parameters are set for printing, update the daily activity report and give a warning on the terminal display.
- 4.1.23 As a minimum, the following warning messages for equipment change of status shall be provided in order to optimize the efficiency of station operations:
- i) For TVM – “coin cash box nearly full”, “coin cash box full”, “bank note cash box nearly full”, “bank note cash box full”, “CST container nearly empty”, “CST container empty”, “not on LAN”, “change hopper nearly empty”, “change hopper empty”, “coin jam”, “bank note jam”, “CST jam”, “no change mode”, “machine out of service”, “tamper detection” and fault status;
 - ii) For entry AG – “machine out of service”, “tamper detection” and fault status;
 - iii) For exit AG - “CST capture bin nearly full”, “CST capture bin full”, “not on LAN”, “CST jam”, “machine out of service”, tamper detection” and fault status;

- iv) For TOM – “machine out of service”, “not on LAN” and fault status.
- v) For AVM- “ Bank note Cash Box nearly full”, “ Bank note cash Box full”, “not on LAN”, “Bank note Jam”, “ machine out of service”.
- vi) The SC shall include facilities to permit detailed interrogation of station AFC equipment status. As a minimum, the following additional detailed status information shall be made available at the SC, in order to optimise the efficiency of station operations:
 - a) For TVM – “current fill level of coin cash box”, “current fill level of bank note cash box”, “current fill level of change hoppers” and “current fill level of CST container”; and
 - b) For exit AG - “current fill level of CST capture bins”.

4.1.24 Loss of communication with any connected AFC device shall be immediately and clearly displayed on the status screen of the SC terminal in the SCR.

4.1.25 Selected status information and fault alarms shall be transmitted to the CC1 or CC2, if applicable, in real time.

SC Reports

4.1.26 The SC shall be capable of processing data to print selected reports at the station for use by station operations and revenue staff.

4.1.27 TOM operator end of shift reports shall be available within ten minutes of the end of shift to enable station supervisors to reconcile cash box contents with the TOM operators before these operators leave the station.

4.1.28 NOT USED.

4.1.29 Historical reports shall be processed at the end of the operating day and shall be available to be viewed or printed not later than the start of revenue service on the next operating day.

4.1.30 Historical reports shall include but not be limited to:

- i) Daily Station Summary Report, summary totals of passengers in and out, tickets vended, cash received or refunded, booking office transactions.
- ii) Entry/Exit Gate passenger flow, totals in, totals out. Each CSC transaction date and time recorded.
- iii) CST and CSC sold and refunded from ticket offices by class of CSC;
- iv) CSC add value transaction summary by class of CSC including stored value, trip and period pass fare products;
- v) Traffic report showing passengers in and passengers out per 15 minutes period throughout the operating day with sub-totals for each hour and grand total for the day.

- vi) Event log, chronological report of daily activities by item of Station Level equipment. Each event shall have date and time recorded.

Other SC Functions

4.1.31 The SC shall, as a minimum, be capable of carrying out the following functions:

- i) Manage the synchronization of date and time with the station devices;
- ii) Manage the updating of the fare table data & EOD resident in the AG, TOM and EFO;
- iii) Control the functions of AG, TOM, AVM, TVM and EFO.
- iv) Implement override of AG monitoring of certain CSC usage fields such as "entry/exit bit", "over time", "over distance" when necessary;
- v) Provide a means of allowing passengers to leave the stations without having a fare deducted in the event of a disruption (non-provision of a passenger carrying service);
- vi) NOT USED;
- vii) Report alarms to the CC1 or CC2, if applicable, on a real time basis;
- viii) Guarantee timely transmission of all audit register data and status messages;
- ix) Guarantee timely transmission of all transaction data to the CC1 for analysis and report generation; and
- x) Manage the download of programme files from the CC1 to the equipment downstream.
- xi) The SC shall be capable of handling a maximum of 64 AFC equipments.
- xii) SC shall be capable of throughput of 60,000 transactions during peak hour.
- xiii) SC shall be able to take care of 30 days of data.
- xiv) The SC shall automatically re-boot after resumption of power in case of power failure
- xv) The SC shall enable station AFC equipment to be taken out of service, put back into service and initiated without the need for communication with CC1 or CC2 if applicable.
- xvi) There shall be one version of the SC software run for all stations.
- xvii) The SC shall enable the station AFC system to operate normally in the event of loss of communication with the CC1 or CC2 if applicable. In the event of failure, the SC shall utilize the most recent operational data received from the CC1 or CC2 if applicable. The SC shall store data up to 10 days to be transmitted to the CC1 or CC2 if applicable when communication is restored.
- xviii) If there is loss of communication between the SC and the AFC equipment (Gates, TOM etc.,) then the equipment shall operate in the stand-alone mode utilizing the most recent data from the SC.
- xix) Password hierarchy shall be setup for different operator access level.
- xx) Secure transaction upload mechanism - Any ambiguous / unauthorized equipment connection shall be readily identified and high security alarm shall be sent to CC1

or CC2 if applicable in such case.

- xxi) Downgraded mode of data transfer from equipment to SC and SC to CC1 or CC2 if applicable in case of network failure.

4.1.32 The SC shall, as a minimum, be capable of accurately recording:

- i) All transactions performed by the TVM;
- ii) All transactions performed by the AVM
- iii) All transactions performed by the TOM;
- iv) All transactions performed by the AG.
- v) Periodic passenger flow through the AG;
- vi) Other information in each station, as specified herein or required to provide the functionality and reporting required to meet the Employer's Requirements.

Anti-Fraud Measures

4.1.33 Anti-fraud measures shall be incorporated into the design of the SC to prevent fraud due to unauthorised CSC transaction record duplication or alteration. A full description of the proposed measures shall be submitted for the Employer's approval.

4.1.34 All CSC shall be rejected at entry AG if their anti-fraud codes are on the blacklist.

SC Major Components

4.1.35 The Station Computer System shall include, but not be limited to the following main units:

- i) Server with CPU performance and memory size adequate for the projected number of transactions and status messages and provision for future expansion;
- ii) hard disk and removable media drives with adequate storage capacity to provide secure storage of data and programs;
- iii) 17" LCD Monitor supporting at least 1280 x 1024 resolution for the display of operational status, warning messages and operator interaction.
- iv) a contingency method of loading the system program in the event of disk drive failure;
- v) Not Used
- vi) Following is the minimum configuration. Contractor to propose configuration to meet PS requirement:

TECHNICAL SPECIFICATION OF SC SERVER for AFC

S.No	Item	Description of Requirement
1	Form Factor	(5U) Form Factor
2	Processors	2 x Quad-Core Intel Xeon E5504 Processor (2.0GHz, 80 Watts,) / 4MB Level 3 cache /based on Intel® QuickPath Technology
3	Chipset	Based on Intel® 5520 chipset or later, capable of supporting Quad-Core/Dual-Core processors.
4	Memory	4GB (2 x 2 GB) PC3-10600R (DDR3-1333) Registered DIMMS, Advanced ECC memory, Mirroring mode and Lock-step mode.(expandable to Up to 192GB, using PC3-8500R DDR3 Registered (RDIMM) memory, operating at 800MHz when fully populated at 2 DIMMs per Channel in 12 slots)

Contract JP/JS21 (1B) - Particular Specifications

5	PCI Slots	Six total expansion slots: One PCI-Express x16 Gen2 (x8 speed); One PCI-Express x8 Gen2 (x8 speed); Four PCI-Express x8 Gen2 (x4 speed)
6	Network	Integrated Dual Port Gigabit NIC
7		Support for 10/100/1000 networks
8	Disk Drives	3*72GB 15K SAS Drives
9	Storage	Onboard controller capable of support RAID levels
10		Minimum 6 numbers of drives, scalable upto 5 TB or more
11	RAID Controller	Hardware based RAID Controller with 256MB battery-backed write cache (RAID 0/1/5)
12	Optical Drives	Half-Height SATA DVD RW Optical Drive
13	Interfaces	Parallel-Optional parallel port available Serial-1 (optional 2nd serial port available) Pointing Device (Mouse)-1 Graphics-1, Keyboard-1, Network RJ-45 3 (1 dedicated for iLO 2), USB 2.0 Ports 6 (2 front, 2 rear, 2 internal)
14	Graphics	Integrated ATI RN50, 64MB video standard
15	Power Supply & Fan	Redundant power supply
16	Server Setup and Systems Management Software	System Management Software and configuration utilities for server setup, changes in configuration, update of drivers should all be included with the offer.
		The cost of server setup, configuration, installation of operating system, creation of volumes and file systems for all the servers should be all included in the cost of the offer.
		All the servers should support Standard baseboard management controller with IPMI 2.0 support
17	Remote Server Management Utility	The servers should be capable of being remotely managed, including starting, stopping and installation of software's.
		Hardware/ Software for Server/ Client, if any, required for this functionality should be included as a part of the offer
18	Operating system	The server should support industry-leading Operating System platforms including: Windows Server 2000
19	Industry Standard compliance	Supports industry standard compliance including Support for ACPI V2.0, PCI-Express Gen2, PXE support, WOL Support, USB 2.0
20	Benchmarks	Model should have a certified TPC-c Benchmark

4.1.36 The SC to ensure an orderly shutdown (in event of abrupt power failure) of the AFC system and shall as a minimum ensure that all transactions in progress are completed, all volatile data is recorded to non-volatile storage media.

4.1.37 The SC shall include facilities for automatic restart when power is restored after shutdown of the AFC system.

4.1.38 All SC equipment shall be suitably rated to enable 24hour X 7 days operation of the AFC system.

4.1.39 The SC shall have a flexible input/output interface to accommodate station interfaces.

Software Requirements

All computer software documentation for the Station Computer and the individual equipment shall be provided by the Contractor. The documentation shall include system requirements analysis, system design, program descriptions, listings, source and object codes, flow diagrams, methods of execution and other necessary information, as required by the Employer. This information shall be supplied prior to the start of production of SC software documentation.

- 4.1.40 A software diagnostic package shall also be provided for test purposes to identify and locate system faults.
- 4.1.41 The software package shall consist of an operating system, application programs, message files, graphics files and parameter files for the SC.
- 4.1.42 The Employer shall be provided with the tools and know how to make changes to message files, graphics files and parameter files to be downloaded to station level equipment.

Security of Data

- 4.1.43 A basic philosophy of the AFC system shall be that of self-sufficiency. In the event that a SC fails to be operational, each piece of equipment shall be able to operate autonomously without loss of data.
- 4.1.44 When a SC becomes operational after a failure it shall be automatically updated with data from the Station Level AFC devices connected to it.
- 4.1.45 Security features shall be incorporated to prevent casual tampering with the CSC data, systems log and any other information stored within the SC.
- 4.1.46 Software to enable new fare tables shall be downloaded from the CC1 or CC2 if applicable into every SC where they shall be stored and shall be activated system-wide on a configurable predetermined date and time or on a broadcast command from the CC1 or CC2 if applicable.
- 4.1.47 The precise mechanisms of the methods proposed for changing and activating fare value tables shall be approved by the Employer.
- 4.1.48 Under no circumstances shall it be possible for a fare table to be changed locally using the SC terminal.

Integrity of Data

- 4.1.49 The Contractor shall provide a reliable method of verifying the integrity of the data and program files sent from the SC to the Station Level AFC devices and the correct reception of data uploads received from these devices.
- 4.1.50 The method used shall be approved by the Employer.

- 4.1.51 The integrity of the data collected by the SC shall be protected from corruption due to power failure, interruption and transients. The exact method of protection shall be approved by the Employer.

4.2 CENTRAL COMPUTER

General Functional Requirements

The requirements as laid down in Appendix 4.2 are currently met by existing central system (CC1) (Phase-1A). In case direct integration solution is proposed, the contractor shall ensure that these requirements are compiled in conjunction with CC1 & new stations after integration of Phase 1-B equipment with CC-1. In case, the proposed solution includes a separate central system (CC2), it will comply requirements as laid down in appendix 4.3.

- The bidder shall ensure that the existing functioning server of Phase 1-A is not affected. The solution is to be demonstrated to JMRC at SDC and shall be implemented at the approval & satisfactory testing only.
- Adequate backup of existing application shall be maintained before implementation at real system.
- The obligation for the current phase 1-A system for any failure during implementation lies with the JP/JS21(1B) contractor.

CHAPTER - 5

AFC STATION EQUIPMENTS

5.1 GENERAL

The proposed AFC system shall meet the AFC system objectives of a MRTS application:

- 1). All equipments and software should be designed to be user-friendly.
- 2). The system should ensure that all transactions and data transfer are secure and reliable.
- 3). The system shall meet all performance and maintainability requirements as specified.
- 4). All AFC equipments shall have a metallic number plate attached to the side or front of the machine which shall display the unique alphanumeric equipment ID for identification purpose.
- 5). All AFC Equipments shall have Stand alone working capability.

5.2 TICKET OFFICE MACHINE (TOM) / EXCESS FARE OFFICE (EFO)

5.2.1 Each TOM / EFO may be considered as a Point of Sale of tickets and for handling passenger's enquiries. The TOM shall be installed in the booking office and EFO at Customer Care Centres at stations.

5.2.2 Modules

The TOM shall have following components:

- Contactless reader/writer (Type A, EMV Level 1,2& NFC),
- (English / Hindi) Passenger information display with speaker,
- Token Dispensing mechanism for issue of two types of tokens using containers, Receipt printers,
- CPU(Corei7 or better, 4 GB RAM, minimum Win 7 Professional licensed software Preloaded with CD, Antivirus licensed software preloaded with CD ,built-in speakers, 10/100 Mbps NIC, scroll optical mouse, keyboard, 17"TFT touch monitor two pin European standard power cord)
- Software and accessories.
- Suitable enclosure racks for CPU shall be provided. Suitable covering for other modules shall also be provided.

5.2.3 Functions

This machine will be operated by the staff and will process following operations:

- 1). Ticket issuance / sale, Add-value (on smart card), Refund, Replacement, Surcharge, Cancellation, Ticket consultation / Analysis etc. as per JAIPUR METRO Business rules.
- 2). For ticket sales operation, there shall be provision for two methods for ticket issuance:

- a). First option for 'station list' based selection for ticket issuance with stations Linewise arranged in a list. By clicking at any station icon, ticket to that station can be issued.
- b). Second option for 'zone wise selection MMI' (downloadable from CC). TOM at each station shall have its own unique fare table in relationship with its station of origin.
- 3). Accountal of quantity / cash collected for adjustments and surcharge handling such as entry /exit bit mismatch, excess fare processing, excess time limit etc. as per business rules.
- 4). Accountal of media stock - Detailed information shall be displayed in shift end receipt. Current stock information shall be available at SC.
- 5). Running maintenance tests for all attached modules.
- 6). User / Operator friendly GUI for sales and other operations: It should display power status, network communication status, R/W status, Station mode of operation, media quantity etc.
- 7). There should be provision to run audio files so that token vending/add value information can be played.
- 8). Integration of TOM with POS terminals for accepting payment towards card sale, card top-up & token sale.
- 9). One POS terminal per EFO shall be supplied by the Contractor. The POS terminal is to be compatible with the Indian Banking System. The POS and its last mile connectivity is in the scope of this contract. The POS should be Master, VISA, & Rupay certified.

5.2.4 Security

- 1). Secure transactions and data transfer.
- 2). Mechanism (such as audit registers) for audit of all transactions (for all quantities and revenue figures).
- 3). SAM for Reader/writersto be issued from existing CC1 (Ph-1A). The supply of SAM is under the scope of this contract.
- 4). No chances of any fraud transactions by fast swiping of tickets over reader/writer or any other means. Data should be recorded first in system and then in card / token or provide any other way to take care of fraud due to fast swapping of card.
- 5). Both options for Password protected and CSC based log-in for - Operator agent, Supervisor agent and Maintenance agent.
- 6). Re-writing protection on ticket already vended - TOM shall keep a buffer of ticket-ids of last 10 transactions and check it against the ticket presented on reader/writer for vending.

5.2.5 Communication with SC

Accept all operational parameters / software from SC. The TOM shall communicate with the CC1directly or through CC2for authorization of certain transactions such as refund / replacement of CSC, etc. CC2shall send this request to existing CC1system for authorization through online queries as defined in CC1-CC2interface specifications.

5.2.6 Data Storage And Integrity

- 1). TOM shall store all records for seven days in case of communication failure between TOM and SC.
- 2). The transaction records, audit records, and status records will be stored at TOM and sent to the Station Computer after the Communication link between TOM and Station Computer is restored.
- 3). All usage data such as transactions, audit registers, events, warnings, alarms etc to be sent to SC.
- 4). Provision for degraded mode data transfer shall be provided (in case of network failure).

5.2.7 Token Dispensing Mechanism

- 1). One token to be ejected off at each issuing command from TOM..
- 2). Multi-vending of tokens shall be possible.
- 3). Token dispensing mechanism should work perfectly with fully loaded containers with upto 2000tokens.
- 4). In case of failure of token dispensing mechanism, it shall be possible to issue tokens manually.
- 5). Token containers: one-

- 1). **Passenger Information Display** English and Hindi characters, Pictograms, alphanumeric and symbols
- 2). Display ticket amount, date/time, current transactions messages, error codes and corresponding messages
- 3). Displayed information visible from all angles in broad day light for Gate End Displays(outdoor condition).
- 4). Displayed information shall be easily configurable locally.

5.2.8 Receipt printer

- 1). Receipt for shift end report reconciliation, group tickets and all transactions.
- 2). Impact Dot Matrix, black / white, Power - 24 V DC.
- 3). Character set - 95 alphanumeric, 37 international, 128 x 12 graphic.
- 4). Columns - 40/42 columns, Characters per inch - 17.8/16 cpi
- 5). Printer should allow the use of 2ply/3ply stationery.
- 6). Capable of printing receipts in both Hindi/English.

5.2.9 TOM Performance to be achieved

- | | |
|-----------------|---|
| (i). Throughput | 10 passenger transactions per minute. |
| (ii). MCBF | 10,000 |
| (iii). MCBJ | 20,000 |
| (iv). MTTR | 30 minutes |
| (v). | There should not be frequent system hang faults during operation. |

5.2.10 Safety

No chances of electric shock to user in any case. No sharp edges.

5.3 AUTOMATIC GATE

5.3.1 Function

- 1). Gate arrays shall be the normal-means of controlling entry to and exit from the paid areas. Control shall be by means of actuating a physical barrier on recognition of a valid token or card by the gate. The barrier shall be retractable flap type. The gate shall be capable of operating either normally open or normally closed.
- 2). At entry, the valid token / card shall be presented by the passenger at reader/writer of the Automatic Gate (AG). At exit, the token shall be captured in the slot of the Automatic Gate. In case of card, electronic value is deducted from the card at exit.
- 3). Automatic Top Up shall be possible on presenting the card on the Gate whenever the Card value reaches a minimum threshold level predefined by the user. CC2 equipment shall query CC1 (directly or via CC2) for auto top-up information and will add value as required. The complete process and Interface will be as per CC1-CC2 Interface specifications to be developed by the contractor.

5.3.2 Types of Gates

- 1). There shall be several types of gate cabinets, which when combined will form Entry / Exit / Reversible Gate. Appendix 5.1 (a) and Appendix 5.1 (b) are attached.
- 2). Two Gate cabinets work together to provide the required functionality of an automatic gate.

a). Entry Gate	The Passenger Entry Gate shall control the entry of passengers into the paid area by validating the fare media.
b). Exit Gate	<p>The Passenger Exit Gate shall control the exit from the paid area by validating the fare media, and where necessary, processing the fare media, capturing the fare media.</p> <p>The Exit Gate shall be identical to the Entry Gate except with the addition of a token collection mechanism and associated equipments.</p> <p>The gate shall be programmed as an Exit Gate which shall determine the mode of operation and graphic responses of the top display and end displays.</p>
c). Reversible Gate	<p>The Reversible Gate shall combine the features of the Entry and Exit gates in one gate enclosure and can operate in Bi-Directional / Uni-Directional mode depending on the operational requirements of passenger flow. This can be done from SC, CC or Gate itself.</p> <p>The Reversible Gate shall be a double ended gate incorporating two passenger display modules, two CSC targets, barrier mechanism and support electronics.</p> <p>The Gate mode is also determined by the passenger</p>

	presenting a ticket on a “first-come-first-served” basis i.e simultaneously it serves both directions.
d). Wide Gate for Disabled / Luggage	Wide Disabled Gate shall be provided normally adjacent to the Excess Fare office, will allow those passengers in wheel chairs to validate their ticket and gain access to, or exit from the paid area. This can also be used as luggage gate.
e). QR code compatibility	Automatic Gates having QR code compatibility shall be provided in numbers as per required in entry/exit arrays as per BOQ. These gates shall fulfill all requirements as stated in this contract but shall additionally have QR code decoding compatibility. The employer intends to have QR code functionality in fixed no. of entry/exit gates at Phase 1-A and Phase 1-B with its own server. The contractor shall assist employer in implementing QR code functionality in QR compatible gates at Phase 1-B stations.

5.3.3 Common Design features for Automatic Gates

1). General Requirement:

- a). The design and construction of the Entry Gate and Exit Gate and Reversible Gates shall have common Components and subsystems. It shall be possible to convert an Entry Gate or Exit Gate to Reversible gate and vice versa by changing configuration and adding/removing modules.
- b). The Entry and Exit And Reversible Gates shall read, check and verify data on the fare media re-encode with new data and allow passage by releasing a barrier only if the fare media is valid. If the fare media is not valid the barrier shall remain closed. A display shall instruct the passenger accordingly.
- c). The reversible gate shall have the same overall dimensions as the Entry and Exit gates and combine the functions and features of both.

2). Dimensions and Spacing

- a). Maximum outside dimensions of the gate cabinet shall be generally based on following criteria :

Length	1900mm
Width	300mm
Height	1110mm

- b). The positioning of the readers and collection slot for tokens has to be designed in such a way to ensure passengers to proceed without stopping through the gate.
- c). Above parameters shall be finalized during design stage and prototype approval.

3). Electronics Module

- a). The gates processor shall control and process data from the readers, PLC, PSU and other modules.
- b). The electronics module shall include activated non-resettable electronic registers which shall retain their reading when power is removed. They shall not be easily removed without the requirement for an audit trail.

- c). The electronic module shall incorporate an electronic and physical ID number unique to each module. This number shall be transferred to the SC.

4). Passage logic controller

This module in gates shall be used for logic and control operation. The use of Electro-magnetic components shall be reduced to minimum.

5). Gate Non Resettable Registers

- a). The contents of the non-resettable registers shall be transmitted to the SC. The registers shall include, but not be limited to the following information:
- Number of passenger for different ticket type entered / exited.
 - Value charged to different ticket types.
 - Number of tokens processed.
 - Individual register on the number of transactions failed (entry mismatch, exit mismatch, excess time, overstep etc.)
 - Number of times out of service
 - Number of times in maintenance mode
 - Number of times gate forced open.
 - Number of times tailgating.
- b). There shall be at least 25% spare registers available for future use.

6). Ticket capture

- a). Tokens after completion of journey shall be captured at exit. Should there be any positive remaining value on a token after the completion of the journey, the exit gate shall encode the remaining value to zero and capture these tickets regardless of the unused remaining value.
- b). Gates shall give alarm / warning to station computer when its bin is 75% full (which should be configurable). If the collecting bin is full, the gate shall go into 'out of service' mode.
- c). The Contractor shall propose user friendly and efficient methodology for capture of tokens in gates. Exit gates shall validate and capture tokens in single presentation. In case ticket is not valid, the gate shall reject it at token acceptor shutter or return it to the passenger and a corresponding error message should be displayed on the PID. After the token is collected by the passenger, the gate should activate the card reader and wait for another ticket.
- d). Token captured at exit gate shall be counted and recorded by audit register. Token count accuracy by Gate should be more than 99.8% in normal operation.

7). Gate Passenger Information Display

- a). The Passenger Information Display (PID) shall be LCD screen type (approx 6.5 inch), located on top of the gate flush with the top panel. The display shall be a programmable capable of displaying information in English and Hindi. It shall be capable of displaying pictograms.
- b). The display shall also be capable of displaying 4 rows of 30 alphanumeric characters, 12 mm high and include some special characters such as direction arrow and no entry symbol. At validation of ticket, the ticket type and amount shall

- be displayed at the screens of gates.
- c). Reversible gates shall have a passenger information display for each end.
 - d). Displays shall be clearly visible in the ambient light level of 300 Lux at gate arrays and at installations in shaded sunlight. The display shall be mounted in a convenient position so as to enable approaching passengers of various heights to read it.
 - e). The top displays shall be informative and instructional including the following typical message:
 - Stop
 - Present ticket
 - Amount deducted Rs.
 - Token Value Rs.
 - Go/proceed
 - Go to Customer Care Centre
 - Add value to Smart card
 - Discount fare
 - Out of service
 - Ticket / pass expires in “n” days
 - f). In the event a ticket or card does not work first time the display shall inform the passenger as to what he should do next, such instructions shall include “Try Again”, “Ticket Error“, “Go to Customer Care Centre” etc.
 - g). Display maintenance information and container status on showing CSC for maintenance agent and Station agent respectively.
 - h). The display information should be easily configurable locally.

5.3.4 Design Parameters

Parameters	Description
1). Functions	Ticket validity check, Authorized passage for entry/exit, Deduct value from CSC, Used ticket invalidation, Alarms for tailgating, fraud, ticket amount display etc.
2). Passage direction control	Option for configurable passage direction form SC, CC2 and manually from keypad.
3). General	Accept all operational parameters / software from SC. Provision for degraded mode data transfer. System hang faults shall not be acceptable.
4). Cabinet Material & Finishes	The gate enclosure shall be fabricated of stainless steel of minimum 2 mm thickness. The degree of protection provided by the enclosure against dust, splashing, intrusion of foreign objects shall be to the standard IP54. (IP- 43 for token acceptor slot).

5). Protection	<p>All housed modules should have protection for damage due to pests or accidental water seepage.</p> <p>Mechanical parts protected against corrosion.</p>
6). Earthing	<p>Each machine shall have provision for connection to the station earth bar and shall be connected accordingly. Contractor shall be responsible for extending of earth strip of 25x6mm from UPS room to AFC equipments through cable trays.</p> <p>No chances of electric shock to user in case of internal assembly/module failure.</p>
7). Passage width	<p>Passage (Normal) : 550 mm</p> <p>Passage (for disabled) : 900 mm</p>
8). Safety Requirements	<p>With regard to emergency exit mode on loss of power, the standard gates shall not prohibit movement of passengers in the direction of the emergency exit.</p> <p>There shall not be any sharp edge in the gate, which can hurt passengers while passing through Gates.</p>
9). Barrier (Flap) Mechanism	<p>The gates shall be retractable type with material of enough strength for use in mass transit system.</p> <p>Flap shall in no case get stuck in the slot meant for flap movement.</p> <p>There shall be a shock absorber to reduce the shock and sound associated with the arresting of the arm and mechanism in the closed position. This device shall not impair the passenger designed flow rate. Flap design should be sturdy to withstand peak hour rush. No possibility of injury to passengers. The barrier shall normally be mounted in such a way to make gate user friendly.</p> <p>If the barrier is forced open, no damage shall happen to gate components and gate should automatically restore to normal. An alarm should be generated during forced opening.</p>
10). Tailgating prevention	<p>Less than 20 cm.</p>
11). Power supply	<p>Protection with ELCB, maintenance sockets</p> <p>Power shall be provided to the PSU from the AFC Electrical cabinet at 230V, 50 Hz.</p> <p>Average power consumption of normal gate shall be 250 VA approx. during operation.</p> <p>There shall be one PSU serving both cabinets of a single gate aisle.</p>
12). Smart media validator	<p>Reader/Writer (for Type A, EMV Level 1,2& NFC smart</p>

	media). The design of the gate arrays should be such that the passenger uses reader placed on the right hand side while passing through the gate.
13). Smart media acceptor	Reader/Writer (for Type A, EMV Level 1,2& NFC smart media) plus token acceptor mechanism. The design of the gate arrays should be such that the passenger uses reader placed on the right hand side while passing through the gate.
14). Token containers	Two per exit gate. All tokens shall be collected in the container. Exact token quantity count to be maintained. This stock data shall be sent to SC on container replacement automatically. Stock status for current and last replaced container.
15). Bin / Rejection slot	For invalid tokens or foreign object inserted
16). Security	SAMs for Reader/writers. Equipment DSMs. Anticollision for CSCs. Secure transactions and data transfer. Data protection in case of power failure (battery back-up mechanism). Protect pending initiated last transactions or data transfer. Back-up data for minimum 7 days. Data not to be purged before transferred to SC.
17). Keyboard	Small keypad accessible in both paid and unpaid are ainside the Gate enclosure for Operation, Maintenance Configuration etc.
18). Gate end display	Directional display - The end displays shall signify the mode of operation of the gate, either entry, no exit or exit no entry or no entry in either direction. There shall be selectively illuminated "entry" and "no entry" sign on both ends of each gate. The "entry" display shall be illuminated whenever the gate is intended for use in the direction shown. The "entry" display shall be illuminated on the paid side of Entry only gates when they are in the free-wheel emergency mode. Concessionary Indicator and Invalid Passage Lamp.
19). Patron sound device	Range of 60-80 db(A) measured from 1 meter from source. Software configurable.

	Unique alarms for intrusion, fraud, tailgating, container-full / nearly empty, invalid ticket, internal UPS failure, access-door open, over-heating.
20). Environment	<u>Operation</u> <ul style="list-style-type: none"> 0° to +65°C external RH (Equivalent test 95% at 35°C) <u>Storage</u> <ul style="list-style-type: none"> -20° to +70°C external 95% (without condensation)
21). Cables	Standard cables to be used for internal wiring. Precise / orderly routing, lacing and labeling.
22). Gate modules & accessories	Standard, easily available All modules should be arranged in a manner so as to facilitate quick / easy replacement in case of failure.
23). Power Failure	In the event of power failure to the gates, the gates shall open to allow unrestricted passenger access.
24). Gate Modes of Operation	<ul style="list-style-type: none"> Normally open / close In Service / Out of Service Other modes as defined in Chapter 2,3 of PS Above modes can be set from CC / SC / Gate <ul style="list-style-type: none"> Emergency mode set from Gate / Changeover switch at EFO
25). Throughput	45 passengers per minute (PPM) for SJT.
26). Performance	
a). General	Capable to process upto 35,000 passages per day.
b). MCBF	40,000 cycles
c). MCBJ	100,000 transactions
d). MTTR	30 minutes
28). Entry/Exit within same station	Following provision at gate level is required: Gate should not allow the exits from the same station within user defined time limit after entry from same station.
29). QR Code reader	Designated no. of gates as per BOQ shall have QR code readers to enable decoding of QR codes.

5.3.5 Gate Installation

- 1). The stanchion frame shall be secured to the floor by at least four stainless steel bolts of minimum diameter 15mm.
- 2). Cables shall be terminated within the gate no less than 300 mm above the finished floor surface. Cable entry from the under floor ducting shall be sealed from the cable duct.

- 3). The circumference of the base shall be sealed with the floor finish after installation so as to prevent the ingress of water.

5.3.6 Fixed Barrier / Swing Barrier

- 1). **Fixed barrier** - To securely segregate the Paid area from Unpaid area at stations, fixed barriers shall be installed in line with the AFC gate arrangement all openings between EFO, Walls and AFC gates.
- 2). **Emergency Swing barrier** - There shall be provision for oneswing gate at each array of AFC gates with locking mechanism for authorized movement in both directions of station equipment / large groups of visitors etc.
- 3). Barrier frame shall be stainless steel, smooth finished (Grade SS304 satin finish) surface with chamfered edges / corners without any protruding parts.
- 4). The diameter of pipe at curvature should remain uniform as rest of the pipe (50 mm). The frame shall have thick clear toughened fiber or equivalent grade material (fixed in between) securely with rubber / fiber lining. The design shall be submitted to Employer for approval.
- 5). The barriers shall be firmly mounted on mounting plates on the station flooring. Both fixed and swing barrier shall be designed for lateral force of 250 N.

5.4 TICKET READER cum Add Value Machine (TR cum AVM)

5.4.1 General

- 1). There shall be ticket reader cum add value machine installed at stations to be used by passengers for-
 - a) Analyzing the CSC/CST.
 - b) Add value in the CSC after payment through website. Upon showing the card in front of Add Value Machines, the Add Value server will query CC1 directly or via CC2 for top-up information after checking the ticket and AVM will add pre-defined value to CSC. CC1 is interfaced to a bank via a bank server for web top-up functionality. The complete process and Interface for receipt of web top-up information from CC1 to CC2 will be as per CC1-CC2 Interface specifications to be developed by the contractor. The contractor shall also upgrade the bank/web server for additional bank interface.
- 2). It shall be located in concourse in free area and near the customer care in paid area.

5.4.2 Functions:

- 1) Analysis and display shall include (but not be limited to) the following items :
 - a) Ticket type
 - b) Ticket electronic value / amount, Zone
 - c) Ticket sale station / date
 - d) Ticket validity duration
 - e) Current Date/Time
 - f) Ticket usage status

- g) At least last five transactions for CSC
 - h) Reject code and message.
 - i) Automatic top up in CSC through gate.
- 2) For the passengers who have paid for add value through website in advance, the TR cum AVM shall process the add value in the card. This shall include-
 - a). Inquire against the CSC physical ID for any pending transaction at AVM Server
 - b). Do the ADD Value in the Card if the transaction is pending.
- 3) For the passengers who do not know how to operate AVM should provide the help menu and instructions.

5.4.3 Features

- 1). Easily detachable with key lock arrangement. No chances of electric shock to user in any case.
- 2). LED & Buzzer (unique tones) for ticket status.
- 3). Display - English / Hindi and alphanumeric, Minimum two rows of 24, characters, Easily visible in the ambient light conditions on the stations.
- 4). Provision for software download, upgrade.
- 5). Size of display should be minimum 7 inch LCD with touch screen.
- 6). Shall have standalone working capability and will act as ticket reader only. It should be able to do the following functions in standalone mode:
Analysis and display of the following items-
 - a. Ticket type
 - b. Ticket electronic value / amount, Zone
 - c. Ticket sale station / date
 - d. Ticket validity duration
 - e. Current Date/Time
 - f. Ticket usage status
 - g. At least last five transactions for CSC
 - h. Reject code and message.
- 7). Monitoring arrangement for TR cum AVM is to be provided by the contractor as per site requirement.
- 8). There shall be a provision to download parameters/ software version at all AVMs, AVM wise, Station Wise from CC and SC.

5.4.4 Construction:

- 1) Material proposed shall be strong, durable and approved by the Employer's Engineer.
 - 2) The methods of construction and installation shall be durable and approved by the Employer's Engineer.
 - 3) The fixing arrangement for AVM as per site requirement is also a part of this contract.
- The process of Add value by TR cum AVM has been given in Appendix 5.3

5.5 TICKET VENDING MACHINE (TVM)

5.5.1 Functionalities

The TVM shall have all required functionalities such as:

- 1). User friendly robust design and ergonomics catering to disabled people also. Housed in a suitable tamper-proof stainless steel casing with all security features incorporated at hardware and software level to make it vandal-proof. Unauthorized access prevention. Smart card / PIN based access. Mechanical assembly of door lock for TVM should be robust.
- 2). Process contactless smart media for ticket issuance (CST), add-value (CSC), cancel etc. Ticket issued at TVM should be refundable at TOM.

5.5.2 Features

- 1). Cabinet- Approximate Dimension: 1800mm (H) x 950mm (W) x 800mm(D), Thickness : 2mm, Material: stainless steel, Front maintenance access.(Exact dimensions shall be finalized during design stage. The degree of protection provided by the enclosure against dust, splashing, intrusion of foreign objects shall be to the standard IP54. (IP-33 for inlets).
- 2). **Printer** - for receipts for all transactions and end-of shift report. Receipt can be printed in both Hindi and English. Size of paper roll should be minimum 2000 receipt /roll.
- 3). Interactive touch screen (TFT, 17 inch) display with single touch feature (not cursor based) for interactive transaction processing. Route map for destination station selection.
- 4). **Passenger Display** - For patron guidance multi-lingual instructions (English / Hindi) with passenger enabled selection. Audible alarms and events.
- 5). **Coin / Currency noteRecycler& sorter mechanism** - The system shall have the facility of recycling of deposited notes for providing balance amount to the passenger. The banknote recycler mechanism shall be high performance, extremely reliable, proven and must be procured from a reputed manufacturer such as MEI, Bill to Bill or any other similarly renowned source which shall also meet Reserve Bank of India (RBI) guidelines. The banknote recycler unit shall also be equipped with banknote loader mechanism. The Bank Note Loader shall have a capacity to hold minimum 1000 notes of two types each. TVM shall be capable of returning change with best combination of coins and Bank Notes. Coin change shall be provided in two denominations which may be configurable to any two out of Re1, Rs2, Rs5 or Rs 10 coins.Two Coin Containers shall be provided. Coin Container Capacity should be 1000 for each type of coin.
- 6). TVM shall have atleast one token box and also one error token box. Capacity of Error token box shall be 300 tokens at least. Exact token quantities to be maintained. This stock data shall be sent to CC2/SC on container replacement automatically.
- 7). Handle currency notes in denominations of Rs. 5, 10, 50 100, 200, 500 &2000currency be made & any other new currency as introduced by government till finalization of design whichshall be configurable. It shall reject torn / counterfeit/invalid notes or any other foreign object. Four way insertions of Notes shall be possible.
- 8). In case of transaction cancellation, TVM should return currency note inserted by user.

- 9). Audit registers for data reconciliation at CC2 level.
- 10). Support downgraded mode operation.
- 11). Communicates with Station computer for transactions, alarms, warnings, EOD, time synchronization etc.
- 12). Internal power back-up, air circulation unit. In case of power failure TVM should have a capacity to complete the ongoing Transaction.
- 13). Transactions from TVM should be incorporated in CC1, CC2& SC level reports.
- 14). Add value of CSC shall also be possible through bank credit/debit card. Provision shall be there for connectivity of telephone/communication line with bank server. The POS and its last mile connectivity is in the scope of this Contract.
- 10). Performance parameters:
 - a). MCBF - 10,000
 - b). MCBJ - 20,000
 - c). MTTR - 30 minutes
- 11.) The contractor shall be responsible for the installation / configuration of TVMs at designated stations. It shall be possible to shift TVMs easily from one station to another, afterwards.
- 12.) Escrow facilities for Bank Note (Minimum 15)
- 13.) No coin acceptance, only dispensing
- 14.) Front openable
- 15.) The token Container size must be of 2000 tokens. The Token container should be compatible with the Gate container such that the Gate Token container can be used for filling the Tokens in TVM.
- 16.) Provision to collect the Tokens while clearing the Tokens.
- 17.) A lamp or lighting arrangement for maintenance of TVM from inside.
- 18.) No chances of electric shock. No sharp Edges.
- 19.) PID for displaying TVM Status-“In Service”, “Out of Service” and “Maintenance Mode”

5.5.3 Design Parameters

Parameters	Description
1. Functions	Issue of Token Top up of Card Ticket validity check, Blacklist Card
2. General	Accept all operational parameters / software from CC2/SC. Provision for degraded mode System hang faults shall not be acceptable.
3. Protection	All housed modules should have protection for damage due to pests or accidental water seepage. Mechanical parts protected against corrosion.
4. Earthing	Each machine shall have provision for connection to the station earth bar and shall be connected accordingly. Contractor shall be

	<p>responsible for extending of earth from nearby room (UPS/EFO/TOM/SCR) to TVM through cable trays.</p> <p>No chances of electric shock to user in case of internal assembly/module failure.</p>
5. Power supply	<p>Protection with ELCB, maintenance sockets</p> <p>Power shall be provided to the PSU from the AFC Electrical cabinet at 230V, 50 Hz.</p>
6. Smart media Validator	Reader/Writer (for Type A, EMV Level 1,2 and NFC smart media).
7. Security	<p>SAMs for Reader/writers.</p> <p>Equipment DSMs.</p> <p>Anticollision for CSCs.</p> <p>Secure transactions and data transfer.</p> <p>Data protection in case of power failure (battery back-up mechanism). Protect pending initiated last transactions or data transfer.</p> <p>Back-up data for minimum 7 days. Data not to be purged before transferred to CC2/SC.</p>
8. Keyboard	Small keypad accessible inside the TVM enclosure for Operation, Maintenance Configuration etc.
9. Patron sound device	<p>Range of 60-80 db(A) measured from 1 meter from source.</p> <p>Software configurable.</p> <p>Unique alarms for intrusion, fraud, container-full / nearly empty, invalid ticket, internal UPS failure, over-heating, counterfeit currency etc.</p>
10. Environment	<p><u>Operation</u></p> <ul style="list-style-type: none"> ▪ 0° to +50°C external ▪ RH (Equivalent test 95% at 35°C) <p><u>Storage</u></p> <ul style="list-style-type: none"> ▪ -20° to +70°C external ▪ 95% (without condensation)
11. Cables	<p>Standard cables to be used for internal wiring.</p> <p>Precise / orderly routing, lacing and labeling.</p>
12. Power Failure	In the event of power failure to the TVM, the battery module should provide enough power to finish the transaction in progress and make clean TVM shutdown.

CHAPTER-6

NETWORK AND CABLING

6.1. NETWORK MANAGEMENT

6.1.1. General

- 1) The contractor shall propose, finalize and interface for AFC WAN (2 Mbps) channels of plan with Jaipur MetroTelecom contractor as per requirement to meet transaction traffic of AFC for all stations.
- 2) The contractor shall be responsible to ensure that CC1 or CC2 if applicable will be connected with the station AFC LAN through 2 Mbps link (shared on a group stations) provided by the Telecom contractor.
- 3) The SC shall communicate with the station AFC machines via the AFC LAN provided by AFC contractor.
- 4) TCP/IP network communication protocol should be used for all data communication in the system. I.P. addresses shall be designed and implemented by the contractor in consultation with the Employer's engineer.
- 5) All network computers and equipment shall be connected through intelligent switches. Any single failure in the network shall be automatically isolated and shall not cause any system disruptions.
- 6) LAN shall be provided by AFC contractor and shall be at least 100 Mbps. Other operating speeds may be proposed if equipment performance of the system is demonstrated.

6.1.2. CENTRAL LEVEL

- 1) Full LAN redundancy shall be provided at CC1 or CC2 if applicable.
- 2) Supervision Console (NMS)
- 3) Contractor shall submit the networking requirements for CC1 or CC2 if applicable at OCC level, at design stage.
- 4) All the connectivity between CC1 and CC2 (if applicable)/station level equipment is also a part of this contract and under the scope of JP/JS21(1B) contractor.

Central Router

- i). Similar to Cisco 7206 or better as per requirement (with required IOS Software Release) and equipped to support 5 stations.
- ii). Mounts in a standard 19 inch rack.

- iii). Processor: 350Mhz min., DRAM memory (supporting upto 512 MB).
- iv). Module VWIC-2MFT-G703 and PA-MC-8EI/120: 2x2.048 Mbps (8 port - RJ 48-E1 for unstructured G.703).
- v). 2x 10/100 Ethernet ports for LAN interface complying to :
 - a). IEEE802.3 - Type 10 Base-T
 - b). IEEE 802.3u - Type 100 Base-TX
- vi). One console port, Telnet (with command line interface), One auxiliary port, One AC power supply (100-240 VAC, 50/60 Hz).
- vii). One Flash memory card (48 MB), Six port adapter slots, Provision of at least 50% spare ports.
- viii). Throughput - more than 400,000 packets per second.
- ix). Operating Temp: 0 to 40° C, Storage Temp.: -25° C to 65° C, Humidity: 10 to 90%.

6.1.3. STATION LEVEL

- 1) In order to assure station communication at an optimum rate, the speed of station LAN sufficient to handle peak traffic performance requirements.
- 2) Network shall be failsafe with redundancy.

3) Components Of LAN

The minimum requirements of various network components areas follows:

a). Data Switch

- i). One switch shall be supplied for SCR and one for each EFO to be connected to router in TER.
- ii). Similar to HP ProCurve 2510 or advanced
- iii). 24 Port RJ-45 complying with 10 Mbps Ethernet / IEEE 802.3 standard / 10/100BaseTX Autosense, further expandable. SNMP compliant and able to remotely monitor and control the status of each port. The speed of the port shall be configurable. Meets SNMP version 1 and 2c.
- iv). Two open transceiver slots
- v). One RS-232C DB-9 console port for management.
- vi). [24xnetwork node - Ethernet 10 Base-T/100Base-Tx-RJ45-24 1x management - RS232 - 9 Pin D-Sub (DB-9)-1]
- vii). Module transceiver 100BaseFX meeting IEEE 802.3u Type 100Base-TX standard.
- viii). Fx port for connection with optical fibre, where ever required, OFC must comply with ITU-T G.651 & ISO/IEC 793-2 TA1b or A1a standards.
- ix). Performance:
 - Packet buffer size: 6 MB shared packet buffers.
 - RAM/ROM: ≥ 26 MB
 - Processor speed ≥ 62.5 MHz

- Flash memory: ≥ 2 MB
- Latency: < 10 us(FIFO)
- x). Adequate sized fitted in a 19" rack (wall / floor mountable with locking mechanism).
- xi). Auto partitioning function, Data collision and jabber handling functions
- xii). Security functions including port and group intrusion control.

b). Station Routers

- i). Similar to Cisco 2811 series or better
- ii). 2x2 Mbps port complying to G703, 2 Mbps interface.
- iii). One 10/100 fast Ethernet port meeting IEEE standards: IEEE 802.3 Type 10 Base-T and IEEE 802.3u Type 100 Base-TX.
- iv). 2 WAN interface card slots, one auxiliary port, one console port, one power supply, one network module slots.
- v). Multiflex trunk voice/WAN interface card - 2 port RJ 48 confirming to ITU G/703 and G.704.
- vi). Provision of spare ports.
- vii). Performance:
 - Processor speed > 50 Mhz.
 - DRAM memory > 32 MB supporting upto 64 MB
 - Flash memory > 8 MB supporting upto 32 MB.
 - Throughput > 25000 packets per second.
 - Throughput: 6.6 million pps (64- byte packets)
 - Switch fabric speed: 9.6 Gbps
 - Address table size: 4,096 entries.
 - Management web interface, console port and Telnet with command line interface.

c). Switch / Router Racks

- i). Size 6U, lockable from front side
- ii). Cable Manager
- iii). Fan (230 V AC) - 2 No.,
- iv). Patch Panel 24 port – loaded PCB type (D-Link or similar make).
- v). Power strip (6 points)-ISI Marks

d). Patch Panels, OFC Db, Wall Panel Etc. - as per requirement.

- e).** For any other network components not mentioned above, the contractor shall give the technical details of the products and standards to which the product adheres to and supply and install the same.

6.2 CABLING - DATA, POWER AND CONTROL CABLES

6.2.1 General

- 1). The Contractor shall be responsible for the specifications, sizing, procurement, installation, wiring, terminating and testing of all power, data and control cables/wires required for the OCC level and for stations of the AFC network.
- 2). This shall include all necessary connecting cables:
 - a). For link to the WAN infrastructure provided by FOTS / Telecom contractor in the TER.
 - b). For distributing power to AFC equipment from Electrical supply from S&T UPS.
 - c). Individual Station LAN for all AFC equipment connectivity.
 - d). For OCC LAN set-up.
- 3). Cable shall meet national or international standards applicable to data processing and data transmission systems and appropriate for the requirement.
- 4). Proper earthing of all AFC equipment by a copper or copper-alloy, corrosion resistant, high-conductivity grounding pad shall be provided to ground all conductive materials such as frames, metallic covers, trays, and doors. Common earthing at S&T UPS room to be utilized and further cable drawn by AFC contractor to SCR and Gate area / TOM / EFO for AFC equipments.

6.2.2 Requirements

The following requirements shall be the minimum but is not limited to ensuring that contractor's designs follow sound engineering practice and are suitable for their intended purposes and environments.

- 1). All material used shall be subjected to the Employer's engineer inspection and examination at site or the factory.
- 2). The cables shall be installed at a safe separation from potential interfering sources, including power cables, LCX, etc. A cable routing plan shall be designed so that there is the least likelihood of coupling between the cables and the potential sources. For example, long parallel runs of signal cables and power cables shall be avoided, Wherever possible, the controls/monitoring cable and the power cable shall meet at an angle as close to 90° as possible. The separation distance between control cables and signal cables shall be maintained when going through walls and floors. Similarly, controls/monitoring cables shall enter the ITB from the top through two separate holes. The Contractor should refer to guidelines recommended by IEC 1000-5-2 wherever possible.
- 3). The contractor shall ensure suitable separation between power, digital signal and analogue cables along the cable route.
- 4). The cables used in the AFC network must be adequately protected against external interference. Additional protective measures, including but not limited to the use of metallic (steel) conduits, armors, ferrite chokes, and EMI filters must be used to reduce such external interference wherever required.

- 5). For protection against the electrostatic capacitance coupling, direct electrical connection between ducts of power cables and controls/monitoring cables must be avoided.
- 6). It shall be the Contractor's responsibility to interface with the appropriate Civil Contractors, System-wide Contractors to determine the most suitable cable route designs, bearing in mind the restraints of the structure gauge, the drawings, the various standards applicable and the requirements of this and other relevant specifications and criteria.
- 7). The Contractor shall prepare installation drawings and specifications for the Employer's engineer approval prior to commencing any work on site. These shall include a schedule of locations, activities and key dates, together with lists and details of staff to be employed.
- 8). The Contractor shall demonstrate satisfactory use of the type of cable proposed for use in a comparable railway and tropical environment, be able to meet the specifications, and shall guarantee at least 25years service life for the product to be provided.
- 9). **Cable Accessories** - All cable should be laid and terminated using standard accessories for laying, lacing, termination / clamping and armoring All cables totally exposed in above ground guide way or above ground open areas shall be armored (in GI conduits)..
- 10). For protection against electromagnetic induction, the controls/monitoring cables should be carried in two separate cable trays / ducts, namely the data cable and power cable. These two conduits should be separated by a distance of not less than 150 mm. The latest versions of IEC 1000-5 and/or other relevant standards must be referred to wherever practical. Cable trays / ducts will be provided by station civil / electrical contractors as per requirement given by AFC contractor.
- 11). Cable routes shall be designed to avoid trapping rubbish which could become a fire hazard. Bends shall be of maximum radius and not less than is appropriate to the size and construction of the cable. Sharp edges shall be avoided.
- 12). In station areas generally, the Contractor shall determine the requirements for brackets, ducts, conduits, troughs, trays and other fittings required to protect the cables for the systems supplied under this Contract. Where cable routes are, or can be made, common to more than one contract, the Contractor shall interface with the other Contractors involved to determine a mutually acceptable arrangement of common routes for the acceptance of the Employer's representative.

6.2.3 Ducting

- 1). AFC ducting will be provided by station Contractors to enable the distribution of power, data and control cables to equipment on the station concourse and platforms
- 2). There will be an earth cable throughout the length of the ducting and in addition there will be earth bonding of the ducting itself. It shall be the responsibility of the contractor to verify the integrity of the earth bonding.
- 3). The AFC ducting will have a nominal cross section of 300mm by 45mm and will be divided

into two symmetric sections, one for power cables and one for data and control cables.

6.2.4 CABLE SPECIFICATION

1). Data Cable

A. The cable shall as a minimum comply to the following:

- i). The cable shall be UTP Category 5e cable.
- ii). Characteristic Impedance: 100 +/- 15 Ohms.
- iii). Coupling attenuation @ 30 MHz : 45 Db/100m
- iv). Conductor diameter: 0.50 mm minimum.
- v). ACR at 100 MHz: 16 Db/100m.(minimum)

B. Test results and certificates shall be submitted for review to the Employer's Representative

2). Optical Fibre Cable-

To be of suitable specification. Contractor to propose as per requirement.

3). Power & Control Cable

- i. To be of suitable specification. Contractor to propose as per requirement.
- ii. Cables shall be ISI mark or similar international rating.
- iii. Fire retardant, Low smoke, low halogen. The halogen content shall not be more than 0.5% for cables used in underground and not more than 20% for cables used at elevated / at grade stations.
- iv. Cables shall comply with latest version of British, IEC, ASTM, ITU standard.
- v. All cables should have continuous operating life of at least 25 years.

- 1) All Cables need to be inspected/ tested by Third Party
- 2) All cost related to inspection/testing shall be borne by the contractor.
- 3) Contractor is required to propose the name of the Third party for JMRC Approval

6.2.5 Electrical Cabinet

- 1) Electrical cabinets may comprise of following items.

Type-A (for EFO)	<p>a). <u>EC housing</u></p> <p>i). EC housing {size 490mm(W) x 590mm(H) x 200 mm (D)} shall be fabricated of 14 SWG CRCA sheet steel.</p> <p>ii). All internal power wiring shall be 2.5/6.0 mm² flexible fire proof wire.</p> <p>iii). Proper size Glands, fire sleeves, lugs & connectors to be used.</p> <p>b). <u>MCBs</u></p> <p>Of suitable rating (Merlin Gerin or similar)</p> <p>c). <u>ELCBs</u></p> <p>Of suitable rating (Merlin Gerin or similar)</p> <p>d). <u>Isolators</u></p> <p>Provision of power cut of gate through Relay (Siemens or similar) when emergency switch operated</p> <p>e). Mains power indicator, Emergency switch indicator.</p> <p>f). Glass/PVC protection cover over MCBs.</p> <p>g). Wall mounted type</p>
<p>-----</p> Type-B (for TOM)	<p>-----</p> <p>a). <u>EC housing</u></p> <p>i). EC housing {size 325mm(W) x 375mm(H) x 150 mm (D)} shall be fabricated of 14 SWG CRCA sheet steel.</p> <p>ii). All internal power wiring shall be 2.5/6.0 mm² flexible fire proof wire.</p> <p>b). <u>MCBs</u></p> <p>Of suitable rating (Merlin Gerin or similar)</p> <p>c). Glass/PVC protection cover over MCBs.</p> <p>d). Wall mounted type</p>
<p>-----</p> Type-C (for UPS)	<p>-----</p> <p>a). <u>EC housing</u></p> <p>i). EC housing {size 325mm(W) x 375mm(H) x 150 mm (D)} shall be fabricated of 14 SWG CRCA sheet steel.</p> <p>ii). All internal power wiring shall be 2.5/6.0 mm² flexible fire proof wire.</p> <p>b). <u>MCBs</u></p> <p>Of suitable rating (Merlin Gerin or similar)</p> <p>c). Glass/PVC protection cover over MCBs.</p> <p>d). Wall mounted type</p>

6.2.6 OFC Distribution Box

Contractor to propose as required.

CHAPTER 7

INTERFACES

7.1 GENERAL

- 1) The purpose of the Interface Specifications is to provide Designated Contractors involved in the interface with a clear overview of the purpose and functionality of each interface. It provides a framework such that Designated Contractors can set to work in a co-operative way to produce the interfacing standard.
- 2) The contractor shall interface with designated contractors (Building service / Civil contractor / Electrical contractor / Telecom contractor), Agencies (government or private), UPS contractor, consultants, and other sub / local contractors etc. to ensure smooth execution of works.
- 3) The Interface Specifications detailed below are used as the key documents for the interface definition and also to define the scope of each Designated Contractor.

7.2 INTERFACE SPECIFICATION

Definitions and Scope

- 1) This specification describes the interface requirements between AFC contractor, DDC / Civil construction / Electrical works Contractor, Telecom contractor and UPS power supply contractor.
- 2) This specification shall be read in conjunction with the relevant paragraphs of the General Specification. Both the AFC and the Designated Contractors shall ensure that all requirements of the Specification pertaining to interfaces are properly satisfied.
- 3) The AFC Contractor shall co-ordinate with the Designated Contractors to assure that rooms are ready when equipment needs to be installed.
- 4) The AFC Contractor shall install cables in co-ordination with the Designated Contractors. The embedded conduits and main cable trays shall be provided by the station building contractor. However, all dropping / distribution conduiting needs to be done by the AFC contractor.
- 5) The AFC Contractor shall furnish and install all AFC equipment at the locations shown in the design plans.
- 6) The AFC Contractor shall furnish and install all of the cabling required to the AFC equipment at stations and OCC
- 7) The Designated Contractors shall provide earth connections at UPS room each station. It shall be the responsibility of the AFC Contractor to extend the earth to AFC equipment.
- 8) It will be the contractor's responsibility to interface with the DDC / civil contractor and determine the most suitable cable route designs, bearing in mind the restraints of the structure gauge, the drawings, the various standards applicable and the requirements of this and other relevant specifications and criteria.
- 9) The AFC contractor shall be responsible for the specification, sizing, procurement, installation, wiring and testing of all single and multicore cables and wires required for the AFC equipment.
- 10) The AFC Contractor shall review the Combined Services Drawings (CSD) for first section and ensure that all information required by him is incorporated in these drawings.

- 11) The AFC Contractor shall determine the sizes of the AFC equipment rooms required at each station and inform the respective DDC as to the minimum sizes required.
- 12) The AFC Contractor shall co-ordinate with the DDC contractors to assure that lighting, power, provision for installation of AFC equipment, dropped ceilings, ventilation, and air conditioning required for AFC equipment is adequate.
- 13) The AFC Contractor shall provide the cable tray sizes and locations required to the DDC contractors.
- 14) The AFC Contractor shall co-ordinate with the DDC contractors to assure that proper cable entrances are provided at all locations where cable must pass through walls.
- 15) The AFC Contractor shall work with the DDC Contractors to identify the locations of AFC equipment.

7.3 INTERFACE WITH CIVIL AND ELECTRICAL WORKS

- 1) The Contractors for the Civil & Electrical Works Contracts shall hereinafter be collectively termed “**Designated Contractors (Civil & Electrical)**”.
- 2) The contractor shall interface with station contractor / DDC for final station level AFC requirements, drawings, civil works execution / completion / taking handover of site for AFC system installations.
- 3) **Equipment Rooms**
All AFC equipment rooms, including power source, ventilation, air-conditioning and lighting will be provided by the works of Designated Contractors.
- 4) **Main Cable Routes**
 - Designated Contractors will provide electric power from a central point (Telecommunication Room).
 - It will be responsibility of Designated Contractor to arrange for main cable routes including cable trays, troughs, hangers, trenches and ducts etc from this central point to all AFC Equipment.
- 5) The scope of works to be provided by the Designated Contractors are outlined in Appendix 7.1.
- 6) The Contractor shall review the details of these works and notify the Employer's engineer of any amendments required or omissions therein.

7.4 INTERFACE WITH TELECOM

- 1) The Contractors for the Telecom Works Contracts shall hereinafter be collectively termed “**Designated Contractors(Telecom)**”.
- 2) **Communication Line**
 - Designated Contractors will provide high speed Optic Fibre Telecom link from OCC to Telecom room of all stations.
 - It will be responsibility of AFC Contractor to arrange for telecom link (2 Mbps E1 links/Ethernet) of all AFC equipment from telecom room. This shall include laying up of cables and wiring etc. from telecom room to all AFC equipment.
- 3) Not Used.

- 4) The Contractor shall review the details of these works and notify the Employer of any amendments required or omissions therein.

7.5 INTERFACE WITH UPS CONTRACTOR

AFC contractor shall interface for the power requirements for the AFC system with the contractor of common S&T UPS system who shall provide Power in the UPS Room. AFC Contractor then shall install his own Power distribution cubicle including the MCB's therein and further lay Power Cables from TER room upto his equipments. For OCC/SDC equipment, AFC contractor shall interface with UPS(S&T) contractor for identification of power port and extend power cables upto its equipment.

7.6 OTHER INTERFACES

All the necessary furniture for SDC, AFC CC and CSS shall be provided by JS 21(1B) contractor.

Appendix 7.1**AFC INTERFACE SPECIFICATION**

Item No.	Subject	Designated Contractor responsibilities	AFC Contractor's Responsibilities
1	Ticket Booth(TOM)related works : Construction of ticket booth with false ceiling and windows with glass panes, Indoor and outdoor lighting, Air-conditioning, Power points at counters Communication line for ticketing machines, Phones, Earthing Facility for ticketing machines, Fare and Route display.	Construction : <ul style="list-style-type: none"> • Construction of ticket booth with false ceiling and windows with glass panes, • Construction of trenches for laying of Power and data cable, • Indoor and outdoor lighting, • Air-conditioning, • Power points on wall for light & other works • Fare and Route display • Counter as per AFC equipment design Design: <ul style="list-style-type: none"> • Design of booth – number of windows and its location; • Design details to be worked out in interface with design requirements. 	Design : <ul style="list-style-type: none"> • Confirm basic booth sizes and layout; • Furnish equipment sizes and weights; • Furnish equipment mounting details; • Confirm room finishes; • Furnish requirements of cable trenches, cable routing and cable support provisions on walls and floor; holes in counter; • Furnish lighting requirements; • Confirm fire safety provisions; • Review the design from designated contractor. • Power & data point below counter for AFC • All the power requirements of all the AFC equipments shall be provided by the contractor • All Earthing work Construction: <ul style="list-style-type: none"> • Installation of Ticketing Machines • Power & Data cable for ticketing machines
2	Passenger Operated Machines / Ticket Vending Machine (TVM)	Construction : <ul style="list-style-type: none"> • Construction of trench for laying of power and communication cables for TVM's to be installed presently and in future Design: <ul style="list-style-type: none"> • Design details to be worked out in interface with design requirements. 	Design: <ul style="list-style-type: none"> • Furnish requirement of cable trenches, cable routing and cable support provisions • Installation of TVM • Power & Data cable for TVM

3.	Provision of furniture at SDC/OCC		To be provided by AFC contractor as per requirement
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4.	Automatic Gates related works : <ul style="list-style-type: none"> • Construction of trenches for laying of Power and Communication lines, • Lighting arrangement, • Communication line for gates, 	Construction : <ul style="list-style-type: none"> • Construction of trenches for laying of Power and data cables, • Lighting arrangement, Design: <ul style="list-style-type: none"> • Design details to be worked out in interface with design requirements. • Location and number of gates to be decided in consultation with contractor. 	Design: <ul style="list-style-type: none"> • Confirm basic gate sizes and booth layout • Furnish equipment sizes and weights • Furnish equipment mounting details • Confirm finishes • Furnish requirement of cable trenches, cable routing and cable support provisions • Review the design from designated contractor Construction: <ul style="list-style-type: none"> • Installation of gates and ticketing machine. • Power & Data cables for Gate • All Earthing works
5.	Station Control Room related works: Construction, Indoor and outdoor lighting, Air-conditioning, Power points for Station computer, Supply through UPS, Communication line for Station Computer,	Construction : <ul style="list-style-type: none"> • Indoor and outdoor lighting, • Air-conditioning, Design: <ul style="list-style-type: none"> • Design details to be worked out in interface with AFC design requirements. 	Design: <ul style="list-style-type: none"> • Confirm area / location required for installation of computer / equipments • Furnish equipment size and weight • Furnish equipment mounting details • Confirm room finishes • Furnish requirement of cable trenches, cable routing and cable support provisions • Furnish lighting requirements • Confirm fire safety provisions • Review the design from designated contractor Construction: <ul style="list-style-type: none"> • Installation of Station Computer • Power & data cables for station computer & printer.

<ul style="list-style-type: none"> • Provision of communication channels for implementing the WAN for AFC system. • Provision of telephones in excess fare booth, cash room, booking office and other AFC rooms in stations • Provision of external clock from master clock system • Provision of earth • Provision of furniture 	<ul style="list-style-type: none"> • Provision of communication channels for implementing the WAN for AFC system. <p>Provision of telephones in excess fare booth, cash room, booking office and other AFC rooms in stations</p> <ul style="list-style-type: none"> • Provision of external clock from master clock system • Provision of earth at UPS room • Provision of table and chair for Station computer and chairs for TOM / EFO. Cash box at counters. 	<ul style="list-style-type: none"> • Propose and Confirm the channel requirement • LAN for connectivity with CC1 shall be under scope of AFC contractor • Extension of earth to each AFC equipment • Give requirements of furniture. Confirm location
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CHAPTER 7

INTERFACES

7.1 GENERAL

- 1) The purpose of the Interface Specifications is to provide Designated Contractors involved in the interface with a clear overview of the purpose and functionality of each interface. It provides a framework such that Designated Contractors can set to work in a co-operative way to produce the interfacing standard.
- 2) The contractor shall interface with designated contractors (Building service / Civil contractor / Electrical contractor / Telecom contractor), Agencies (government or private), UPS contractor, consultants, and other sub / local contractors etc. to ensure smooth execution of works.
- 3) The Interface Specifications detailed below are used as the key documents for the interface definition and also to define the scope of each Designated Contractor.

7.2 INTERFACE SPECIFICATION

Definitions and Scope

- 1) This specification describes the interface requirements between AFC contractor, DDC / Civil construction / Electrical works Contractor, Telecom contractor and UPS power supply contractor.
- 2) This specification shall be read in conjunction with the relevant paragraphs of the General Specification. Both the AFC and the Designated Contractors shall ensure that all requirements of the Specification pertaining to interfaces are properly satisfied.
- 3) The AFC Contractor shall co-ordinate with the Designated Contractors to assure that rooms are ready when equipment needs to be installed.
- 4) The AFC Contractor shall install cables in co-ordination with the Designated Contractors. The embedded conduits and main cable trays shall be provided by the station building contractor. However, all dropping / distribution conduiting needs to be done by the AFC contractor.
- 5) The AFC Contractor shall furnish and install all AFC equipment at the locations shown in the design plans.
- 6) The AFC Contractor shall furnish and install all of the cabling required to the AFC equipment at stations and OCC
- 7) The Designated Contractors shall provide earth connections at UPS room each station. It shall be the responsibility of the AFC Contractor to extend the earth to AFC equipment.
- 8) It will be the contractor's responsibility to interface with the DDC / civil contractor and determine the most suitable cable route designs, bearing in mind the restraints of the structure gauge, the drawings, the various standards applicable and the requirements of this and other relevant specifications and criteria.
- 9) The AFC contractor shall be responsible for the specification, sizing, procurement, installation, wiring and testing of all single and multicore cables and wires required for the AFC equipment.
- 10) The AFC Contractor shall review the Combined Services Drawings (CSD) for first section and ensure that all information required by him is incorporated in these drawings.

- 11) The AFC Contractor shall determine the sizes of the AFC equipment rooms required at each station and inform the respective DDC as to the minimum sizes required.
- 12) The AFC Contractor shall co-ordinate with the DDC contractors to assure that lighting, power, provision for installation of AFC equipment, dropped ceilings, ventilation, and air conditioning required for AFC equipment is adequate.
- 13) The AFC Contractor shall provide the cable tray sizes and locations required to the DDC contractors.
- 14) The AFC Contractor shall co-ordinate with the DDC contractors to assure that proper cable entrances are provided at all locations where cable must pass through walls.
- 15) The AFC Contractor shall work with the DDC Contractors to identify the locations of AFC equipment.

7.3 INTERFACE WITH CIVIL AND ELECTRICAL WORKS

- 1) The Contractors for the Civil & Electrical Works Contracts shall hereinafter be collectively termed “**Designated Contractors (Civil & Electrical)**”.
- 2) The contractor shall interface with station contractor / DDC for final station level AFC requirements, drawings, civil works execution / completion / taking handover of site for AFC system installations.
- 3) **Equipment Rooms**
All AFC equipment rooms, including power source, ventilation, air-conditioning and lighting will be provided by the works of Designated Contractors.
- 4) **Main Cable Routes**
 - Designated Contractors will provide electric power from a central point (Telecommunication Room).
 - It will be responsibility of Designated Contractor to arrange for main cable routes including cable trays, troughs, hangers, trenches and ducts etc from this central point to all AFC Equipment.
- 5) The scope of works to be provided by the Designated Contractors are outlined in Appendix 7.1.
- 6) The Contractor shall review the details of these works and notify the Employer's engineer of any amendments required or omissions therein.

7.4 INTERFACE WITH TELECOM

- 1) The Contractors for the Telecom Works Contracts shall hereinafter be collectively termed “**Designated Contractors(Telecom)**”.
- 2) **Communication Line**
 - Designated Contractors will provide high speed Optic Fibre Telecom link from OCC to Telecom room of all stations.
 - It will be responsibility of AFC Contractor to arrange for telecom link (2 Mbps E1 links/Ethernet) of all AFC equipment from telecom room. This shall include laying up of cables and wiring etc. from telecom room to all AFC equipment.
- 3) Not Used.

- 4) The Contractor shall review the details of these works and notify the Employer of any amendments required or omissions therein.

7.5 INTERFACE WITH UPS CONTRACTOR

AFC contractor shall interface for the power requirements for the AFC system with the contractor of common S&T UPS system who shall provide Power in the UPS Room. AFC Contractor then shall install his own Power distribution cubicle including the MCB's therein and further lay Power Cables from TER room upto his equipments. For OCC/SDC equipment, AFC contractor shall interface with UPS(S&T) contractor for identification of power port and extend power cables upto its equipment.

7.6 OTHER INTERFACES

All the necessary furniture for SDC, AFC CC and CSS shall be provided by JS 21(1B) contractor.

Appendix 7.1**AFC INTERFACE SPECIFICATION**

Item No.	Subject	Designated Contractor responsibilities	AFC Contractor's Responsibilities
1	Ticket Booth(TOM)related works : Construction of ticket booth with false ceiling and windows with glass panes, Indoor and outdoor lighting, Air-conditioning, Power points at counters Communication line for ticketing machines, Phones, Earthing Facility for ticketing machines, Fare and Route display.	Construction : <ul style="list-style-type: none"> • Construction of ticket booth with false ceiling and windows with glass panes, • Construction of trenches for laying of Power and data cable, • Indoor and outdoor lighting, • Air-conditioning, • Power points on wall for light & other works • Fare and Route display • Counter as per AFC equipment design Design: <ul style="list-style-type: none"> • Design of booth – number of windows and its location; • Design details to be worked out in interface with design requirements. 	Design : <ul style="list-style-type: none"> • Confirm basic booth sizes and layout; • Furnish equipment sizes and weights; • Furnish equipment mounting details; • Confirm room finishes; • Furnish requirements of cable trenches, cable routing and cable support provisions on walls and floor; holes in counter; • Furnish lighting requirements; • Confirm fire safety provisions; • Review the design from designated contractor. • Power & data point below counter for AFC • All the power requirements of all the AFC equipments shall be provided by the contractor • All Earthing work Construction: <ul style="list-style-type: none"> • Installation of Ticketing Machines • Power & Data cable for ticketing machines
2	Passenger Operated Machines / Ticket Vending Machine (TVM)	Construction : <ul style="list-style-type: none"> • Construction of trench for laying of power and communication cables for TVM's to be installed presently and in future Design: <ul style="list-style-type: none"> • Design details to be worked out in interface with design requirements. 	Design: <ul style="list-style-type: none"> • Furnish requirement of cable trenches, cable routing and cable support provisions • Installation of TVM • Power & Data cable for TVM

3.	Provision of furniture at SDC/OCC		To be provided by AFC contractor as per requirement
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4.	Automatic Gates related works : <ul style="list-style-type: none"> • Construction of trenches for laying of Power and Communication lines, • Lighting arrangement, • Communication line for gates, 	Construction : <ul style="list-style-type: none"> • Construction of trenches for laying of Power and data cables, • Lighting arrangement, Design: <ul style="list-style-type: none"> • Design details to be worked out in interface with design requirements. • Location and number of gates to be decided in consultation with contractor. 	Design: <ul style="list-style-type: none"> • Confirm basic gate sizes and booth layout • Furnish equipment sizes and weights • Furnish equipment mounting details • Confirm finishes • Furnish requirement of cable trenches, cable routing and cable support provisions • Review the design from designated contractor Construction: <ul style="list-style-type: none"> • Installation of gates and ticketing machine. • Power & Data cables for Gate • All Earthing works
5.	Station Control Room related works: Construction, Indoor and outdoor lighting, Air-conditioning, Power points for Station computer, Supply through UPS, Communication line for Station Computer,	Construction : <ul style="list-style-type: none"> • Indoor and outdoor lighting, • Air-conditioning, Design: <ul style="list-style-type: none"> • Design details to be worked out in interface with AFC design requirements. 	Design: <ul style="list-style-type: none"> • Confirm area / location required for installation of computer / equipments • Furnish equipment size and weight • Furnish equipment mounting details • Confirm room finishes • Furnish requirement of cable trenches, cable routing and cable support provisions • Furnish lighting requirements • Confirm fire safety provisions • Review the design from designated contractor Construction: <ul style="list-style-type: none"> • Installation of Station Computer • Power & data cables for station computer & printer.

<ul style="list-style-type: none"> • Provision of communication channels for implementing the WAN for AFC system. • Provision of telephones in excess fare booth, cash room, booking office and other AFC rooms in stations • Provision of external clock from master clock system • Provision of earth • Provision of furniture 	<ul style="list-style-type: none"> • Provision of communication channels for implementing the WAN for AFC system. <p>Provision of telephones in excess fare booth, cash room, booking office and other AFC rooms in stations</p> <ul style="list-style-type: none"> • Provision of external clock from master clock system • Provision of earth at UPS room • Provision of table and chair for Station computer and chairs for TOM / EFO. Cash box at counters. 	<ul style="list-style-type: none"> • Propose and Confirm the channel requirement • LAN for connectivity with CC1 shall be under scope of AFC contractor • Extension of earth to each AFC equipment • Give requirements of furniture. Confirm location
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CHAPTER 8

DESIGN REQUIREMENTS

8.1 GENERAL

- 1) The following design requirements shall be adopted by the Contractor in addition to those specified in the GS.
- 2) The Contractor shall submit a list of all design review documents for the review of the Employer.

8.2 DESIGN PROCESS

The Contractor shall adopt a structured design process, including, but not limited to the following:

- 1) Conceptual, preliminary and final design reviews with the Employer, including, but not limited to: system architecture, logic flow diagrams, operation and maintenance philosophy, and verification and test approach; and
- 2) Conceptual, preliminary, and final software design reviews with the Employer, including but not limited to: the software requirements specification, software architecture, logic flow diagrams, and verification and test approach.

8.3 SOFTWARE REQUIREMENTS

- 1) The Contractor shall demonstrate to the Employer the correct application of the standards specifically detailing the allocation of software integrity levels for all software.
- 2) The Contractor shall submit with the Design Plan for the review of the Employer a list identifying all software, which will be maintainable and re-configurable by the Employer.

8.4 EQUIPMENT TYPE DESIGN CRITERION

1) Environmental

- a) This is described in detail in GS.
- b) The gates shall be installed in open areas at some stations. The Contractor shall follow international dust standards in respect of dust control for AFC gates.

2) Applicable Standards

The standards to be followed during the design, construction, and installation of the AFC System shall be as stipulated in the Codes and Standards (Appendix 6.1). The Contractor may propose alternative or additional standards for review by the Employer at least 60 days before application. Such standards shall include, but are not limited to, the following:

- Tests of individual components;
- Power supply standards;
- System performance and reaction time requirements;
- Earthing& bonding;

- Terminations;
- Fire/smoke proofing of cabling;
- Electrical isolation;
- Lightning protection;
- Structural requirements;
- Cabling standard; and
- Earth leak detection.

8.5 SYSTEM LIFE CYCLE PERFORMANCE REQUIREMENT-

- 1). The Contractor shall ensure that all equipment and material used is able to meet the specified availability throughout its service life as required to minimize disruption to the railway operation and to minimize the ongoing maintenance costs.
- 2). The Systems shall be so designed as to have a minimum of 10 years of service life (except Computer Hardware/Displays wherein it will be 7 years) operating continuously. The life of all the cables shall not be less than 25 years.
- 3). The system shall be designed to facilitate normal train and station operation, management of incidents and abnormal operations as well as of emergencies.
- 4). The System shall, to the extent practicable, have no credible failure mode, which will directly cause an interruption to security surveillance or delay in the train services. The Contractor shall demonstrate that the probability of occurrence of the credible failure mode, if any, has been reduced to ALARP (as low as reasonably practicable) and no further cost-effective means of improving reliability can be identified.

8.6 DESIGN DOCUMENTATION

- 1) The Contractor shall, in addition to the documentation requirements specified in the GS, supply, as a minimum, the following hardware and software design documentation:
 - a) Conceptual Design Specifications, details and drawings
 - b) Detailed Design Specifications, details and drawings
 - c) AFC Station Layouts
 - d) Software Design Specifications, Detailed Interface Specifications,
 - e) Configuration Documents
 - f) Installation, Validation Procedures and Test Reports etc.
- 3) The submission of the above documentation shall be included in the Submission Programme.

8.7 TICKET READING AND ENCODING MECHANISM

The AFCEquipments shall be designed to process contactless SMART card and token which shall meet the following requirements:

- 1) Read and verify data coded on tickets.
- 2) Capable of being easily modified to read/verify and write.

8.8 SECURITY PROVISIONS

The equipment shall be designed with features, which deter revenue losses from the following:

- 1) Acts such as altering, copying or counterfeiting the tickets.
- 2) Protection from unauthorized changes to the software.
- 3) Protection from breaking the multi-pin locking concept or circumventing security access controls and PINs. The idea behind multi-PIN (Personal Identification Number of Staff) locking concept is to provide security to AFC Systems by using different personal identification number of staff. The Contractor may propose alternative means to achieve the same objectives.
- 4) Protection from falsification of records. Provision shall be made to allow entry at the internal keypad of pre-encoded ticket serial numbers to track the ticket supply in order to identify any variances between the tickets dispensed and the tickets used in re-supplying TOM and the exit gates.

8.9 STAND-ALONE OPERATION

Individual units of the AFC equipment shall be capable to function in a stand-alone mode. Any breakdown in cabling or communication links between units of equipment or computer installation in stations or at the Central Office shall not affect operation.

8.10 MODULAR DESIGN

Modules, subsystems, assemblies and components shall be of modular design for ease of maintenance. The mean time to replace shall be less than 30 minutes.

8.11 INTERCHANGEABILITY

Modules performing identical functions shall be interchangeable. Electrical and mechanical components shall be packed together in shop repairable and field exchangeable modules according to the function.

8.12 MAINTAINABILITY

- 1) All components shall be packaged in replaceable and repairable modules. The mean time to replace line replaceable unit shall be less than 2 minutes. Standard hardware and components shall be used for flexibility and ease of maintenance.
- 2) Special customized carrying cases shall be provided to avoid damage to sensitive modules, as necessary, in quantities sufficient to support the level of maintenance required.

8.13 WEIGHT LIMITATION

Modules requiring removal for off-site maintenance shall be limited to 25 kg. Modules weighing more than 10 kg and requiring on-site maintenance with in the equipment structure shall be provided with hinges or roll-out slides.

8.14 MAINTENANCE

Employer's maintenance philosophy is to fully maintain the AFC equipment with its own staff or by a nominated agency. The job of the AFC Field Technicians is to perform preventive maintenance on the equipment and to isolate failures in the field only to the extent to enable identification of a failed replaceable unit. The failed unit will be replaced and the unit will be sent to Employer's maintenance facility for further failure analysis to determine the specific cause of failure and appropriate action.

8.15 TROUBLESHOOTING AIDS

The primary troubleshooting aid for field diagnosis shall be used. All possible failures shall be uniquely coded so that the failure can be isolated to the faulty module or subassembly. The Contractor shall demonstrate this capability on each type of equipment as part of the demonstration tests. The Employer and Contractor will introduce failures at random for this demonstration. Upon request from a technician using the service keyboard, the failure codes shall be displayed on the display board. Failure codes shall be transmitted to OCC with a data and time. The number of failure codes to be provided shall be related to the complexity of the unit of equipment. The failure codes shall be retrievable after a power loss or CPU reset, and shall be comprehensive and detailed and shall include, but not be limited to, such failures as:

- 1) Decoding error
- 2) Ticket jam
- 3) Sequence error in handler
- 4) No response from assembly
- 5) Check sum error
- 6) Wrong parameter
- 7) Record read impossible
- 8) Accounting error
- 9) Transmission error
- 10) Disk and File error
- 11) Not initialized

8.16 SELF-DIAGNOSTICS AND SELF-CLEARING

Self-diagnostics shall be employed to the maximum extent possible to assure the highest possible availability. Standard diagnostic programs shall be provided for computer hardware and software programs. Customized diagnostics shall be employed to assure such items as all modules in place, communications link up, non-computer electronics working properly,

battery backup ready and monitoring of wear for signs of deterioration. The Contractor shall indicate in the Manuals how the tests are initiated and provide a complete definition of the results of the tests and ranges of the possible results. A problem detected by self-diagnostics and problems occurring during a transaction shall be subjected to automatic resolution before the offending system or the unit of equipment is removed from service. Automatic resolution shall be unique to each subsystem, module or component.

8.17 SHOP MAINTENANCE

The design and fabrication of equipment modules shall be such that detailed failure analysis of failed modules and repair of such modules can be accomplished by Employer's maintenance personnel.

8.18 SOFTWARE

Downloading

Downloading of commands and parameters shall be accomplished remotely from OCC. Downloading shall be accomplished using standard communications protocols, cables and connectors. All necessary cables and connectors shall be provided.

2) Software Use and Verification

a) All software shall be complete and fully tested prior to shipment of the respective equipment. The software shall be fully programmed, debugged and updated. The Contractor shall provide the latest version of software source code and documentation for use during Contractor-conducted operation and maintenance training. All software source code, object code and documentation shall be provided on CD-ROM in a MS-WINDOWS compatible format. Upon entry of the proper command into the service terminal, the AFC equipment shall generate a printed receipt showing the software part number and version of all installed software.

8.19 COMPUTER CLOCK

A quartz clock shall be used in each unit of equipment to provide clock and calendar information at least up to year 2030. The clock shall have battery back-up. It shall be possible to synchronize the clock remotely, with the master clock of OCC. The clock shall automatically account for leap year, days of the month. The change to daylight saving time shall be made whenever an execution command is received from OCC. The accuracy of the clock shall be plus or minus 2 seconds per day.

8.20 DATA COMMUNICATION INTERFACE

A Network interface through LAN interface trans receiver shall be provided in each unit of equipment mounted inside the communication interface box provided at the base piece of equipment. The Contractor shall provide connecting cables from the equipment to the communications interface box.

8.21 LOCKS AND KEYS

The lock and key configurations for all the doors and internal components shall provide separate set of key along with key holder for operations and maintenance and revenue service (Minimum 5 set of keys per lock for each equipment).

8.22 GROUNDING

A copper or copper-alloy, corrosion resistant, high-conductivity grounding pad shall be provided within each AFC equipment to ground all conductive materials such as frames and metallic covers, motor frames, trays and doors.

8.23 SAFE GUARDS

The safety of all operating personnel using the equipment or performing their duties shall be an essential aspect of the AFC equipment design and fabrication. The Contractor shall provide appropriate safeguards. Such safeguards shall include shields or barriers placed to prevent injury, including burns from heated surfaces or cuts from sharp edges. Safety label shall be shown on moving parts, live voltage etc to alert operating or maintenance staff.

8.24 PAINTING AND PLATING

All exterior non-stainless steel surfaces shall be painted or plated. Parts or areas in contact with concrete or masonry walls or floors shall receive a minimum of 2 coats of rust and corrosion preventive primer and 2 coats of non-corrosive finish paint.

8.24 DESIGN REVIEWS

- 1) Design reviews as detailed in the following Articles will be conducted by the Employer. These reviews shall be conducted to evaluate the progress and technical adequacy of the design and conformance with the requirements of the Contract. Each design review shall include a design review submittal and a design review meeting. For each design review, a design package shall be submitted that includes all documents listed. The Employer will review the documents for conformance with the Specifications and will discuss its comments with the contractor at the design review meeting. The Employer will schedule the design review meeting approximately two weeks after the Employer has received the design review submittal. The Contractor shall incorporate the Employer's comments on the next design review submittal. Satisfactory completion of each design review shall require the approval of the Employer. Design reviews shall occur in the following chronological order:

- 2) **Conceptual Design Review**

The Conceptual Design Review (CDR) shall evaluate the Contractor's system concept and design approach. The CDR shall include at least the following items:

- a) General description of the major sub-assemblies including identification of components supplied by subcontractors for each type of equipment.
- b) Preliminary internal layout of sub-assemblies for each type of equipment.
- c) Preliminary layout of the front operating panels for each type of equipment.
- d) Functional block diagram of the system and equipment.
- e) Catalog cuts of the following modules: Main Display Unit, soft keys and numeric keypad; smart card interface device; and the equipment CPU.
- f) Identification and description of all interfaces between the major sub-assemblies.
- g) Identification and general description of all functions, data elements and its transfer supported by communications protocol.
- h) Information and decisions required from the Employer.
- i) Physical dimensions of each type of equipment.
- j) Power and other facility requirements of each type of equipment.
- k) Plans, programs, data related to management, training, manuals, quality assurance, reliability assurance and configuration control.

3) Final Design Review

The Final Design Review (FDR) shall evaluate the detailed design and the production drawings for the equipment. The FDR is the mechanism for determining whether the detailed design has a high probability of meeting all the design requirements, subject only to the results of any following tests or audits such as the pre-production tests, the reliability test during revenue service, and reliability and data accuracy audits. Work performed by the Contractor prior to required approval of the FDR by the Employer shall be entirely at the Contractor risk and expense. The FDR shall not commence until all Manual Outlines have been submitted by the Contractor and approved in writing by the Employer.

- a) The FDR shall include at least the following items:
- b) Latest revisions of the drawings, documentation and samples that were submitted at the CDR, PDR and MDR.
- c) Complete production drawings for each type of equipment
- d) Electrical schematic drawings, down to the individual signal and component level.
- e) Complete baseline software and preliminary software documentation for each type of equipment.
- f) Fully operating ticket handling mechanism
- g) List of maintenance service commands, codes and messages.
- h) Fully operating smart card components.
- i) Plans, programs and other data
- j) Latest revisions of the interface description that were submitted at PDR.

4) Pre-Production Review

- The Pre-Production Review (PPR) shall evaluate actual operation and performance of the pre-production equipment in an in-service environment.
- The PPR shall provide the basis for the Employer's release of manufacturing of the production equipment. Pre-production equipment approved as noted shall be the Production Configuration Baseline.
- The PPR shall not commence until all First Draft Manuals have been submitted by the Contractor and approved in writing by the Employer.
- The PPR shall include at least the following items:
 1. Fully operating units for each type of equipment in the quantities and locations indicated.
 2. All interfaces fully operating.
 3. All software and firmware fully operating.
 4. Special tools and test equipment in the quantities and locations indicated.

8.25 EQUIPMENT PLACEMENT DETAILS REVIEW

The Equipment Placement Details Review (EPDR) shall be held to evaluate the placement details and resolve issues resulting from the Employer's review of placement drawings and documents. The EPDR shall evaluate at least the following items:

- 1) Physical mounting items, including base plates, lifting procedures, and filler panels for each type of equipment;
- 2) Electronic/ electrical interfaces; and
- 3) Installation/cutover plans.

CHAPTER 9

PACKAGING, STORAGE AND DELIVERY

9.1 GENERAL

- 1) The requirements on packaging, shipping, storage and delivery shall be as given in the GS.
- 2) The Contractor shall designate a single point of contact for logistics support to insure compliance with specifications related to inventory and logistic support, including packing, marking, shipping, delivery, and storage of contract deliverables, including spare parts.
- 3) The Contractor shall be responsible for and shall, at Contractor's expense, repair or replace, as approved by the Employer, any deliverables damaged during shipment or storage.

9.2 PACKAGING

- 1) Immediately after the tests at the place of manufacturing, all AFC equipment shall be tightly packed with water proof material and adequately secured to prevent ingress of moisture.
- 2) Particulars of AFC equipment i.e. name of equipment, number, gross and net weights, shall be clearly shown on the packing
- 3) Standard Practice for Commercial Packaging shall be followed for preservation, packaging, packing, unitization, and marking of all deliverables. Deliverables shall be packaged to insure the integrity of the product during transportation, handling, and storage. Protection shall be provided against loss, pilferage, corrosion and deterioration. Packaging shall be such that the parts can be identified, inspected and stored for long periods without damage or degradation.
- 4) Cushioning materials shall be applied to reduce the effect of externally applied shock or vibration.
- 5) Devices such as relays and meters shall be so blocked and fastened to their main structures that they will withstand rough handling in transit.
- 6) Parts susceptible to damage by static electricity shall be enclosed in anti-static wrappers.
- 7) Small parts shall be packaged to prevent dispersal and loss. An itemized list of the contents shall be firmly affixed to the outside of each package.
- 8) Each unit pack, intermediate pack, and shipping container shall bear markings that meet the requirements of Standard Practice for Commercial Packaging.

9.3 OFFICE AND STORE

- 1) The Contractor shall be responsible for erecting / arranging his own storage, office and facilities for storage of all items / project management for this contract.
- 2) Space for office / store can be provided by JMRC.
- 3) The Contractor shall maintain records of stored items for this Contract and make available for the Employer for inspection upon request.

- 4) The Employer reserves the right to inspect all equipment prior to placement into storage. Pre-storage inspection, approval, or partial payment for stored equipment shall not constitute acceptance of said equipment by the Employer.
- 5) Contractor's Project manager / Interface manager shall be stationed in Delhi during interface, installation / commissioning stages.

9.4 DELIVERY

- 1) The Contractor shall deliver all items supplied under this contract to the site as designated by the Employer.
 - a) Delivery of individual pieces of equipment, spare parts, keys, special tools, test equipment, and other deliverables shall be as indicated in the Contract Specifications for the subject deliverable.
 - b) Materials shall be delivered undamaged in manufacturers' original containers, as applicable, packaged as indicated, with identifying labels intact and legible.
 - c) Deliveries shall be made in accordance with the Contract Documents, including General Conditions and the Contract Schedule and as approved by the Employer.
 - d) Unless otherwise indicated, Contractor shall notify the Employer at least five working days prior to proposed delivery to the placement or set-up site. Unloading at placement site or set-up site shall be performed by the Contractor.
- 2) The Contractor shall ensure the Site is ready and in good conditions for delivery.
- 3) The Contractor shall ensure security of the delivered items on Site.
- 4) The Contractor shall remove of temporary fittings, if necessary, for delivery of his items to site and shall restore the fittings to the original state and to the satisfaction of the Employer.
- 5) No dangerous goods shall be delivered to the Site.
- 6) **Delivery of AFC Gates, AVM cum TR, TVM and TOMs**

Delivery of Automatics Fare Collection Gates, Manual Ticket Office Machines, Automatic Ticket Vending Machines, Ticket reader cum Add value Machine etc.

The Contractor shall supply these items as per Appendix 2.1 and 2.2.

CHAPTER 10

INSTALLATION

10.1 GENERAL

- 1) This chapter of the specifications covers placement and connection of the AFC equipment and describes the facilities and provisions available for this work. The Contractor shall set in place and anchor all AFC equipment and shall connect such equipment to power and communication cables.
- 2) The Contractor shall conduct field surveys and make inspections of all locations where equipment will be placed to ensure that placement provisions, including raceways, wireways, cabling, and anchor bolts, are satisfactory. Surveys and inspections shall be made as necessary prior to the placement of AFC equipment. Any discrepancies that will affect the placement or operation of the AFC equipment shall be reported to the Employer.
- 3) The Contractor shall supervise all installation of the works and shall ensure all technical, safety and quality matters adhered to the design reviewed by the Employer.
- 4) The Contractor shall maintain the site in a neat and tidy state at all times. The Contractor shall also clear the site daily before leaving.
- 5) The Contractor shall take every precaution to protect existing equipment and facilities on site from damage, and shall make good any damage caused. Care shall also be taken not to interfere with the operation of existing equipment.
- 6) The Contractor shall provide all necessary and sufficient resources such as tools, test instruments, spares, equipment, manpower and communication facilities to complete all the installation activities.
- 7) The Contractor shall ensure his staff is competent and possess all the necessary skills to carry out the installation in a proper and safe manner.
- 8) The Contractor shall submit calculation, if required by the Employer, to demonstrate the proposed brackets and mounting methods are sufficient to withstand the wind loading for the equipment.
- 9) The Contractor shall submit installation method statements for each type of installation activities at least three months before the commencement of the activity to the Employer for review.
- 10) The installation method statement shall include the details on the methods and procedures of installation, site arrangement, manpower resources, equipment and tools required. Drawings shall be included to illustrate the proposed installation details.
- 11) All installation activities shall commence only after the method statement and the Employer has reviewed related submissions without objection.

- 12) The Contractor shall assign competent site supervisors for each work site to be responsible for all site-related matters.
- 13) The Contractor shall carry out regular site audit on both technical and safety matters and maintain records of the site audits. The Contractor shall make these records available to the Employer for inspection upon request.

10.2 INSTALLATION PROGRAMME

- 1) The Contractor shall develop and submit to the Employer for approval an Equipment Placement Plan. The Plan shall include the following:
 - a) Schedule for each station.
 - b) Tools and equipment required.
 - c) Placement drawings.
 - d) Step-by-step, detailed procedures for all placement work in the stations, including:
 - Pre-delivery of the equipment to the storage;
 - Inspection at the storage facility;
 - Final assembly, if needed, and pre-delivery testing;
 - Delivery to the station site; and
 - Testing.
 - e) Procedures for running and terminating of power cabling and control wiring, if necessary, between gate consoles.
 - f) Contingency plans for placement delays.
 - g) Number and qualifications of personnel required.
 - h) Time of day that placement will be performed.
 - i) Movement of equipment within the station including up and down stairs and exact placement and connections.
 - j) Identification of interfaces with others.
 - k) List of activities required from JMRC or its other contractors.
- 2) The Contractor shall co-ordinate with relevant Designated Contractors to agree the date of access to the physical areas to carry out installation activities.
- 3) The Contractor shall develop the Installation Programme and take the following into account:
 - a) the Co-ordinated Installation Programme;
 - b) Key Dates and Milestones given in the Particular Specification;
 - c) Site access;
 - d) Interfacing with relevant Designated Contractors.
- 4) The Contractor shall highlight in his Installation Programme any items, materials, equipment, resources and supports to be provided by the Employer with dates, duration and locations.

- 5) The Contractor shall also highlight all relevant constraints, which may affect the Installation Programme to the Employer's attention.
- 6) The Contractor shall include dependencies between relevant activities in the Installation Programme.
- 7) The Contractor shall ensure sufficient floats or slacks in all activities and avoid critical paths built in his Installation Programme. In case critical paths cannot be avoided, the Contractor shall highlight any critical paths to the Employer's attention.
- 8) The Contractor shall propose contingency plan to ensure all the major Key dates and Milestones can be met in case there is slippage in the installation activities.
- 9) Any subsequent changes in the reviewed Installation Programme shall be submitted to the Employer for review.

10.3 INSTALLATION WORKS

1) Installation in Equipment Rooms

The following areas will be provided by Designated Contractors (Civil Works) to install the AFC equipment:

- Station premises for installation of AFC equipment.
 - OCC for installation of CC and other AFC equipment.
- 2) Electric power to the equipment room shall be drawn from the nearest power supply switch, as per interface with designated Station contractor. In case electrical power is not available, the contractor shall make his own arrangement at his own cost for installation / testing of AFC.
 - 3) The Contractor shall liaise with the Employer and relevant Designated Contractors for access to the site for installation.
 - 4) The Contractor shall submit the following to the Employer for review at least three months before the commencement of the installation inside the equipment room:
 - a) Drawings showing the equipment layouts and positions of the racks, cabinets and enclosures;
 - b) Racks, cabinets layout drawings;
 - c) Specifications, sample of all the mounting brackets and accessories;
 - d) Schematic diagrams and wiring diagrams of the system;
 - e) Electrical distribution schematics within the room including the earthing details;
 - f) Cable route diagrams.
 - 5) Installation work inside the room shall be carried only after the Employer has reviewed these submissions without objection.
 - 6) Working in Confined Spaces

The Contractor shall observe the safety precautions under the Factories and Industrial Undertakings (Confined Spaces) Regulations when working in areas defined as Confined Spaces like the equipment room in Metro.

10.4 CABLING

- 1) Designated Contractors (civil works) will provide primary cable containment around station areas. The Contractor shall make use of the available primary cable containment for cabling.
- 2) The Contractor shall provide all necessary secondary cable containment (**in duplicate**) and supports in addition to the primary cable containment provided, if necessary, to complete the connection to the Contractor's equipment.
- 3) The Contractor shall submit the working drawings with the following details to the Employer for review at least three month before the cabling activities:
 - Cable routes;
 - All cables shall be neatly run and fitted in ducts or conduits
- 4) The Contractor shall provide and install all interconnection cabling between the gate consoles with in each array. All wiring and cabling shall be identified and submitted to the Employer for approval.
- 5) Any modification or extension to the underfloor ducts shall be performed by the Contractor. The ducts shall be hot dipped galvanized steel cable trays, which shall be supplied and installed by the Contractor. The Contractor shall also repair and make good to the floor after any modification work.
- 6) Cables shall be terminated within the equipment no less than 300mm above the finished floor surface. Cable entry from the underfloor ducting shall be sealed from the cable duct.
- 7) The periphery of the equipment base shall be sealed with the floor finish after installation so as to prevent the ingress of water.

10.5 HOUSING, ENCLOSURE AND CABINET

- 1) All equipment installed shall be able to withstand vibration levels likely to be experienced in railway stations, tunnels and structures.
- 2) The housing of equipment shall not allow entry of rodents inside the equipment.
- 3) All design of housing and enclosure shall be submitted to the Employer for review.

10.6 COORDINATION

Coordination between the Contractor and others will be handled by the Employer. The Contractor shall advise the Employer of any anticipated installation problems in sufficient time to avoid any unnecessary delays due to lack of coordination.

CHAPTER 11

VERIFICATION, TESTING AND COMMISSIONING

11.1 GENERAL REQUIREMENTS

1) General

- a) This section of the Specifications covers the requirements for tests to be performed by the Contractor on AFC equipment, special tools, materials and accessories furnished under this Contract. Factory tests shall be performed prior to shipment and field tests shall be performed after shipment. A series of inspections and tests shall be conducted on the pre-production units and production units of equipment in order to:
 - Demonstrate compliance with the Specifications from a physical, operating servicing, and reliability standpoint.
 - Confirm satisfactory operation prior to delivery, after installation, and prior to revenue service.
 - Evaluate efficiency of the equipment in the performance of transactions.
 - Identify potential problem areas.
- b) The Employer reserves the right to inspect all equipment at the Contractor's and Subcontractor's facilities at any time and as often as deemed necessary during manufacture and again prior to preparation for shipment. Equipment shall not be prepared for shipment before the Employer has either inspected the equipment or waived inspection. Any deficiencies found shall be corrected prior to shipment of the equipment. Any inspection or waiver of inspection shall in no way relieve the Contractor of the responsibility of furnishing equipment in accordance with these Specifications.
- c) The Contractor shall perform testing and commissioning activities by stages in accordance with the requirements given in this Specification.
- d) The Contractor shall ensure the system is in a state ready for testing and commissioning before the commencement of the tests witnessed by the Employer. The Contractor may conduct trial tests by himself before the Employer witnesses the tests, if necessary.
- e) Test results of the Contractor's own trial tests shall be made available to the Employer on request before the tests are witnessed by the Employer, to indicate the readiness of the system for tests witnessed by the Employer to commence.
- f) The Contractor shall satisfy himself that all items interfacing to Designated Contractors are in satisfactory condition for the Contractor's tests to be carried out.
- g) The Contractor shall provide all necessary test instruments, special tools, emulators, simulators and test software to carry out the tests.
- h) The Contractor shall provide simulation for testing in case the interfacing equipment is not available for testing.

- i) The Contractor shall extend full support to the Employer and provide all necessary facilities to enable convenient inspection of materials, work and testing.
- j) The Contractor shall investigate and provide corrective actions for all the faults detected during the tests. The tests shall be resumed only after all the faults are properly cleared. The Contractor shall submit fault report to the Employer to describe the symptom and causes of the faults and the corrective actions taken.
- k) If the operation of other Designated Contractor's system or equipment is suspected to be interfered by the system during the test, the Contractor shall withheld the test, investigate and provide corrective actions, if necessary. The test shall be resumed only after the interference has been eliminated or found to be not related to the system.
- l) The Contractor shall prepare check-off sheets to list all items to be inspected, demonstrations to be presented, and measurements to be made for each piece of equipment. Examples of such items include but not be limited to the following:
 - Fabrication workmanship and quality.
 - Wire and cabling installation, attachments, tags, and connections.
 - Existence of all required features such as a door stop, maintenance telephone jack, bar codes, model and serial numbers.
 - Weight checks.
 - Leakage current measurement.
 - Existence of safety precautions.
 - Primary power and RAM back-up power.
 - Memory storage space capacity.
 - Durability and stress tests.
 - Confirm waterproof and electrically isolated keyboard.
 - Check immunity against water accidentally entered into machine from seepage, splashing or wet tickets and intentional insertion of liquids.
 - EMI interference.

2) Test Plan

The Contractor shall submit a Test Plan for the Employer's approval. The approved plan shall be used as a controlling document for all inspections and tests. The Test Plan shall include, but not be limited to the following information for each test:

- Test title.
- Reference to specification section requiring the test.
- Organization performing the test (Contractor, Subcontractor, independent test)
- Test location(s).
- Schedule showing dates for submittals of test procedure, test report, and/or certified test document.
- Test start date.

- Test duration.
- Test objectives.
- Test pre-requisites.
- Problem recording, tracking and resolution reporting format.

3) Test Procedure

The Contractor shall develop a detailed 'Test Procedure' for each test to be performed. Test procedures shall be prepared by equipment type or assembly. The test procedures shall be submitted for approval by the Employer. The test procedures shall include but not be limited to the following:

- Test title.
- Equipment and instrumentation with accuracies and calibration data.
- Test methodology.
- Personnel and equipment requirements.
- Step-by-step procedure to perform the test.
- Test input and expected output.
- Forms to record data, with fields for date, name and signature of persons conducting or witnessing the test.
- Test procedure revision number and date.
- Forms for entering problem descriptions and unique tracking identifier. In the case of problems related to software, problem descriptions shall be entered also into the configuration control software.

4) Revision

Based upon the results of the first items tested, the Contractor may initiate 'Revisions' to the test procedures. The modified test procedures shall be resubmitted to the Employer for review and shall meet the same submittal requirements indicated. If the procedures are revised, the complete test shall be re-conducted.

5) Test Reports

Within 30 calendar days after completion of each test, the Contractor shall submit three copies of each test report to the Employer for approval. Each report shall document the results obtained and shall include but not be limited to the following:

- Title of test.
- Reference to the Test Procedure number and revision number.
- Location and date of test.
- Test Equipment used, including serial numbers and copies of calibration certificates.
- Printed names and signatures of individuals who performed the test.
- Printed names and signatures of individuals who reviewed the test and tests results.

- Printed names and signatures of individuals who witnessed the tests on behalf of the Employer, if any.
- Results including tables, curves, photographs and any additional test data required to support the test results.
- Descriptions of any failures and modifications including reasons for such failures and modifications and names of individuals approving such modifications.

6) Witnesses

The Employer shall have the right to witness all tests including factory tests conducted by the Contractor, its contractors, or by independent laboratories. The Contractor shall confirm the date of any scheduled test at least 10 days prior to the test.

7) Test Responsibility

- a). The Contractor shall be responsible for all tests performed under the Contract including Reliability Demonstration Test (RDT), Revenue Readiness Test and Maintainability Demonstration Test (MDT).
- b). The Contractor shall furnish all test instruments and other equipment and materials necessary for performing all tests required.
- c). Should there be any loss of AFC equipment or damage to such equipment as a result of tests, the Contractor shall be fully responsible for replacing the damaged equipment and/or repairing such equipment. Replacement of damaged equipment shall include all costs, including but not limited to, removing damaged equipment, furnishing, transporting, installing and testing replacement equipment.

8) Rejection and Retesting

- a). Failure of equipment to meet test specifications or ratings shall be sufficient ground for rejection of equipment. Equipment failing to pass the test criteria shall have deficiencies corrected and be retested. If the modifications or changes affect any drawings, diagrams, or other documents submitted to and accepted by the Employer, such drawings or diagrams shall be revised and re-submitted for the Employer's approval showing the proposed changes before changes or modifications are made on the equipment.
- b). Modifications or changes, which do not warrant revisions of any drawing, shall still be furnished to the Employer with notice of the retest schedule. If it is not possible to rework rejected equipment, replacement equipment shall be provided. The requirement for drawings and design calculations of the original unit shall be applicable to the replacement unit. The entire cost of the rework or the replacement unit shall be borne by the Contractor, including retesting and the costs incurred by the Employer to witness the retesting.

9) Ambient Conditions

Unless otherwise indicated measurements and tests shall be made at the ambient temperature and humidity conditions that exist within the test area and are typical of the stations in which the

equipment will be installed. Whenever conditions must be controlled in order to obtain reproducible results, a fixed set of conditions shall be used of approximately: 45 °C degrees, and 90 percent humidity. Ambient conditions shall be recorded periodically during the test. The Contractor shall be responsible to monitor and control the environmental conditions required.

10) Demonstration Tests

The demonstration tests shall be conducted on pre-production units of fare collection equipment. The Contractor shall fully demonstrate the functions and operations of each type of AFC equipment.

11) PERFORMANCE MONITORING PROGRAMS

a). General

This chapter of the Specifications covers the requirements of performance, reliability and maintainability to ensure long-term performance of the AFC equipment furnished under this Contract. Performance monitoring is also included in order to obtain acceptance and confidence in the calculated levels of performance. The Contractor shall submit evidence collected from factory tests and from field tests on the pre-production equipment and on the production equipment.

The Contractor shall develop and implement a Performance Monitoring Program to measure the reliability and maintainability of the equipment during the tests on the pre-production equipment at the factory and in the field, and on the production equipment once revenue operation has started. Data shall be obtained from as many sources as practical. The data shall be processed to produce computer generated reports. The report shall represent the reliability and maintainability of the equipment by specific unit and by modules.

b). Reliability

The reliability required shall be in accordance with the following table:

	TOM	GATE
MCBF	10,000	40,000
MCBJ	20,000	100,000

c). RELIABILITY TESTS

i). General

The Cycling Test, Field Test, and Reliability Demonstration Test shall be used to demonstrate the reliability of the equipment as well as to demonstrate functional requirements. Data shall be recorded as necessary in order to predict or compute the Mean Cycles Between Failures (MCBF) and Mean Cycles Between Jams (MCBJ) for each unit of equipment.

ii). Field Test On Pre-Production Equipment.

For the field tests on the pre-production equipment the Contractor shall temporarily install one Entry, two Reversible and one Exit gate forming an array of three reversible aisles, two TOMs at any station, primarily to evaluate the performance of the equipment. The station in which the equipment will be installed will be identified at a later date.

iii). Production Field Test.

The production field test shall be the formal Reliability Demonstration Test (**RDT**).

iv). Data Collection

- The Contractor shall be responsible for collection of the data and the calculation of reliability test for all equipment.
- For the Cycling Test and the Field Test if the collected data indicate that the reliability of the pre-production equipment is below 75 percent of the specified levels, the test shall be stopped. The source of this low reliability shall be investigated and the problems corrected before the test is permitted to continue. The Contractor shall submit his plans to achieve the specified 100 percent levels. Retrofit kits shall be prepared as necessary and installed by the Contractor at no additional cost to the JAIPUR METRO.
- The Contractor shall be primarily an observer and shall participate in the classification of the failures. The Contractor shall respond to reliability levels below those specified. If Contractor's response is unsatisfactory, the Contractor shall stop any further work until the causes of the poor performance are found and corrected.

v). Reliability Formula

▪ **Mean Cycles Between Failures (MCBF)**

Mean cycles between failures is the average number of equipment cycles that were conducted between chargeable failures. These failures are exclusive of jams.

$MCBF = \text{Total number of cycle/ chargeable failures}$

▪ **Mean Cycles Between Jams (MCJB).**

Mean cycles between jams is the average number of equipment cycles that were conducted between chargeable jams.

$MCBJ = \text{Total Number of Cycles/ Chargeable Jams}$

vi). Cycle Definition.

The following definition of cycles shall be used.

- TOM - One ticket issued or one smart card reload, or one cancellation.
- Gate - One validation of a ticket.

A ticket jam counts as one cycle.

d). MAINTAINABILITY

- i). The maintainability of the equipment is affected primarily by the design. The Contractor shall submit a Maintainability Program as part of the Performance Assurance Plan. The

goal of the program shall be to monitor the design and contribute suggestions, which result in minimizing equipment down time and maintenance costs.

ii). Time To Return to Service.

- The Time To Return to Service (TTRS) is the elapsed time for a trained and qualified technician to repair and return a failed piece of AFC equipment to revenue service. The TTRS shall not include travel time.
- The mean TTRS shall be 30 minutes for all types of AFC equipment.
- The 90th percentile TTRS shall be 2 hours for all types of AFC equipment.
- The absolute maximum TTRS shall be 24 hours for all types of AFC equipment.

iii). Time to Perform a Diagnostic

The time for a trained technician to perform a diagnostic of a failed field replaceable unit on the Primary Maintenance Test Bench shall be no more than 60 minutes.

iv). Time to repair.

The Time to Repair a failed secondary maintenance Test Bench shall be less than 2 hours.

v). Maintainability Report.

A Maintainability Report shall be submitted to the Employer for approval. The Maintainability Report shall address the following items as a minimum:

- Layout of components, modules, displays, assemblies, and sub-assemblies.
- Identification of Lowest Level Replaceable Units (LLRU).
- Physical requirements of maintenance personnel such as lifting and reaching.
- Test points for quick isolation of faults.
- Built-in test devices such as keypads and displays.
- Fault-diagnostic hardware, firmware, and software for both field and depot use.
- Generation of failure codes.
- Standardization and interchangeability of parts, modules, assemblies, and sub-assemblies.
- Type and quantity of spares required.
- Preventative maintenance and servicing schedules.
- Contractor's recommendations for spare parts policy, including quantities. Storage location, availability in the stations or in secondary depots.

The report shall be based on JAIPUR METRO maintenance philosophy and shall be designed to achieve the specified time to return to service and time to repair. The report shall reflect the results of the tests and the Contractor's experience acquired from other installations with similar equipment.

e). Failure Review Team.

A Failure Review Team shall be established to evaluate which failures are chargeable against the Contractor's reliability requirements. The Failure Review Team shall be comprised of one member from the JAIPUR METRO reliability staff and one from the Contractor's reliability staff, as a minimum. Responsible parties within these two staffs will initially attempt to settle disputes. The Employer will make a final and binding decision on any disputes that remain unsettled after a period of two weeks.

f). FAILURE REPORTING AND CORRECTIVE ACTION SYSTEM (FRACAS)**i). General.**

The Contractor shall develop and submit to the Employer a Failure Reporting and Corrective Action System (FRACAS). The FRACAS shall apply to factory and field reliability tests on both the pre-production and production equipment. The FRACAS shall include failure analysis for both hardware components and software modules.

ii). Reports.

The FRACAS shall generate a log of failures, detailed failure analysis to the component level, and the corresponding corrective actions. These shall include maintenance review chapters, verification of repair/replacement/restoration, and the results of Employers review of the failure. Reports shall be submitted by the Contractor to the Employer daily during pre-production equipment testing and weekly after production equipment is placed in revenue service.

g). Classification of Failures/Jams

All failures/jams shall be classified as either "chargeable" or "non-chargeable." Only chargeable failures/jams shall be included in the reliability calculations. The Failure Review Team shall classify a failure/jam as non-chargeable only after review.

i). Definitions

Jams are defined as an obstruction to the movement of the ticket media located anywhere within their path that prevents completion of their travel and which cannot be attributable to an equipment malfunction.

ii). Chargeable Failure/Jams.

A chargeable failure is defined as the inability of the equipment to perform as specified, unless the failure is caused by one or more of the occurrences listed under "Non-Chargeable Failures/Jams." Only one failure is to be charged per reported incident.

iii). Non-Chargeable Failures/Jams.

Failures/Jams that shall be considered as non-chargeable are caused by:

- A captured, verified defective ticket, or ticket, unless the ticket(s) was rendered defective by Contractor-furnished equipment.
- Environmental conditions beyond those indicated in the Specifications.

- Clearly incorrect maintenance, abuse or operating practices that are not a result of incomplete or inaccurate operating and maintenance manuals, or incomplete or inadequate training by the Contractor.
- Consumable items that ate at more than 85 percent of their published life span.
- Failure not substantiated by staff/technician.
- Vandalism or misuse by patrons.
- Power failure exceeding battery back-up capacity.

h). Reliability and Availability Warranty.

In addition to the guaranty and warranty provisions, Contractor shall warrant that each unit of AFC equipment under this Contract will meet the Reliability and Availability requirements for a period of two more years. If these requirements are not met, Contractor shall take immediate corrective action to bring the performance of the equipment into compliance with the requirements without cost to the JAIPUR METRO. In addition, if performance testing is terminated due to requirements not being met, testing shall be restarted after corrective action by Contractor and warranty period shall be extended accordingly. If at the end of the warranty period, Contractor has been unable to achieve compliance with these requirements, JAIPUR METRO may, at its option, exercise any and all actions as may be provided by this Contract for default of Contractor due to nonperformance,

12) TYPE OF TESTS.

The following tests shall be performed on the pre-production equipment either at the Contractor's facility or at one of the JAIPUR METRO facility where pre- production equipment is installed, or both, as indicated:

- Functional Test
- Servicing Test
- Maintainability Test
- Environmental Test
- Interface Test
- Cycling Test
- Field Test

A) FUNCTIONAL TEST

The Functional Test shall be a test of all the operating features of the equipment. The Functional Test shall be performed on the pre-production equipment at the Contractor's facilities. The Contractor shall identify and list all the operating features and test each one. All operating modes, such as primary, secondary and maintenance, and the switching between modes shall be included in the test. The test of the features and operating modes shall be intermixed so that all the test cycles are not performed at one time on the same feature before going to the next

feature. The test shall include all boundary conditions that can be anticipated due to either improper passenger action, invalid or partially damaged ticket, or malfunctioning equipment.

B) SERVICING TEST

Servicing Test shall be conducted on the pre-production equipment installed at a station. The servicing tests shall check the functions of the equipment that are used by the Revenue field personnel. These tests shall include but not limited to the following:

- a) Access to the equipment, door opening, security level entry authorization, door closing, and return to revenue service.
- b) Features of the ticket supply such as ease of re-supply, near empty and empty alarms, ticket dispensed counters.
- c) Features of captured ticket bins such as ease of removal and replacement from gate consoles, near full and full alarms.
- d) Times specified for servicing the equipment.
- e) Times to reset and return to service.
- f) Transmission to CC of financial summary of the service.

C) MAINTAINABILITY TEST

The Maintainability Test shall be performed at the Contractor's facilities and in the station. Functions to be demonstrated shall include but not be limited to the following:

- a) All local and CC failure codes and text messages, to the extent that is practical with real failures.
- b) Ability to meet the time to return to service requirements stated in Article
- c) Menu driven troubleshooting and repair procedures under real failure conditions in revenue and maintenance mode operation.
- d) Automatic and continuous self-diagnostic routines.
- e) Manual diagnostics with the use of logic analyzers, emulators, or equal and other test equipment useful in isolating and correcting a problem.
- f) Ability to meet the time to perform diagnostic.
- g) Ability to meet the time to repair.
- h) Demonstration of SC operation relative to the AFC equipment.
- i) Time to switch between various operating modes.
- j) Timing of gate configuration changes.

D) ENVIRONMENTAL TESTS

a). The Environmental Tests shall be performed at the Contractor's facilities. The tests to be conducted shall include the following:

- Electrical Environment (EMI)
- Shock and Vibration
- Dust Laden Air
- Exposure to Sunlight

- Seismic Protection
- Noise

Environmental tests shall be performed on the AFC equipment to demonstrate compliance with the equipment environmental design requirements.

b) Test Cycle

One cycle of the functional test shall be performed for each of the above tests. Each unit of equipment shall be operational for all tests, and operating status shall be monitored continuously during the test. One cycle of the functional test shall be repeated under ambient conditions immediately after each environmental test. Special tests, such as the EMI test, where conditions are difficult to duplicate shall be conducted with as many machine cycles as necessary to assure immunity from and cause of electro-magnetic interference.

c). TEMPERATURE AND HUMIDITY TEST

The temperature and humidity tests shall be conducted under the following requirements and guidelines:

- The tickets to be used shall be left in the test chamber unwrapped and uncovered during the entire test period.
- One cycle of the functional test shall be conducted at each of the four extreme and achievable combinations of temperature and humidity.
- At least 20 percent of the conducted tests shall be repeated at the two temperature extremes with the supply voltage increased by 10 percent and repeated for a supply voltage decreased by 10 percent.
- All other requirements shall be identical to the tests under ambient conditions.

E) CC INTERFACE TEST.

1. This includes:

- Interface test with existing JMRC AFC system including CC1 & CC2 (if applicable) to be performed at testing platform connected with SDC at OCC. The CC interface test shall interface data protocol and messages between the CC1/CC2 (if applicable) SDC & CC2 SDC (if applicable)/new stations.
- Interface test with bank.

2. Any simulator requirements for testing shall be provided by the contractor

F) CYCLING TEST

The Cycling Test shall be performed on the pre-production equipment at the Contractor's facilities or at an independent laboratory. The Cycling Test shall represent a realistic accumulation of a maximum number of machine cycles over a minimum timespan.

Objectives:

The objectives of the Cycling Test are:

- a). Determine with reasonable certainty that the mean time between chargeable failures as indicated in the reliability requirements can be achieved.
- b). Obtain with reasonable certainty that the jam rate of tickets is below the limits specified.
- c). Obtain with absolute certainty that the cash reconciliation as derived from the audit registers, from electronic storage devices, and from the data to be transmitted through the data interface is within a maximum error of 0.01 percent.
- d). Obtain information on modules, assemblies and components wear that will be used to estimate the life of consumable parts.

G) FIELD TEST

The Field Test will be performed by the JAIPUR METRO on the pre-production equipment installed by the Contractor in a designated station or Test Platform/SDC. The Contractor shall conduct one cycle of the Functional Test and the CC interface Test to confirm that the equipment is functioning properly prior to the start of the Field Tests

- a). **Maintenance.** Maintenance during the test period shall be performed by the Contractor. The JAIPUR METRO shall have the right to assign its maintenance staff personnel to accompany the Contractor assigned staff during all maintenance testing during this period. The machine downtime shall not exceed 24 hours for each incident.
- b). **Treasury Service.** The JAIPUR METRO Treasury/Commercial staff will service the equipment during the test and replenishing ticket stock.
- c). **Record and Report** Using forms provided by the JAIPUR METRO, the Contractor shall keep a record of failures and equipment cycles in order to obtain an estimate of MCBF and MCBJ during the test. If possible, automatic transmission of data over telephone lines directly to the Contractor's facility shall be performed to closely monitor the equipment.
- d). **Employer's Report:** The Employer will also make observations of equipment performance and customer behavior and report on his/her findings during the course of the test. The Employer will also report on his/her evaluation of other design aspects such as servicing, installation, appearance, and maintainability.
- e). **Evaluation and Upgrade.** The pre-production equipment shall be kept upgraded during the course of production to assure that it becomes functionally identical to the production equipment and contains interchangeable assemblies and subassemblies before final delivery to the JAIPUR METRO.

11.2 TESTING STAGES

The Contractor shall carry out testing and commissioning activities in the following phases:

- Factory Acceptance Tests;
- On Site Testing and Commissioning.

11.3 FACTORY ACCEPTANCE TESTS

- 1) The Contractor shall carry out factory acceptance tests at the place of manufacturing. The test shall include, but not be limited to, visual, environmental, electrical and functional tests on each individual equipment and associated Subsystem as well as simulation before delivery of the equipment to the Site.
- 2) Factory acceptance test shall be carried out for all AFC equipment.
- 3) The Contractor shall prepare and submit a Factory Test Plan at least three months before the tests. In addition, the Factory Test Plan shall also include the following:
 - the program of all the activities related to factory acceptance tests;
 - the locations where factory acceptance tests to be carried out;
 - the estimated duration of tests activities at each locations; and
 - submission schedule of all the factory acceptance test procedures for equipment and cable.
- 4) The Contractor shall prepare the factory acceptance test procedures for equipment and cables and submit to the Employer for review.
- 5) The factory acceptance test procedures shall describe all tests to demonstrate the functional, electrical and physical performance of the equipment and cable under designed environmental conditions
- 6) Contractor shall not proceed with production until the Employer issues formal written Production Approval. A satisfactory conclusion and acceptance by the Employer of the demonstration tests with the exception of the Field Test and reports on the pre-production equipment, and acceptance of any deviations shall be mandatory in order for the Contractor to obtain a formal Production Approval. The JAIPUR METRO will identify required modifications to be made and demonstrated before accepting the results of the tests. Should a major design change be made after the test, the performance of the modified equipment shall be demonstrated and the test results submitted for acceptance. The Contractor shall maintain the pre-production equipment to the latest configuration for hardware and software throughout the Contract duration.

11.4 ON-SITE TESTING AND COMMISSIONING

1) General

- a) The on-site testing and commissioning shall be undertaken in the following phases:
 - Installation Tests;
 - Partial Acceptance Tests;
 - System Acceptance Tests; and
 - Tests on Completion.
- b) The Contractor shall prepare and submit to the Employer for review an On-Site Testing and Commissioning Plan.

2) INSTALLATION TESTS

- a). Installation Tests shall be carried out on individual Subsystem location by location after the completion of equipment physical installation.
- b). The objective of the installation tests shall ensure:
 - i). The equipment is installed in accordance with the reviewed design documentation;
 - ii). The equipment is installed in accordance with the requirements detailed in this Specification;
 - iii). All cables are properly and accurately connected and terminated; and
 - iv). All installation works are of acceptable workmanship.
 - v). The Contractor shall develop procedures for Installation Tests and submit to the Employer for review.
 - vi). The Installation Test shall not be started unless the Employer has reviewed the test procedures without objection.
 - vii). All installed equipment shall be physically inspected against all relevant review design documentation.
 - viii). All the installation test results, physical locations of the equipment and serial numbers shall be captured in the test record forms. The Contractor shall include completed test record forms in the Test Report and submit to the Employer for review.

3) PARTIAL ACCEPTANCE TESTS

- a). Partial Acceptance Tests shall be carried out on individual Subsystem location by location, on areas or section basis to verify the functions, performance and services coverage at the stage:
 - i). After successful completion of the Installation Tests;
 - ii). After the Subsystems have been configured with correct settings and parameters;
 - iii). Properly connected to the power supply and can be switched on for Partial Acceptance Tests; and
 - iv). Before the equipment of different locations are connected up and ready for System Acceptance Tests.
- b). The Contractor shall develop Partial Acceptance Tests Plan at least three months before the test.
- c). The Contractor shall develop Partial Acceptance Tests procedures for each Subsystem and submit to the Employer for review at least two months before the tests.
- d). The Partial Acceptance Tests procedures shall include:
 - i). Objectives of the Partial Acceptance Tests for all Subsystems;
 - ii). List of specifications and standards, reviewed design documentation for reference;
 - iii). Step-by-step test instructions;

- iv). List of test instrument and special tools;
- v). Test record forms; and
- vi). Pass or fail criteria.
- e). Where performance across interfaces to Designated Contractors or to other parties is required to be verified during the Partial Acceptance Tests, the Contractor shall include a list of Designated Contractors and the interface test procedures agreed with the relevant Designated Contractors in the Partial Acceptance Tests procedures for the relevant Subsystem.
- f). The functional and timing performances of the Subsystems shall be verified against the requirements and relevant international standards.
- g). All equipment settings and parameters shall be verified and recorded in the reviewed test record forms.
- h). The Contractor shall perform functional check.
- i). The Field Test will be performed by the JAIPUR METRO on the pre-production equipment installed by the Contractor in a designated station or stations for use.
- j). The Partial Acceptance Tests are considered completed only if the Employer without objection reviews the Partial Acceptance Tests results.
- k). Upon completion of the Partial Acceptance Test, the individual Subsystem shall be operational and ready to be connected to other Subsystems and interfacing systems for testing.

4) SYSTEM ACCEPTANCE TESTS

- a). System Acceptance Tests shall be carried out to ensure the System operates in accordance with functional and performance requirements given in the Particular Specification.
- b). System Acceptance Tests shall be carried out at the stage after completion of Partial Acceptance Tests for each Subsystems; and
- c). after all individual Subsystem has been connected together and the System as a whole is capable to operate in all respect in accordance with the requirements given in the Particular Specification.
- d). The Contractor shall submit a System Acceptance Tests Plan including software quality assurance plan to the Employer for review.
- e). The system response time of relevant Subsystems and the System shall be tested and measured.
- f). The Contractor shall carry out load test on each Subsystem to verified the designed system capacity and performance in accordance with the requirements given in the Particular Specification under full load condition.

- g). The Contractor shall carry out tests on the operation of the System in accordance with the normal operation procedures and emergency operation procedures, which has been reviewed without objection by the Employer.
- h). The Contractor shall conduct tests to verify the proper inter-operation among Subsystems.
- i). The System Acceptance Tests are considered completed only if the Employer without objection reviews the System Acceptance Tests results.
- j). Upon completion of the System Acceptance Tests, the System shall operate in accordance with the functional and electrical performance requirements given in the PS.
- k). Prior to placement of the equipment in revenue service, tickets will be loaded by the JAIPUR METRO into the TOM. A limited Functional Test shall be performed on all units to confirm that the equipment is ready for revenue service. All registers and audits shall be reset to zero or recorded for reference, whichever is appropriate.
- l). The Contractor shall provide all necessary support and attendance to the Employer during the Pre-Revenue Operations period in accordance with the requirements given in General Specification.
- m). The Contractor shall provide on-Site supports to the Employer in all aspects related to the operation of the System. The Contractor shall also conduct investigation and provide corrective actions for any problems related to the System or the interfaces with the System.
- n). The Contractor shall assign competent staff to support the Pre-Revenue Operations as required by the Employer. The persons shall have sufficient skills and knowledge of the System and have involved in either the design, installation or commissioning of the System.
- o). The Contractor shall submit a manpower plan to the Employer for review at least 1 month before the commencement of the Pre-Revenue Operations.
- p). The manpower plan shall include the organisation chart of the Contractor's Pre-Revenue Operations supporting group, individual person's role and responsibility and 24-hour contacts for emergency cases.

5) TESTS ON COMPLETION

- a). The Contractor shall carry out Tests on Completion after the completion of the System Acceptance Tests.
- b). The Contractor shall co-ordinate with the Employer and with all the interfacing Designated Contractors including CCHS contractor to ensure all the interface test activities are completed in accordance with the program on Completion Plan.
- c). The Contractor shall provide all necessary supports, conduct investigation and provide corrective actions, if necessary, to ensure all matters related to interfacing are properly resolved.

- d). Within two weeks upon completion of all interface test activities, the Contractor shall submit the test results to the Employer for review.
- e). After the Employer without objection has reviewed the test results of all interface test activities, the Contractor shall start the reliability demonstration test in accordance with the reviewed reliability demonstration test plan.
- f). The Contractor shall advise the Employer in writing the commencement date of the reliability demonstration test.
- g). The reliability demonstration test period shall be at least three months.
- h). The Contractor shall submit a reliability demonstration test plan to the Employer for review at least three months before the test.
- i). The Contractor shall include the following in the reliability demonstration test plan as a minimum:
 - Calculation of the maximum allowable number failures of equipment, Subsystems and System during the reliability demonstration period in accordance with requirements on reliability performance of the equipment, Subsystems and System given in the Particular Specification;
 - Definition of relevant failures;
 - Pass and fail criteria; and
 - Sample of fault logs.
- j). During the reliability demonstration test period, the Contractor shall record details of all faults in a fault log which shall include:
 - The date and time the fault occurs;
 - The date and time the Contractor's staff arrive on site;
 - The date and time the fault is cleared and the normal operation is restored;
 - The description of the fault;
 - The cause of the fault; and
 - Equipment or component replaced.
- k). All fault logs shall be submitted to the Employer for review.
- l). The reliability demonstration test is considered failed if the actual number of relevant failures exceeds the maximum allowable number of failures for any equipment, Subsystems or System identified in the reliability demonstration test plan; and
 - Any fault resulted from the design omission or omission error and shall require design modification in order to fix the fault.
 - If the reliability demonstration test fails, the Contractor shall provide all the necessary corrective actions and rectify the fault to the satisfaction of the Employer.
 - The reliability demonstration test shall be repeated on the affected Subsystem or Subsystems for another two months until the test is successfully completed.

- m). Within two weeks upon completion of the reliability demonstration test, the Contractor shall submit the test results for the Employer to review.
- n). The Tests on Completion are considered completed only if the Employer without objection has reviewed all the test results of the Tests on Completion.

CHAPTER 12

OPERATION AND MAINTENANCE SUPPORT

12.1 GENERAL

- 1) The Contractor shall ensure that the design of the software and hardware of the AFC System is supportable throughout the service life of the System to address, as a minimum, the following:
 - a) Design errors in the system;
 - b) Operational changes;
 - c) Environmental changes; and
 - d) Changes in infrastructure.
- 2) The Contractor shall ensure that in order to support the Employer during the DLP, personnel are available with the relevant skills and level of competence.
- 3) The Contractor shall investigate all failures, major failures, repetitive failures, design defects and provide all necessary corrective actions throughout the Contract period.
- 4) The Contractor shall investigate interference problems either from or to the systems of other Designated Contractors and provide all necessary corrective actions throughout the contract period.

12.2 OPERATION AND MAINTENANCE DOCUMENTATION

- 1) **Maintenance Plan**
 - a) The Contractor shall submit a Maintenance Plan to the Employer for review before the commencement of installation activities.
 - b) The Maintenance Plan shall describe the Contractor's proposed maintenance regime for preventive and corrective maintenance of the system, including, but not be limited to the following:
 - The maintenance philosophy and approach;
 - All necessary tasks for corrective maintenance; and
 - Frequency of each maintenance task.
 - c) The Contractor shall include the following information on each maintenance task described in the Maintenance Plan:
 - The equipment, sub-systems covered in the task;
 - Step by step procedure to carry out the task;
 - Tools and tests equipment list of each task;
 - Diagrams and flowcharts for illustration, if applicable;
 - Recovery procedures, if applicable;
 - Precautions the maintenance personnel to follow; and
 - Estimated duration and manpower required.

- d) In addition to the Maintenance Plan, the Contractor shall also submit a Yearly Routine Maintenance Schedule to the Employer for review and shall indicate the schedule of maintenance tasks in a calendar year.

12.3 SOFTWARE SUPPORT

1) General

- a) The Contractor shall provide all changes, debugging, updates, modifications and upgrade of all the software developed or delivered for the system if such changes are necessary and in order to maintain the normal operation and meet the requirements given in this Particular Specification.
- b) All changes and modifications of the software shall not degrade the performance or have adverse impacts of the system.
- c) The Contractor shall maintain backup copies of all software developed or delivered for the system.
- d) The Contractor shall ensure that all new versions are fully tested and validated and reviewed without objection by the Employer prior to loading into the system.
- e) The Contractor shall provide training for the Employer's staff for use of new version, if necessary and applicable.

12.4 SECURITY OBLIGATIONS

Within 14 days of the installation of any software, which is developed or modified for this Contract, the Contractor shall submit to the Employer for retention by the Employer two back up copies of the software, which shall include, without limitation:

- All executable code;

12.5 SUPPORTS DURING DEFECTS LIABILITY PERIOD (DLP)

1) General

- a) During the Defects Liability Period, the Contractor will provide all maintenance support to the Employer.
- b) The Contractor shall provide workshop repair services of all defective and faulty items of the system.
- c) The Contractor shall provide experts for supervision of maintenance for AFC System.
- d) The Contractor shall submit a supervisory maintenance manpower plan show the Contractor's organization and committed resources level available for all types of activities to be carried out within the Defects Liability Period.
- e) The Contractor shall ensure all his staff who provide supervisory maintenance support shall be competent and with sufficient training in the responsible sub-systems.

- f) In addition the Contractor shall provide individual cover to protect the front face of each TOM from dust and damage after they have been installed into position in the station.
- g) The contractor shall be required to supply polishing liquid, till one year after installation of AFC equipment, to polish the metal finish of the AFC equipment to a shiny finish as and when informed by the Employer
- h) The maintenance staff and labour shall be provided by the Employer.

2) Workshop Repair

The Contractor shall collect and repair defective parts that are removed from the system during maintenance or from the Employer.

- a) The Contractor shall perform all necessary adjustments or alignments as to the repaired parts. The repair of defective parts can only be considered as completed and returned to stock or back to the system if the parts are tested and verified fit for use in the system.
- b) The Contractor shall use only components of equal or higher specification than the original components in his repair activities.
- c) The performance of the defective parts after repair shall not be degraded or deteriorated due to repairing.
- d) The maximum turnaround time for workshop repair shall be less than 15 calendar days. The turnaround time is started to count when the defective parts are removed from the system and ended when the parts are repaired and returned to stock or to the system. Any extension of workshop repair time shall be agreed with the Employer.

3) Support And Call-Out Services

- 1) The supervisory support and call-out services shall be available 24 hours per day and 7 days per week.
- 2) The Contractor shall provide sufficient number of competent and experienced supervisory staff for supervision of maintenance support and call-out services
- 3) The Contractor shall provide a list of supervisory maintenance staff together with the contact mobile telephone numbers whom can be contacted for support and call-out services
- 4) Any changes in the call-out numbers and the maintenance staff shall be notified to the Employer at least two weeks before such changes become effective.
- 5) The Contractor's staff shall be available on site for maintenance support within one hour upon receiving the call-out request from the Employer and shall proceed to perform corrective actions to restore the system to normal full operation.

- 6) The Contractor shall take every precaution to protect existing equipment from damage, and make good any damage caused.
- 7) Should any abnormal system behaviour like intermittent faults, interference, frequent repeated faults, etc, or the performance be found to deviate from the specified tolerances, the Contractor shall conduct investigation and report the findings to the Employer together with the recommendation and proceed after the recommendation has been reviewed without objection by the Employer.

4) Monthly Maintenance Meeting

The Contractor shall attend the Monthly Maintenance Meeting with the Employer to discuss the maintenance matters during the Defects Liability Period. The dates and agenda of the meeting shall be agreed with the Employer.

12.6 AMC SERVICES

The Contractor shall provide AMC services as per the terms and conditions listed in Appendix 12.1.

CHAPTER 13

SPARE PARTS, SPECIAL TOOLS & TEST EQUIPMENT

13.1 SPARES

1) General

- a) The Contractor shall provide his own spares during installation and commissioning period as well as for support during the Defects Liability Period. The Contractor shall also provide separate spares for the Employer to enable the Employer to operate and maintain the system.
- b) Spare parts shall be interchangeable with their corresponding original equipment part, and shall be subject to the same inspections and test requirements.
- c) Logistics, packaging shall be designed to protect the reliability of the parts and shall be such that the parts can be identified, inspected, stored for long periods, and can endure multiple handling without damage or degradation. Spare parts accompanying equipment shall be furnished in storage boxes that conform to commercial standards for weather resistance.
- d) The Contractor shall submit the lists of spares within three months after the Date of Commencement of the Works to the Employer for review. The lists shall include:
 - Grouping by Subsystem, diagnostic and test equipment and special tools, as applicable, for stocking identification; and
 - Detailed description with references and correlation with the maintenance manuals.

2) Contractor's Own Spares

- a) The Contractor shall keep and maintain sufficient stock of his own commissioning spares and Defects Liability Spares. In addition, in determining the list of spare parts for the commissioning spares and Defects Liability Spares, the Contractor shall provide calculation to support the proposed types and quantities with the following taken into account:
 - The expected failure rate of the parts;
 - Population of the parts in the system;
 - Criticality of the parts in the system;
 - Availability and Mean Time to Repair (MTTR) figures of the System;
 - Spare delivery lead time; and
 - Workshop repair turnaround time.

- b) The Contractor shall submit the list of commissioning spares, with the types and quantities of spares the Contractor intends to hold, at least three months before the commencement of installation activity to the Employer for review.
- c) The Contractor shall submit the list of Defects Liability Spares, with the types and quantities of spares the Contractor intends to hold, at least three months before the commencement of the Defects Liability Period to the Employer for review.
- d) The Contractor shall include details of the stock of the Contractor's own spares in the monthly progress report. The status of the spares, either in store or under workshop repair, shall also be included.

3) Contract Spares

- The Contractor shall submit a list of recommended spare parts to the Employer for review before the commencement of installation work.
- The Contract spares recommended by the Contractor shall be of appropriate types and sufficient quantities to support the Employer's own operation and maintenance of the system for 2 years.

13.2 SPECIAL TOOLS AND TEST EQUIPMENT

- 1) The Contractor shall provide his own test equipment and tools during the installation, commissioning periods and Defects Liability Period.
- 2) SpecialequipmentrequiredtoperformtheplacementofAFCEquipment shallbeprovided.Theplacementequipmentshallincludetemplates, gauges,doorjacks,bolts,covers,andotherspecialtools requiredtosetinplace,adjust,level,andfacilitatethephysicalinstallation oftheAFCEquipment.Onesetofplacementequipmentshallconsistofone fullcomplementoftheabovenotedequipment/tools. Consumablesuchasboltsandcoversshallbefurnished in asingle batchinsufficientquantityfortheplacementofallequipmentfurnished undertheprocurement.
- 3) All the special tools provided for the Employer shall not be used on site prior to delivery to the Employer.

CHAPTER 14

TRAINING AND TRANSFER OF KNOWLEDGE

14.1 GENERAL REQUIREMENTS

- 1). This section of the specification covers the requirements for a Training Program to train the Jaipur Metro maintenance and operations and training personnel. The training Program shall enable the staff to operate, service, enhance, maintain, and interact with, the hardware, software, and firmware, such that the automatic fare collection system and equipment will perform in accordance with the specifications of this contract.
- 2). The Contractor shall provide comprehensive training to the Employer's staff, including Employer's trainers.
- 3). The Contractor shall provide competent training instructors, training manuals, training simulators, all necessary aids and materials in support of all training courses.
- 4). The training instructors shall be qualified, competent, with sufficient years of practical experience in the relevant fields and possesses good communication skills.
- 5). The training instructors shall be competent staff of the Contractor, or the subcontractors or the equipment manufacturers.

14.2 SCOPE OF TRAINING

- 14.2.1 The training shall be provided by the contractor to the Employer's personnel in design, manufacturing, testing, system architecture, installation practices. This will cover training in India and abroad including training at manufacturing facilities.

14.2.2 TRAINING

Contractor shall submit a training programme for Automatic Fare Collection system as per the BOQ and minimum in following areas.

S.No	Description	Total Period (Trainee Man Months)
1	Design, Operation & Maintenance of Automatics Fare Collection Gates , Ticket Office Machines, Ticket Vending machines, Ticket Reader cum Add Value Machine	0.5
2	Design, Operation & Maintenance of system software System description, architecture SC and CC. catering for provision of open loop cards system and additional bank/e-wallet integration	1
3	Existing CC1 Integration, System Security, Media, Networking system design, configuration	0.5

14.3 TRAINING PLAN

- 1) The Training Program shall consist of a logically related sequence of separate courses. The Program shall include separate courses, as required, for System and Equipment Operation, System Management Primary Maintenance, and Secondary Maintenance. The Program shall not be limited to the courses listed if additional courses are required to achieve the Program Objectives.
- 2) The Program shall utilize classroom, hands-on, and field instruction, as appropriate, and any models, mockups, aids, documentation, and equipment required to implement, sustain, or complete the Program.
- 3) Within three months after the Date of Commencement of Works, the Contractor shall submit a Training Plan to the Employer for review.
- 4) The Training Plan shall include , but not limited to, the following:
 - a). The program of the training courses and submission schedule of the training materials;
 - b). Overview and description of objectives of each training course;
 - c). The location where the training courses to be conducted;
 - d). Set ups for practical exercises;
 - e). The Contractor's training organisation chart, including the role and responsibilities of individual key persons;
 - f). The qualifications and experience of the training instructors; and
 - g). Details of training simulators to be provided or developed, if applicable.

14.4 TRAINING COURSES

- 1). The Contractor shall provide Training Courses on all facilities, systems, equipment, hardware, and firmware, software. Each Course shall be specific, and shall consist of classroom, hands-on, or field training as necessary to accomplish the Course Objectives specified in the Training Program Plan.
- 2). The Contractor shall provide training courses for each of the sub-systems, including, but not be limited to:
 - Ticketing System;
 - Gate System;
 - Computer System; and
 - Audits and Supervisory function
- 3) The number of trainees from different disciplines shall not be less than:
 - All Employer operations staff;
 - Five of Employer's maintenance staff;
 - Five of Employer's Training Instructors.

- 4) Different types of training courses of each subsystem shall be provided for staff from different disciplines. Operations training courses shall be provided for the operations staff. Maintenance courses shall be provided for maintenance staff. The Employer's Training Instructors shall attend all types of training courses such that the Employer's Training Instructors shall be able to subsequently train the Employer's staff in all aspects of operation and maintenance of the System.
- 5) The maximum number of trainees of each training class shall normally not be more than fifteen. Class size, which is larger than fifteen shall be subject to the review of the Employer.
- 6) The Contractor shall determine the number of classes for each type of training course to ensure the objectives of the course can be met.

14.5 OPERATIONS TRAINING COURSES

- 1) The operations training courses shall be developed to provide all necessary knowledge and skills for operations staff of the Employer to operate the system under normal and emergency situations and recovery from minor or simple faults. In particular, the training course shall include the following as minimum:
 - a). Overview of the AFC System;
 - b). Brief description of the operation principle of the Subsystem;
 - c). Operational features and functions;
 - d). Familiarisation and use of all man-machine interfaces involved;
 - e). Reading and interpretation of system status and alarm messages or indications;
 - f). Normal operating procedures;
 - g). Operating procedures under emergency situations;
 - h). Procedures for recovery from minor or simple faults; and
 - i). Use of Operation and Maintenance Manuals and documentation.
- 2) Particular exercises shall be included in the operations training course for each trainee to operate and manage the system under normal and emergency operating conditions and simple faults recovery.

14.6 MAINTENANCE COURSES

- 1) The maintenance courses shall be developed to provide all necessary knowledge and skills:
 - a). To perform full maintenance, including both preventive and corrective maintenance, on the System; and
 - b). To perform system Employering management including system parameter configuration, enhancement, expansion and provision of new circuits.
- 2) The Contractor shall determine the content of the courses and the courses shall include the following as minimum:
 - a). Overview of the AFC System;
 - b). System features and functions;

- c). Operation principles;
 - d). Description of system components;
 - e). Test and commissioning procedures;
 - f). Use of test equipment and special tools;
 - g). Reading and interpretation of alarm indications, messages and print-outs;
 - h). Preventive maintenance procedures;
 - i). Fault diagnosis, troubleshooting and corrective maintenance procedures;
 - j). Equipment settings and parameters configuration;
 - k). Use of equipment manuals, Operation and Maintenance manuals, circuit diagrams and wiring schematics;
 - l). Methods and procedures to provide new circuits, system expansion and enhancement;
 - m). Data, software backup and loading; and
 - n). Use of software such as peripheral control and configuration, utility, database structure, generation and modification.
- 3) Practical exercises shall be provided for each trainee to practise the following as minimum:
- a). Use of test equipment and special tools;
 - b). Preventive maintenance;
 - c). Fault diagnosis and troubleshooting with induced faults set by the Contractor to simulate real-life situation; and
 - d). Faulty modules or cards replacement and restore the system to normal operation.

14.7 TRAINING MATERIALS

- 1) TrainingAids, TrainingMaterials, and TrainingDevices shall be of durable construction, and shall become the property of the JAIPUR METRO on approval of the Training Demonstration, or on approval of the Final Deliverables, as applicable.
- 2) The Contractor shall provide all TrainingAids, TrainingMaterials, TrainingDevices, SpecialTools, fixtures, models, mockups, simulators, or other equipment required to train Course participants.
- 3) The Contractor shall provide sufficient TrainingAids, TrainingDevices, SpecialTools, fixtures, models, mockups, simulators, or other equipment for the number of Course participants.
- 4) Models, mockups and TrainingDevices used in the Courses shall be connected and configured to simulate the existing environment.
- 5) Throughout the Contract and Warranty, it shall be the responsibility of the Contractor to supply the JAIPUR METRO with all changes and revisions to the TrainingAids, Training Materials, and TrainingDevices.
- 6) The JAIPUR METRO reserves the right to reproduce all TrainingAids, TrainingMaterials, TrainingCourses, and TrainingDevices for use in the TrainingCourses.
- 7) TrainingManuals are a convenient sourced document for use in the field. The Contractor may prepare TrainingManuals in place of the Student Handout Package upon approval by the Employer.
- 8) TrainingManuals shall be separate from Operation and Maintenance Manuals.

- 9) The Contractor shall prepare Training Manuals, and submit them to the Employer for review and approval at least 60 days prior to the start of the Training Demonstration.
- 10) Throughout the Contract and Warranty, it shall be the responsibility of the Contractor to supply the Employer with all changes and revisions to the Training Manuals.
- 11) Training Manuals shall become the property of the JAIPUR METRO.
 - a). The Contractor shall provide the master and thirty-five copies of the Training Manual for each course/subject.
 - b). The JAIPUR METRO reserves the right to copy all Training Manuals for use in Training Courses.
- 12) At least two months before the commencement of the training course, the Contractor shall submit all the training materials including the trainer's guides, training manual for trainees, training aids and presentation materials to the Employer for review. The training materials shall be prepared in a form allow easy future reproduction.
- 13) The format of the trainer's guides and training manual for trainees shall be submitted to the Employer for review.
- 14) The Contractor shall, for each course, distribute two sets of trainer's guides, one set of training manual for each trainee, two sets of trainer's guides and three additional sets of training manual to the Employer before the commencement of the training course.
- 15) All the training materials shall be accurate and match with the actual design of the System.

14.8 TRAINING RECORDS

- 1) The Contractor shall keep records on the attendance of trainees.
- 2) The Contractor shall devise a system, standards in assessing the level of knowledge, understanding of the course content and proficiency of the trainees. The system and standards shall be submitted to the Employer for review four weeks before the commencement of the training course.
- 3) The Contractor shall issue appropriate training certificate to the trainees who pass the assessment and have over 80-90% attendance.

14.9 COURSE EVALUATION

- 1) The Contractor shall develop questionnaires to trainees for each training course in determining the level of satisfaction with the course content. Appropriate scoring weighting shall be assigned to each question in the questionnaires such that the scores shall reflect the trainee's satisfaction to the training course. The questionnaires shall be submitted to the Employer for review four weeks before the commencement of the training course.
- 2) Upon completion of each training course, the Contractor shall distribute the questionnaires to the trainees to fill in.

- 3) The Contractor shall submit a training report to the Employer for review within two weeks after completion of each course. The training report shall include a summary of the training course conducted, the results of trainees' assessment and the course evaluation questionnaires.
- 4) The contractor shall submit the course evaluation criteria to the Employer for review, which shall identify the criteria for course success, course failure leading to re-designing the course, and the trainee failure score for re-attending the course.
 - a). A grading system shall be established by the Contractor and approved by the Employer, to report the progress of each trainee during a Training Course.
 - b). Grades shall be kept strictly confidential, and shall be submitted only to the Training Department.
 - c). The grading system shall identify students for whom further training is required.

14.10 TRANSFER OF KNOWLEDGE(TOK)

- 14.10.1 Tenderer shall submit the detailed plan of transfer of knowledge along with MoU with suitable Indian companies or company having proven track record and are working in related areas for all major systems/software.
- 14.10.2 TOK shall be essential and shall include system assembly, installation, maintenance and software configuration / source code modification and training of employer personnel to cover.
- 1) All configuration/application programmes for Automatic Fare Collection system for:
 - Addition, revocation, relocation of equipment to a station
 - Modification of equipment
 - Addition of a new station / group of stations to the system
 - Configuration of all equipment level and EOD parameters
 - Configuration / customization of all MMI, PIDs, displays, information of AFC equipment
 - Source code modification
 - Any other configuration / programmes required for maintenance/upgradation of hardware/software.
 - 2) The Transfer of Knowledge shall require involvement of Employer personnel in design, manufacturing, testing and installation of Sub-Systems during the Contract period. The sponsored engineers shall be under the technical and administrative control of the Contractor.

The personnel programme for this deployment shall be:

S.No	Description	Employer's personnel
1	Gates	3
2	TOM	3

3	Software	3
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- 14.10.3 The Transfer of Knowledge shall also include encouraging implementation of AFC software development / customization, networking of station equipments, data cabling, system integration etc. The Tenderer shall submit the detailed plan for progressive implementation of these items in India along with MoU with Indian companies.
- 14.10.4 The MoU with the local company shall necessarily confirm that the Knowledge shall be Transferred to the Local Company. All software/products shall be jointly owned with JAIPUR METRO and further JAIPUR METRO shall have full right to use the know how and the software/hardware for its own use in future. The Local TOK partner shall be bound to extend all necessary assistance in future to JAIPUR METRO at the market rate in India.
- 14.10.6 The Contractor shall undertake to supply or make arrangement with the original manufacturer to supply additional equipment required for replacement or expansion of the network in future. The contractor shall undertake to provide, if required during the life of the equipment ordered, technical assistance in the form of additional drawings, maintenance practice and technical advise.
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CHAPTER 15

DOCUMENTATION

15.1 GENERAL

- 1) The Contractor shall submit a Submission Programme. The Submission Programme shall identify all submissions to be submitted, submission titles, submission numbers and target submission dates.
- 2) The Contractor shall provide configuration management to ensure that the System is correctly configured. The Contractor shall ensure that a configuration control programme is maintained. The programme shall ensure that the configuration of each item is recorded and maintained during the life of the Contract and Defects Liability Period.
- 3) The Contractor shall submit a configuration management plan to the Employer for review within 60 days of the Date for Commencement of the Works. The Configuration Management Plan shall identify the persons to be responsible and the methods and arrangement to carry out the configuration management.

15.2 SUBMISSION REQUIREMENT

1) General

The Contractor shall include records of amendment in each submission with the following details:

- Revision history and status of the submissions;
 - Description on changes for each revision; and
 - The Contractor's signature for authorisation of the submission indicating proper design check has been carried out before the submitting to the Employer.
- a) The revision status and date of preparation of the submission shall be clearly indicated at the header of each page of the submission.
 - b) The first submission shall be revision 0 and subsequent revision shall be A, then B, so and so forth.
 - c) The Contractor shall maintain records of the submission and updated record shall be included in the Monthly Progress Report. The submission record shall include the following details:
 - Submission number;
 - Submission title;
 - Revision history;
 - Status of Employer's Response for each revision;
 - Submission dates and dates of return from the Employer for each revision; and
 - Current status.

2) Levels of Submissions

- a) The Contractor shall adopt top-down approach and submit submissions of the following levels in a logical sequence for the review of the Employer:
- System level related submissions;
 - Equipment level related submissions;
 - Installation design related submissions;
 - Design calculations;
 - Management plans and procedures;
 - Approval certificates; and
 - Miscellaneous submissions.
- b) System level related submissions shall show the total system including the configuration block diagrams, operating principle, system features and functions, capacity, expandability, interconnection within the Subsystem, between Subsystems and between other Project Contractors.
- c) Equipment level related submissions shall show the specifications on electrical, mechanical and functionality of the equipment/materials employed for the System and the Subsystems.
- d) Installation design related submissions shall include:
- The installation methods and procedures for different types of installation activities;
 - Drawings showing the equipment locations and positions, Subsystems coverage;
 - Schematic and wiring diagrams;
 - Equipment mounting details; and
 - Layouts of equipment, in equipment rooms.
- e) Design calculations shall demonstrate the performance of the System and Subsystems. Detailed requirements on calculation submissions are given in respective volumes of individual Subsystem.

CHAPTER 16

PROGRAMME REQUIREMENTS

16.1 GENERAL

- 1) The dates of completion of different sections of the Works and the Key Dates are given in this General Specification.

16.2 DESIGN

To ensure proper co-ordination of design efforts, the Contractor's attention is drawn to the tender and award programme for the interfacing Designated Contractors.

16.3 KEY DATES AND ACCESS DATES

- 1) Key Dates and Access Dates for various sections have been shown in Appendix 15.1 and 15.2 respectively.

16.4 PROJECT MEETINGS

1) General

- a). The Contractor representatives shall attend meetings scheduled by the Employer for the collection and dissemination of information related to the Contract.
- b). The Employer will prepare the agenda and will record the minutes of each meeting and distribute them to each of the participants.
- c). Routine progress meetings shall be conducted at the Employer's facilities. Meetings requiring demonstration of equipment and major hardware shall be held at the Employer's facilities, at the Contractor's or its sub-Contractor's facilities, as decided by the Employer.

2) Post Award Meeting

A Post Award meeting will be scheduled by the Employer. Before the meeting, the Employer will distribute a notice of the meeting along with an agenda of the subjects to be addressed.

- a) The Employer will perform the following at this meeting:
 - Explain and discuss the responsibilities and authorities of the Employer.
 - Discuss procedures for meetings, project correspondence, and points of contacts for administrative and technical communications.
 - Discuss procedures for shop drawings, product data and other Contract submittals.
 - Discuss procedures for processing change notices and change orders.
 - Discuss monthly progress estimate cut-off dates.

- Discuss progress and final payments.
- b) The Contractor shall perform the following at this meeting:
 - Introduce Contractor representatives and briefly describe each person's responsibilities. Provide an organization chart identifying managers of all departments, lead Employees, quality control staff and subcontractors.
 - Introduce the major sub-contractors representatives and their scope of work.
 - Discuss design and manufacturing schedule and the sequencing of entire Contract.
 - Provide an overview of the basic design concepts and point out where design efforts will be most critical to the success of the program.
 - Discuss breakdown of lump sum items in the proposal form.

3) Progress Meetings

- a) Progress meetings shall be held each month, and weekly when equipment placement starts, or as scheduled by the Employer, for the complete and timely execution of the Contract. Progress meetings shall include representatives of subcontractors who are or will be performing work during the coming weeks.
- b) The Employer will:
 - Distribute notices of progress meetings to the Contractor who shall forward notices to sub-contractors engaged in the Work, and all those expected to be engaged in the work before the next scheduled meeting.
 - Prepare the agenda.
- c) The agenda for progress meetings will include the following:
 - Introduction of new attendees and areas of responsibility.
 - Review of minutes of previous meetings, amendment of minutes if necessary, and acceptance of minutes.
 - Analysis of work accomplished since previous meeting, design issues, fabrication, product delivery, schedule changes, problems arising from proposed changes, and other circumstances which might affect progress of work Contractor shall have an updated schedule showing all activities started, completed, and on going during previous month and all activities scheduled for the next month.
 - Discussion of sequence of work and Progress Schedule. Contractor shall report on all activities which are forecasted to be completed beyond the approved schedule date(s) and shall identify means of maintaining the approved schedule.
 - Discussion of work quality observations, problems, and employee work

standards as they pertain to successful completion of the Contract.

- Discussion of changed conditions, time extensions, and other relevant subjects as they affect the progress of the work.
- Discussion of corrective measures to maintain progress schedule when necessary.
- Discussion of upcoming month's work.

d). Inquiries, requests for information, and requests for solutions of problems presented during such meetings shall be answered, when possible, during the meeting; those not answered during the meeting shall be resolved, documented and delivered in person or fared to the person requesting the information within 10 working days of the close of the meeting. The Employer will develop and maintain an action item list which will indicate items to be resolved, person assigned to follow or resolve, and anticipated date for resolution. Answers provided orally at the meetings shall be recorded in the minutes.

4) Special Meetings

Special meetings will be scheduled by the Employer as the Employer deems necessary.

Appendix 1.1

Overview of existing AFC System of Phase 1-A, JMRTS

Introduction

Jaipur Metro Rail Corporation Ltd. (JMRC) has implemented Automatic Fare Collection system (AFC) for the Phase-I-A consisting of 9 stations. The system utilizes SDS Samsung's AFC solution.

The Central Computer (CC) is the core system of metro AFC system located at Operation Control Center (OCC). The CC is designed to monitor operation of the whole AFC system and process equipment data such as transaction data, revenue data and operation status data generated by AFC equipment. The station equipment send the data to AFC Station computer (SC) through LAN for processing. SC further uploads this data to Central computer for end-of-day processing and revenue and traffic reports.

The CC manages parameter for reliable operation of whole AFC system and provides the functions for operational control of AFC system in Jaipur Metro.

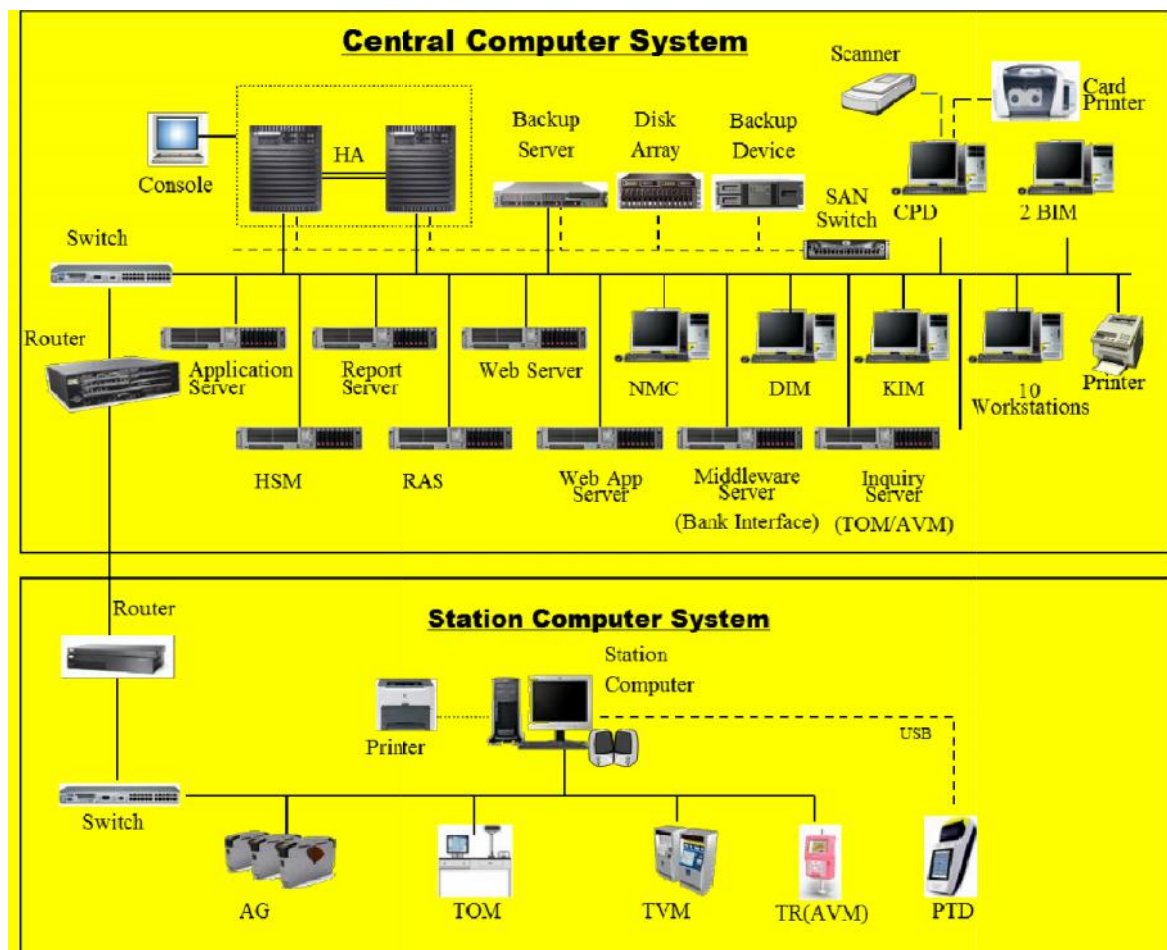


Figure - The System Configuration of Jaipur Metro AFC System

Ñ **Configuration**

The CC consists of following sub-systems:

- 2 DB servers with disk array for DB and data storage
- 1 Backup server and 1 Backup device(Tape library) for back up and recover of DB
- 1 Application server for communication with SC
- 10 Workstations for monitors and operators
- 1 Middleware Server(Bank I/F) for communication with banks and online refund/replacement at TOM
- 1 Report Server for web report
- 1 Web Server and Web app server for web page service
- 1 Add Value Server for TR/AVM top up
- 1 NMC(Network management console) for network monitoring
- Security systems which ensures high security in the AFC system
- BIM (Bulk Initialization Machine) for initialization of CSC
- 1 CPD(Card Personalization Device) for issuance of personalized staff card

Ñ **Basic Functions**

The CC provides following functions to manage AFC system as central system.

- 1) Data management
- 2) Card and Purse management
- 3) Equipment monitoring
- 4) Equipment controlling
- 5) Traffic monitoring
- 6) Parameter management
- 7) Revenue management
- 8) Equipment management
- 9) Software management
- 10) Security management
- 11) System clock synchronization
- 12) Procedure of end of operating
- 13) Transaction Data Audit
- 14) Report
- 15) Online Refund/Replacement
- 16) Bank Interface

Bank Interface

CC interfaces with bank server through the External Interface server in CC for settlement of top up transactions. External Interface server receive/send Interface file between CC and bank server.

CC collects the auto top up transactions with amount and approval number for a day. At the end of operation, CC makes request file by using these transactions and sends it to bank system for settlement. After checking of the request file from bank, the result file will be generated by bank and it is transferred to CC.

Bank interface sever is a system for file interface with bank system as following figure.

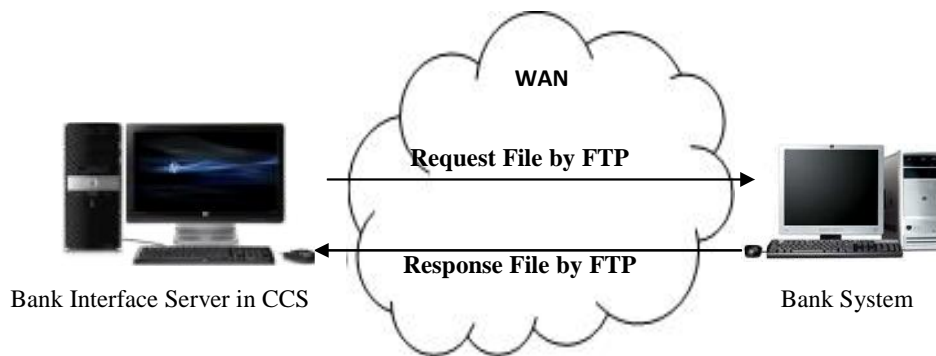


Figure Bank Interface

- **Fare Media**

- CSC (Mifare DES fire EV1)
- CST General Layout (Mifare Ultralight)

- **Provision for Integration with other service providers**

CC provide the connectivity with other service provider such as retailer and with AFC system such as other metro service provider for interoperation using same CSC. FTP (File Transfer Protocol) is the mode of communication for interfaces with other systems. CSC map will be designed in order to support following function:

- 1) Common area including card information and purse.
- 2) Metro application for metro usage.
- 3) Bus application, retail application, toll application and some reserved application

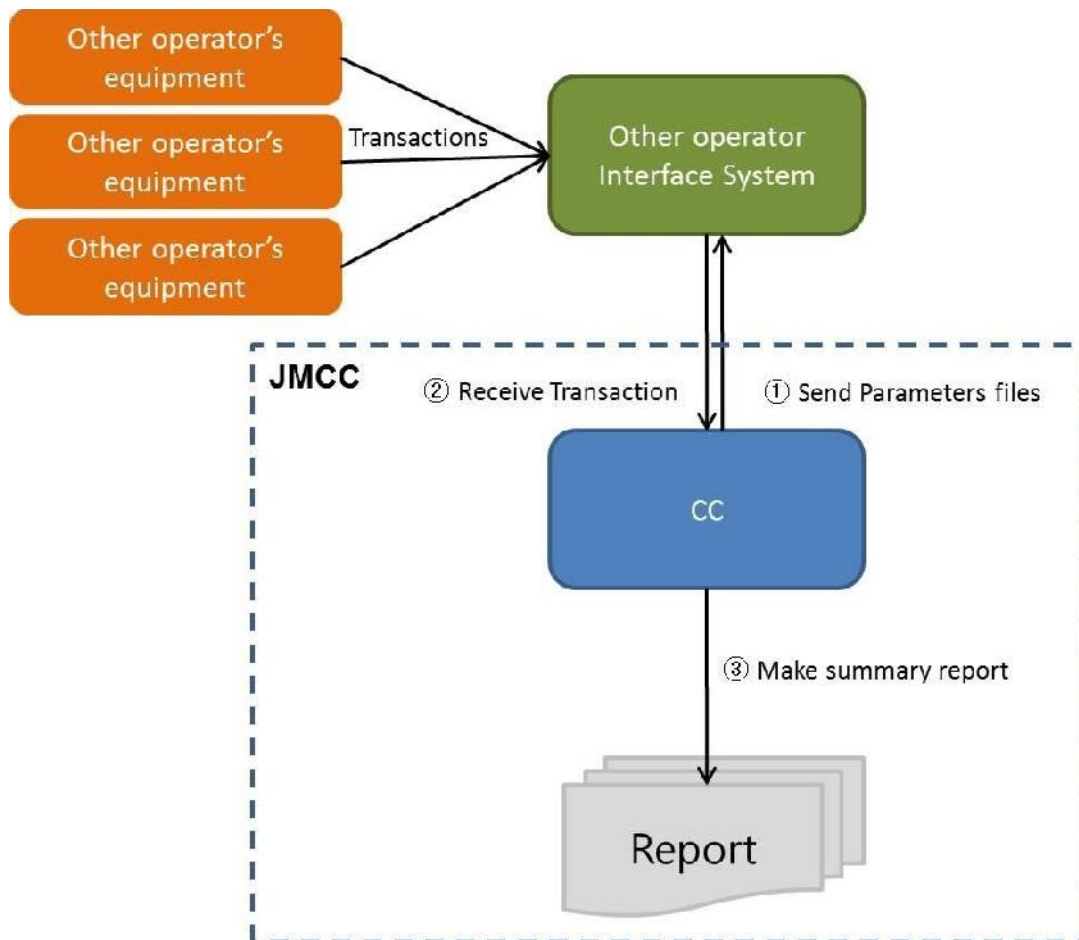


Figure : Procedure for Settlement of other operator's transaction

Appendix 1.2

List of items to which the contractor shall have access during execution*:

- a) AFC system interface specification
- b) CRW API Interface Specification
- c) Ticket Key Layout
- d) Bank Interface Specification
- e) Key Management Specification
- f) Source Codes

- Any other documents / specifications / software required to complete the scope of works of Phase 1B shall be the Bidder's obligation.
- Only for the purpose of JP/JS21 (1B) contract, a confidentiality agreement is required to be signed by the contractor/bidder.

Appendix 2.1

JS21 (1B): AFC Equipments Quantity for 2 Stations of Jaipur Metro Phase 1B.

Sr. No.	Station	Stations Type	Gate			EFO/TOM	TR/AVM	SC	TVM
			Entry	Exit	Disabled				
1	ChotiChouper	4 Access each for entry + exit	4	6	2	6	4	1	4
2	BadiChouper	4 Access each for entry + exit	4	6	2	6	4	1	4
	Total		8	12	4	12	8	2	8

Note: - All stations are underground.

Appendix 2.2**JS21 (1B): AFC System Equipments Quantity for 2 Stations of Jaipur Metro Phase 1B**

Sr. No.	Station	Gate			SE	SMc	SMb	SEb	SHWa	SEWc
		Entry	Exit	Disabled						
1	ChotiChouper	4	6	2	4	2	4	2	2	2
2	BadiChouper	4	6	2	4	2	4	2	2	2
	Sub-Total	8	12	4	8	4	8	4	4	4
		Total Gate:- 24							Total Cabinets:- 32	

Appendix 2.3

List of Spares for Automatic Fare Collectionfor Jaipur Metro Phase 1B

S.No.	Item	Quantity
1.	Gate Cabinets	8
2.	AVM cum TR	1
3.	TOM/EFO	1
4.	CSC R/W	5
5.	Station Computer	1
6.	TVM	2
7.	Data Switch	2
8.	Station Router	2
9.	Switch/router rack with patch panel, connector etc. complete	2
10.	Electrical Cabinet (C)	2
11.	Electrical Cabinet (B)	2
12.	Electrical Cabinet (A)	2
13.	Swing Barrier	2
14.	CPU Racks	2
15.	Emergency Switch	2
16.	Spares Parts installed quantity as per Appendix2.4	LS

Appendix 2.4

List of spare modules and consumables for Jaipur Metro Phase 1B

S.No.	Equipment/Item	Quantity of spare modules	
		Entry gate	Exit gate
1	Gate (complete modules)	Entry gate	Exit gate
	All internal modules including internal cables/connectors, SMA, SMV, UCM, PLC, PIDs, sensors, flaps, motor etc. of Gates (excluding cabinet)	2 sets	2 sets
2	TVM complete modules (except cabinet)	2 sets	
3	AVM cum TR (complete modules)	1 set	
4	SAM	5	
5	Power supply distribution board for SC	1	
6	Cables		
a)	LAN Cable	CAT 1 Km.	
b)	Patch chords	20 nos.	
c)	RJ 45 Male connector	20 nos.	
d)	RJ 45 Female connector	20 nos.	
e)	All patch panel, connectors, power strip, fan, LEDs for switch rack (except cabinet)	1 sets	
6	MCB & ELCB (Merlin Gerin make or similar)		
a)	63A - 3Phase	1	
b)	40A	2	
c)	32A	2	
d)	20A	2	
e)	10A	2	
f)	ELCB 40A SP/100mA	4	
7	Consumables		
a)	TOM Printer Cartridge	20 nos.	
b)	TOM Printer Paper roll	20 nos.	
c)	SC Printer Cartridge	10 nos.	
d)	SC Printer Paper Roll	10 nos.	
e)	Fuse of all ratings 1A, 1.25A, 2A, 2.5A, 5A, 10A	20 nos. of each rating	
f)	Container Opening Tool	5 nos.	
g)	Hopper Tool	5 nos.	

APPENDIX 4.1

AFC System List of Reports for 2 Stations of Jaipur Metro Phase-1B

Type of Report	Report name
Daily	Day AFC Revenue Summary (Global and linewise reports)
	DayStation (Global and linewise reports)
	Day Consolidation
	DayOperator
	DayTicket
	DaySV_TX
	DayTraffic
	DayTrip
	DayReject
	DayShift
	DatStaffUsage
	DayFail
	DayOpAnomaly
	DayStock
	DayCancel
Log	Current Stock
	Media Leakage
	LogStock
	StockHistory
	ARDayStock
	ARMediaLeak
	LogAnomaly
	LogCancel
	LogCSCHistory
	LogEvent
	LogFail
	LogOperator
	LogReject
	LogShift
	LogTicket
	LogTraffic
	LogTransaction
	OpAnomaly
System	SysDiffSecurity
	SysEqpt
	SysFare
	SysSecurity
	SysSite
	SysTicket
	SysOperator

Monthly	MonthOperator
	MonthTicket
	MonthCash
	MonthFail
	MonthReject
	MonthStock
	MonthTraffic
	MonthCancel
	MonthClear
Weekly	WeekOperator
	WeekTicket
	WeekReject
	WeekShift
	WeekTraffic
	WeekCancel
Graphical	Ridership Summary
	Station Summary

These are the minimum reports for the AFC Systems. Final reports will be finalized at Design stage. The JPJS21 (1B) Contractor have to modify the reports at respective CC of Phase 1B due to changes in the Station level equipments.

APPENDIX 4.2

4.2 CENTRAL COMPUTER (CC1)(Operational as implemented in Ph 1A)

The requirements given below are currently met by existing central system (CC1) (Phase-1A). In case direct integration solution is proposed, the contractor shall ensure that these requirements are complied in conjunction with CC1 & new stations after integration of Phase 1-B equipment with CC-1

- 4.2.1 The Central Computer System (CC1) generates the necessary management reports from the CST and CSC transaction information received from the Station Computer System.
- 4.2.2 The CC1 holds and downloads CST and CSC parameters and fare table information to each SC from where they are distributed to the Station Level AFC equipment.
- 4.2.3 The CC1 automatically collates all CST and CSC data from the SC to provide accurate accounting, audit and traffic statistics.
- 4.2.4 There is a data link between the Bulk Initialization Devices, the Card Personalization Device and the CC1 such that the CC1 controls all operations performed by these centrally located devices.

BULK INITIALIZATION MACHINE

General

A suitable machine along with software which can handle large volume of smart cards for initialization has been commissioned in Phase-1A.

Ticket Initialisation

- 1) Initialization of contact less smart card was done in bulk during initial use.
- 2) CSCs will be issued at the Excess Fare Office/ Booking Office and encoded by the Office CSC Processor attached to the Ticket Office Machine. Gates has been process the data received from the gate CSC processor and provide the CSC processor with data to be re encoded on the CSC. Data from the processor are sent to the SC.

Initialisation Requirement

Tickets has been formatted, processed and encoded to the same standard as specified in ticket specification.

Card personalization device: One number of complete device to print the personalized card is commissioned.

- 4.2.5 The CC1 allocates encoding and validity dates and other information required for the encoding of fixed data on CSC and CST and monitors and records all operations performed by the devices.
- 4.2.6 The CC1 is capable of remote monitoring and control of station computers /all Station Level AFC equipment. It is possible to perform all the functions of each SC such as AFC equipment monitoring and control from a remote desktop on a CC1 workstation as if the operator is using the SC workstation.
- 4.2.7 The CC1 database servers/other servers are located in a dedicated computer room in the Administration Building at Mansarovar Depot.
- 4.2.8 Not Used.

System Description

- 4.2.9 The Central Computer (CC1) System communicates with each Station Computer System via the Wide Area Network and process the data received to provide overall audit, statistical and operational information.
- 4.2.10 Not Used
- 4.2.11 The operator interfaces to the CC1 to facilitate the preparation of adhoc reports and permits both scheduled and adhoc reports to be produced with data corresponding to user-selectable short time periods within an operating day.
- 4.2.12 Not used
- 4.2.13 A hierarchical password structure has been incorporated to ensure that persons can only gain access to the information or facilities that are relevant to their specific job.
- 4.2.14 The data transferred from the SC to the CC1 includes, as a minimum, information such as usage of various equipment, number and cash value of all classes of CST and CSC issued and topped up, TOM shift revenue, fault reports and station of origin and destination traffic data by CST type, CSC type and period pass type and time of day.
- 4.2.15 The CC1 have facilities to generate and update blacklists for CSC and Employee Passes and to download these lists to the SC for distribution to the Station Level AFC equipment.
- 4.2.16 The CC1 downloads parameter data to the SC for updating. There are provisions to transfer EOD parameter to one station/some stations / all stations. The information is include system parameters, the fare tables, validity times for CSC, date and time synchronisation, blacklist of CSC and employee identification number and password updates.
- 4.2.17 The CC1 downloads program files to the SC including updates to operating software modules, graphics files, look up tables etc., in addition to parameter files.
- 4.2.18 The CC1 is able to support CSC replacement and refund applications from TOM devices.
- 4.2.19 If a CSC is corrupted, the operator inputs its engraved or printed card identification number to retrieve the recent usage of the CSC together with the remaining value, unused number of trips or expiry date depending on the class of CSC.

- 4.2.20 It is possible to print the details of any selected CSC that is stored in the CC1 on a printer connected to the CC1.
- 4.2.21 The CC1 is designed for autonomous operation of the various components of the AFC system to ensure that a failure in any one component of the AFC system not disrupts the system as a whole.
- 4.2.22 In the event of a failure of either the CC1 or the data transmission network, each SC is operates independently and records all transaction and alarm data for a period of not less than ten days.
- 4.2.23 All data stored are transmitted to the CC1 once the system is fully operational.
- 4.2.24 The CC1 also provides fallback facilities, in the event of prolonged communication failure with the SC. Station configuration data files on the CC1 are copied onto a backup media and hand carried to the stations for SC initialization, if necessary.
- 4.2.25 Revenue data stored in the SC is copied onto a backup media and hand carried to the CC1 for input. The CC1 is able to read the station data from the backup media, store the data in temporary files and merge the data with other station data.
- 4.2.26 The CC1 is able to generate reports on each station and system wide after the data have been merged.
- 4.2.27 Not Used

Data Flow

- 4.2.28 The data received by the Station Computer System in the stations is stored in files which in turn are transmitted to the Central Computer System (CC1) for processing and retention.
- 4.2.29 The data transmission between the SC and the CC1 is via wide area network links provided by the S & T (Telecom) contractor.
- 4.2.30 All critical alarms are transmitted to the CC1 in real time.
- 4.2.31 The communication network is equipped with built-in error detection and transmission retries to ensure accuracy and dependability of data transmission.
- 4.2.32 A cut off time is defined for the end of one operating day and the beginning of the next for data consolidation and reporting purposes.
- 4.2.33 The sequence for end of operating day processing including the time allowed for the printing of reports that are required on a routine basis has been defined.

CC1 Communication Links

- 4.2.34 The communication link provided a reliable method of verifying the integrity of the data and programme files sent from the CC1 to the SC and the correct reception of data uploads received from the SC at the CC1.
- 4.2.35 Not Used

Summary of Hardware

- 4.2.36 The Central Computer System includes, the following main units:
- i) Complete Central (CC1) System with required Data servers, application servers, Middleware etc.
 - ii) Archiving mechanism
 - iii) Equipment management
 - iv) Key Management System
 - v) Network management console
 - vi) Local workstations
 - vii) AFC LAN at OCC
 - viii) Power distribution cabling, connectivity with existing UPS and earthing.
 - ix) Its includes power and data connectivity to each item of AFC equipment at OCC.
- 4.2.37 Power to the CC1 Application and Database Server has been supplied from an Uninterruptible Power Supply (UPS) to be provided by the UPS Contractor. To ensure that the loss of power supply will not result in any loss of or corruption of data, the CC1 initiates an orderly shutdown before the expiry of the UPS power supply.
- 4.2.38 The CC1 Application and Database Servers meets the following requirements:
- i) Server computers have high performance, high speed and high reliability characteristics;
 - ii) The OS is of proven reliability in similar applications;
 - iii) Server computers have sufficient memory and internal hard disk capacity to meet all current requirements and provide 50 percent spare capacity at the end of DLP;
 - iv) Either an internal RAID hard disk system has been provided and configured to meet operating requirements or a system using a Storage Area Network (SAN) may be implemented but whichever solution is proposed it has been extendible;
 - v) DVD/CD-Read/Write capability;
 - vi) Keyboard, Mouse and 17" LCD Monitor supporting at least 1280x1024 resolution;
 - vii) Support for back-up media; and
 - viii) One (1) Super DLT or LTO or other suitable format tape drive with a tape auto-loader and necessary automated backup software; and
- 4.2.39 The major components of the CC Workstations comprise as a minimum the following:
- i) PC System Windows 7 or equivalent operating system approved by the Employer;
 - ii) 17" LCD Monitor supporting at least 1024x900 resolution;

- iii) Standard keyboard and mouse;
- iv) Integrated Fast Ethernet 10/100;
- v) DVD/CD-RW at least 24xR and 4xW;
- vi) Four (4) USB ports.

Software Requirements

- 4.2.40 The software provided include a package consisting of computer operating system software, diagnostic, testing, development and support software and AFC application software, including software to manage and safeguard security keys for CSC and software for the generation and modification of report contents and presentation.
- 4.2.41 Corresponding software has been provided for all CC1 Workstations to ensure that all features of the CC1 are accessible at all locations in accordance with user access rights.
- 4.2.42 All reports are generated in a form that can be easily exported to Microsoft Office application format for off-line storage, analysis and editing.
- 4.2.43 The output reports from CC1 are available in the standard format like Excel, XDR, CSV, XML, PDF etc..
- 4.2.44 Security features have been incorporated to prevent tampering with any data, programs, or other facilities of the CC1.
- 4.2.45 Not Used

Data and Parameter Management

- 4.2.46 The CC1 is capable of checking and handling exception, missing, duplicate, delayed and fabricated data.
- 4.2.47 The system is able to track the continuity of all types of data of all CSC system devices in case the above problems occur.
- 4.2.48 The CC1 maintains and download the AFC parameters to the SC. The AFC parameters to be maintained include the following:
 - i) System parameters
 - ii) Device parameters
 - iii) Fare related parameters
 - iv) CSC and CST related parameters and
 - v) Blacklist tables

- 4.2.49 Parameters have an effective date and time which may be any time in the future or in the past such that they are applied with immediate effect. If the effective date and time is set in the future, these parameters take effect on the specified date and time without further operator intervention.
- 4.2.50 The AFC system is able to handle at least two versions of future parameters. However, there is only be one current parameter list in the system and the system is ensure that only one version of parameters takes effect in the system at any one time. Once the parameters take effect, they are locked to prevent any modification.
- 4.2.51 The system allows only authorized staff to maintain parameters. A facility has been provided as part of the CC1 whereby the operational parameters can be modified and once verified can be transmitted to the SC for implementation at a date and time to be specified. It is possible to use back-up media to allow for change in operational parameters to be implemented in the event that the communication links are down.
- 4.2.52 Parameters are grouped in files according to the different levels of validation required such that, for example, AG over ride parameters can be sent separately from fare tables and without the same level of validation.

Data Storage

- 4.2.53 The design of the database system has been arranged to keep track of all valid CSC in circulation. This information aids in reporting any abnormal usage of stored value or trips and in providing refunds for corrupted CSC.
- 4.2.54 The database system satisfy the following requirements:
- i) Full-function, RDBMS based on SQL
 - ii) Support complicated data structure, multi-user, multiprocessing, large capacity operation
 - iii) Offer data integration, data recovery and security
 - iv) Support parallel processing
 - v) Provide disk mirroring functions
 - vi) Authority control is independent of that of the operating system.
 - vii) Offer multilevel safety management of database.
- 4.2.55 Data storage capacity is sufficient to maintain a minimum of six months transaction data available on line for adhoc report generation and other investigations.
- 4.2.56 The volume of data to be calculated for this requirement is assume 1.5 million transactions per day.
- 4.2.57 To maximize the utilization of the disk space of the system, system data is undergoing a regular housekeeping process. Housekeeping covers the files created by the CC1 and the files relative to each subsystem.

- 4.2.58 Any outdated or invalid files are not be archived. Duplicated records in the database and records where only the latest data need to be retained is merged and archived.
- 4.2.59 The system is able to backup and recovers data according to different modes and periods of backup required based on their criticality and data volume.
- 4.2.60 It is possible to restore archived data covering periods up to six (6) months at a time and use this data for the preparation of adhoc enquiries and reports.
- 4.2.61 The system has the functionality to backup and recover all key data (usage data, system data) and files.

CC1 Security

- 4.2.62 The Central Computer (CC1) System implements security systems to manage equipment authentication and administer the control over authority given to administrators of the operating system and others. It manages administrator accounts doing administrative and operational tasks to comply with external audit procedures. It also manages the operating authority of Station Level AFC equipment.
- 4.2.63 The CC1 is capable of handling a minimum of 200 operator PIN and password combinations per station. However system is capable to handle more number of operator subject to upgradation of Hardware (no software related change is required)

Clock Management

- 4.2.64 The Central Computer (CC1) System obtains the standard date and time and synchronize its clock automatically from the Employer's master clock system. The CC1 is synchronizing its clock at least once every fifteen (15) minutes.
- 4.2.65 If the clock is not synchronous to the standard time, the correction is completed in one second.
- 4.2.66 The clock information is downloaded to all SC and all other Station Level AFC equipment. When the clock time of Station Level AFC equipment is different to the downloaded clock time, the Station Level AFC equipment's clock have corrected automatically to the downloaded clock time.
- 4.2.67 When the hosts or the Station Level AFC equipment of the system are restarted, they are able to download or receive the clock data and synchronize their own clock automatically.

4.2.68 Functions

4.2.68.1 Data Categories

- a). Data to be transmitted from AFC equipment to the SC and further to CC1 divided into the

following categories.

i). Transaction Data	Accounting and statistical data including cash accounting, ticket sales, passenger traffic, gate data, origin and destination data etc.
ii). Audit Data	Details of audit data of each machine including data of non-resettable registers
iii). Status Data	Status data including faults, maintenance alerts, mode of operation Alarms, Events and Warnings data etc.

- b). Data is also downloaded from the CC1 facility to the SCs. This data is be operational and security data such as:

Operational Data	EOD such as fare tables, date and time, peak and off-peak, promotional features, discounts etc.
Security Data	Security data includes keys and list of black listed tickets.
Control data	Modes of operation of equipment and station
Maintenance data	

- c). System has inbuilt process to ensure completeness of data from different levels.

4.2.68.2 Equipment Management

- (i). Identification and blacklisting of fraudulent, stolen / lost equipment.

4.2.68.3 Security Management / Key Management

Security requirements: - Security covers following aspects applicable to AFC system:

- (i). Physical protection of equipment
- (ii). Security of data and transactions
- (iii). System security
- (iv). Protection of revenue
- (v). Security of cash through audit trails

4.2.68.4 Equipment security

- (i). The AFC machines resist tamper by either passengers or unauthorized staff of the Employer's representative or unauthorized access by staff.
- (ii). Valid identification is required before opening any machine containing cash or tickets.
- (iii). All machines have locked enclosures to satisfy the overall security requirement.
- (iv). All fare media are protected from being tampered with during the period that they are being processed within a machine. It is impossible to substitute a ticket or card and validate it once a transaction has been initiated.

4.2.68.5 Revenue Security

- (i). The AFC machines and system provide a complete audit trail of all transactions, transfers of cash and other payments.
- (ii). Non-resettable transaction and audit registers are provided in gates, and TOMs to record essential information sent to the SC. These registers are easily visible and readable when the machine is switched off or on.
- (iii). The equipment is designed with features, which deter possibility of revenue losses from altering, copying or counterfeiting of the tickets.
- (iv). Unique ticket id - Fail-safe features are incorporated to check that no duplicate ticket ids are introduced in the system, either through hardware or software failures. System addresses any other fraud mechanism for revenue erosion from automatic fare collection and accountal system. Sufficient security has been provided to prevent an increase in the remaining value of the ticket except at machines having revaluation function.

4.2.68.6 System Security

- (i). System design ensures protection from unauthorized access and changes to the systems and software
- (ii). All software / firmware supplied by the Contractor shall be free of virus.
- (iii). Suitable mechanisms to handle any possibility of system being infected by any virus shall be incorporated.

4.2.68.7 Not used

4.2.68.8 Report Management

- (i). The CC1 generates reports automatically at end of day. The CC1 shall collate, format and enable end of day and ad hoc reports to be printed from the data transmitted by the various AFC machines. Data is stored in a relational data base structure to permit adhoc and detailed log reporting.
- (ii). The entire "End of Day" routine does not take longer than 30 minutes in total to prepare and print each day report by 05:30 Hrs or as agreed.
- (iii). Station specific reports are available at SC after validation routine at CC1.
- (iv). All reports are read only and printable in PDF format. Option to change in MS Excel format is also available.
- (v). Suitable web intelligence software for accessing reports remotely has been provided.
- (vi). The reports include but not be limited to:

Daily Summary Report	Summary of all ticketing, financial transactions / cash received or refunded. Stationwise, ticketwise
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Shift consultancy reports	All ticketing, financial transactions. Each transaction with date and time stamped.
Aggregated / Consolidation reports	for matching all Transaction based, Audit registers based and Revenue figures.
Traffic reports	Entry/Exit Gate passenger flow. Ticket wise, stationwise
Individual ticket transaction history	
Operator action reports	
Log reports	Chronological report of daily activities. Each event shall have date and time recorded.
Ticket stock inventory reports	Detailed reports for global stock position, token leakage (available at CC1 level only) and stationwise stock reconciliation (available at CS and SC both)
Equipment inventory	for equipment installed and removed
Events, alarms, warnings	
Quarterly stock position	Station ticket stock report by 15 minutes frequency
Quarterly Traffic	To calculate number of passengers at station or access at that time Traffic report by 15 minutes frequency and passengers in and passengers out per 15 minutes frequency throughout the operating day, with sub-totals for each hour and grand total for the day.
RAMS analysis (for reliability, accessibility, maintainability measurements)	For MTTR, MTBF, MCBF
Maintenance and failure reporting	
System reports	System configuration related
Non AFC revenue	Station wise as well as at CC1 level
Any other report required by Employer's engineer at subsequent implementation stage.	

(vii). Complete list of reports shall be finalized during design phase.

4.2.68.9 Revenue Reconciliation

- 1). The purpose of the functionality is to provide an efficient revenue management system for JMRC.
- 2). There is provision for manual entry of cash amount (other than AFC revenue at stations) through GUI at SC. This information is uploaded to CC1 for daily revenue reconciliation and are shown as part of non AFC revenue.
- 3). Central system has feature for automatic generation of daily, monthly & yearly reports for revenue reconciliation using the revenue data - transactions, audit register and cash amount. Reports are generated global, stationwise, operatorwise and shiftwise.
- 4). The functionality has flexibility to take care of any manual entry errors. There is provision for

entry correction (stating reasons) within a defined period.

- 5). It provides a transparent accountal of revenue figures. Any discrepancy highlighted in revenue figures reconciliation is visible in the detailed reports.

4.2.68.10 Maintenance Analysis Mgmt.

- (i). Customized reporting tool for detailed periodic reports for maintenance log - failure information, corrective action, faulty / replaced module (with unique serial no.), calculation of MTTR, MTBF, MCBF etc.
- (ii). It shall include inventory flow and management feature - Accountal of movement and stock of faulty, replaced, repaired, workshop and spare equipments / modules.

4.2.68.11 Software / Document version Mgmt.

A utility for managing all submitted documents and installed software versions has been provided.

4.2.68.12 Status Monitoring

Geographic area layout based GUI for monitoring and controlling

- (i). Equipment status, Station/ Equipment mode of operation, EOD information
- (ii). Individual modules of equipment
- (iii). Current stock status
- (iv). Traffic information (quarterly)
- (v). Configuration parameters

4.2.68.13 Alarms, Events & Warnings

Alarm signals are transmitted automatically for display on the SC and CS. All important alarms are acknowledged. Alarms are for:

- (i). Power failure to any AFC machine.
- (ii). Communication failure to any AFC machine.
- (iii). Application program or parameter files download error to any AFC machine.
- (iv). Other unwanted events.
- (v). Unauthorised entry/intrusion, tampering with cash handling modules.
- (vi). Other mechanical and electronic problems or anomalies output from the device's own diagnostic and condition monitoring system.
- (vii). Encoding errors in Gate/TOM, Ticket stock threshold level at Gate, TOM, Station
- (viii). Alarms related to Status Monitoring etc.

4.2.68.14 Stock Management for Smart Media

- i). The AFC system have functionality for automatic stock management of CSC and CST at central / station level. This includes stock registration, distribution, return etc.

- ii). Detailed reports for Media global stock position & Media leakage (available at CC1 level only) and stationwise stock reconciliation (available at CC1 and SC both) at the end of the day has been provided. Any discrepancy in the stock accounting figures are evident in the report.

4.2.68.15 Archiving, Back-up and Restore mechanism

See 'Performance requirements'.

4.2.68.16 Performance Requirements

(i). Availability	99.9%
(ii). CC1 able to handle transactions per day	1.5 million
(iii). Transactions in peak hour	0.25 million
(iv). Fare table configuration	unlimited
(v). System spare capacity	Over 50%
(vi). Connect a maximum of station computers (configurable, not to be limited by any parameter)	30
(vii). Handle a maximum of station equipments	700
(viii). Total CC1 system rebuild (reinstallation of AFC application and database restore from tape)	within 4 Hr.
(ix). On-line data	30 day
(x). Off-line data	6 months
(xi). Data on tape	36 months
(xii). Daily database and system backup on backup server and tape	1 Hr
(xiii). Data restore Tape to backup server	1 Hr
(xiv). Backup server to system	1 Hr
(xv). Transaction update interval at CC1	5 min.
(xvi). AR update interval	15 min.
(xvii). Time for completion of all end of business day tasks.	within 4 Hr.

4.2.68.17 Hardware Configuration

- 1) System had inbuilt redundancy including that of CC1 database.
- 2) Failure of any one module / server does not result in disruption of operation.

4.2.69 NOT USED.

4.2.70 NOT USED.

4.2.71 NOT USED.

4.2.71.1 Provisions for Automatic Add Value

4.2.72 There is provision in the hardware and software for automatic top-up of CSC through credit cards/debit cards or similar banking instruments.

4.2.73 Not used.

4.2.74 Automatic top-up of CSC is possible on reaching a predefined threshold value. Operational mode and requirements are defined in co-operation with banks and credit card providers.

4.2.75 Provision for top up via a dedicated website by use of a credit or debit card is included. Hardware, software and website design has been provided.

4.2.76 It is possible to load value onto a CSC via an ATM transaction in a similar way to that used to re-load pre-pay mobiles. Operational mode and requirements are defined in co-operation with banks

4.2.77 Software Development Centre (SDC)

- 1). A Test platform cum Software development system of suitable configuration is included in the CS delivery.
- 2). It includes replica of complete AFC system (as per final design) including all System level components and Station level components.
- 3). It includes all software, hardware, simulators and interfaces required for the purpose of system testing (before deployment) and future modifications and upgrades.
- 4). One POS terminal has been integrated with TOM.

4.3 Other Considerations

Integration with other service providers

4.3.1 The Employer has the objective of integrating the use of the AFC System with other transit and non-transit service providers.

4.3.2 The Employer has the objective of integrating the use of the AFC System with other transit between city to city as well as across the regions.

4.3.3 There are necessary provisions in the AFC System in order to achieve this objective. Such provisions include, but not be limited to the following:

- i) Provisions in the CSC data structure to permit other transit service providers to process the CSC for transactions with a common e-purse;
- ii) Provisions in the CSC data structure to permit other non-transit service providers to process the CSC for e-purse transactions;

- iii) Provisions to implement fare promotion and loyalty schemes for multi mode transit and other common use of CSC.
- 4.3.4 There is an external interface and integration manual ("External Interface and Integration Manual") which details the features of the AFC System, interface points, protocols, software and hardware requirements for interface and integration with other service providers together with guidelines and other requirements for integration and testing of the AFC System with other service providers.
- 4.3.5 It is possible for integration of AFC system with other similar AFC systems when the Jaipur Metro system expands in future. To ensure seamless integration between AFC systems of different manufacturers an interface specification are available incorporating all the above software and hardware features.
- 4.3.6 Not used.
- 4.3.7 Not used.
- 4.3.8 Not used.

Facility for Travel Using Mobile Phone Technology.

- 4.3.9 There are provisions in the design and manufacturing of AFC equipment for necessary compatibility with the future use of Near Field Communications (NFC) technology to enable usage of mobile phones as fare media.
- 4.3.10 To this end, the CSC R-W installed in the AG equipment is compatible with NFC technology.
- 4.3.11 Design provisions are based on Near Field Communication (NFC) of (fully compatible with ISO 14443 "Type A") for use as Stored Value Media and Stored Ride Media.

APPENDIX 4.3

4.3 CENTRAL COMPUTER (CC2)

In case, the proposed solution includes a separate central system (CC2), it will comply requirements as below:

- 4.3.1 It is envisaged that the Phase 1-B Central server(CC2) shall interface with the existing Phase 1-A central server(CC1- SDS Samsung make) in a master slave configuration with CC1 being master for exchange of all data i.e. parameters, transactions, keys, equipment operating data etc. as per the interface specifications of CC1. The Contractor shall propose design architecture for CC2 to meet Employer's requirements.
- 4.3.2 The design shall incorporate all parameters / interface data / and other requirements for integration of Phase-I B system with Phase 1-A CC (CC1).
- 4.3.3 The Central Computer System (CC2) shall generate the necessary management reports from the CST and CSC transaction information received from the Station Computer System. CC2 shall send the reports to CC1 at regular intervals of 15 minutes including transaction, revenue, EOD data etc at a predefined interval. Also in case of failure in connection between CC1 & CC2, all remaining data shall be transferred to CC1 once the connection is restored.
- 4.3.4 The CC2 shall hold and download CST and CSC parameters and fare table information to each SC from where they shall be distributed to the Station Level AFC equipment.
- 4.3.5 The CC2 shall automatically collate all CST and CSC data from the SC to provide accurate accounting, audit and traffic statistics.
- 4.3.6 The CC2 shall be capable of remote monitoring and control of station computers /all Station Level AFC equipment. It shall be possible to perform all the functions of each SC such as AFC equipment monitoring and control from a remote desktop on a CC2 workstation as if the operator was using the SC workstation.
- 4.3.7 The CC2 database servers/other servers shall be located in a dedicated computer room in the Administration Building or Operations Control Centre. Bidder shall submit a list of all servers to be provided which shall be finalized at design stage.

System Description

- 4.3.12 The Central Computer System shall communicate with each Station Computer System via the wide area network and process the data received to provide overall audit, statistical and operational information.

- 4.3.13 A hierarchical password structure shall be incorporated to ensure that persons can only gain access to the information or facilities that are relevant to their specific job.
- 4.3.14 The data transferred from the SC to the CC2 shall include, as a minimum, information such as usage of various equipment, number and cash value of all classes of CST and CSC issued and topped up, TOM shift revenue, fault reports and station of origin and destination traffic data by CST type, CSC type and period pass type and time of day.
- 4.3.15 The CC2 shall have facilities to generate and update blacklists for CSC and Employee Passes and to download these lists to the SC for distribution to the Station Level AFC equipment.
- 4.3.16 The CC2 shall download parameter data (including blacklisting) to the SC for updating. There should be provision to transfer EOD parameter to one station/some stations / all stations of new stations. The information shall include system parameters, the fare tables, validity times for CSC, date and time synchronisation, blacklist of CSC and employee identification number and password updates.
- 4.3.17 The CC2 shall download program files to the SC including updates to operating software modules, graphics files, look up tables etc., in addition to parameter files.
- 4.3.18 The CC2 shall be able to support CSC replacement and refund applications from TOM devices.
- 4.3.19 If a CSC is corrupted, the operator shall input its engraved or printed card identification number to retrieve the recent usage of the CSC together with the remaining value, unused number of trips or expiry date depending on the class of CSC.
- 4.3.20 It shall be possible to print the details of any selected CSC that is stored in the CC2 on a printer connected to the CC2.
- 4.3.21 The CC2 shall be designed for autonomous operation of the various components of the AFC system to ensure that a failure in any one component of the AFC system shall not disrupt the system as a whole.
- 4.3.22 In the event of a failure of either the CC2 or the data transmission network, each SC shall operate independently and record all transaction and alarm data for a period of not less than thirty days.
- 4.3.23 All data stored shall be transmitted to the CC2 once the system is fully operational.
- 4.3.24 The CC2 shall also provide fallback facilities, in the event of prolonged communication failure with the SC. Station configuration data files on the CC2 shall be copied onto a backup media and hand carried to the stations for SC initialization, if necessary.
- 4.3.25 Revenue data stored in the SC shall be copied onto a backup media and hand carried to the CC2 for input. The CC2 shall be able to read the station data from the backup media, store the data in temporary files and merge the data with other station data.

- 4.3.26 The CC2 shall be able to generate reports on each station and system wide after the data have been merged.
- 4.3.27 The Contractor shall define the arrangements to be made if the failure of the CC2 extends beyond an acceptable period.

Data Flow

- 4.3.28 The data received by the Station Computer System in the stations shall be stored in files which in turn shall be transmitted to the Central Computer System for processing and retention.
- 4.3.29 The data transmission between the SC and the CC2 shall be via wide area network links provided by the S & T (Telecom) contractor.
- 4.3.30 All critical alarms shall be transmitted to the CC2 in real time.
- 4.3.31 The communication network shall be equipped with built-in error detection and transmission retries to ensure accuracy and dependability of data transmission.

CC2 Communication Links

- 4.3.32 The Contractor shall provide a reliable method of verifying the integrity of the data and programme files sent from the CC2 to the SC and the correct reception of data uploads received from the SC at the CC2.
- 4.3.33 The method used shall be approved by the Employer.

Summary of Hardware

- 4.3.34 The Central Computer System shall include, but not be limited to, the following main units:
- i) Complete Central System with required Data servers, application servers, Middleware etc.
 - ii) Archiving mechanism
 - iii) Equipment management
 - iv) Network management console
 - v) Local workstations (minimum 4 nos.) with one printer (Laser and Network-, A4)
 - vi) AFC LAN at OCC
 - vii) Power distribution cabling, connectivity with existing UPS and earthing.
 - viii) It shall include power and data connectivity to each item of AFC equipment at OCC.
 - ix) Interfaces with CC1 for Equipment Operating Data, Key and data exchange
 - x) All connectivity between CC2 and CC1.
 - xi) Any other equipments as per finalization of design

- 4.3.35 Power to the CC2 Application and Database Server shall be supplied from an Uninterruptible Power Supply (UPS) to be provided by the UPS Contractor. To ensure that the loss of power supply will not result in any loss of or corruption of data, the CC2 shall initiate an orderly shutdown before the expiry of the UPS power supply.
- 4.3.36 The CC2 Application and Database Servers shall be mainstream products that conform to current industrial standards. Each shall meet the following requirements:
- i) Server computers shall have high performance, high speed and high reliability characteristics;
 - ii) The OS shall be of proven reliability in similar applications;
 - iii) Server computers shall have sufficient memory and internal hard disk capacity to meet all current requirements and provide 50 percent spare capacity at the end of DLP;
 - iv) Either an internal RAID hard disk system shall be provided and configured to meet operating requirements or a system using a Storage Area Network (SAN) may be implemented but whichever solution is proposed it shall be extendible;
 - v) DVD/CD-Read/Write capability;
 - vi) Keyboard, Mouse and 17" LCD Monitor supporting at least 1280x1024 resolution;
 - vii) Support for back-up media; and
 - viii) One (1) Super DLT or LTO or other suitable format tape drive with a tape auto-loader and necessary automated backup software; and
- 4.3.37 The CC2 Workstations shall be capable of being used for other functions at the Employer's discretion. The major components of the CC2 Workstations shall comprise as a minimum the following:
- i) PC System Windows 7 or equivalent operating system approved by the Employer;
 - ii) 17" LCD Monitor supporting at least 1024x1280 resolution;
 - iii) Standard keyboard and mouse;
 - iv) Integrated Fast Ethernet 10/100;
 - v) DVD/CD-RW at least 24xR and 4xW;
 - vi) Four (4) USB ports.

Software Requirements

- 4.3.38 The software provided shall include a package consisting of computer operating system software, diagnostic, testing, development and support software and AFC application software, including software to manage and safeguard security keys for CSC and software for the generation and modification of report contents and presentation and Anti-virus software.

- 4.3.39 Corresponding software shall be provided for all CC2 Workstations to ensure that all features of the CC2 are accessible at all locations in accordance with user access rights.
- 4.3.40 All reports shall be generated in a form that can be easily exported to Microsoft Office application format for off-line storage, analysis and editing.
- 4.3.41 The output reports from CC2 will be available in the standard format like Excel, XDR, CSV, XML, PDF etc..
- 4.3.42 Security features shall be incorporated to prevent tampering with any data, programs, or other facilities of the CC2.
- 4.3.43 All computer software documentation for the CC2 including workstations shall be provided by the Contractor. The documentation shall include system requirements analysis, system design, program descriptions, listings, source and object files, flow diagrams, methods of execution and other necessary information, as required by the Employer. This information shall be supplied prior to the start of production of software documentation.

Data and Parameter Management

- 4.3.44 The CC2 shall be capable of checking and handling exception, missing, duplicate, delayed and fabricated data.
- 4.3.45 The system shall be able to track the continuity of all types of data of all CSC system devices in case the above problems occur.
- 4.3.46 The CC2 shall maintain and download the AFC parameters to the SC. The AFC parameters to be maintained shall include, but not restricted to the following:
 - i) System parameters
 - ii) Device parameters
 - iii) Fare related parameters
 - iv) CSC and CST related parameters and
 - v) Blacklist tables
- 4.3.47 Parameters shall have an effective date and time which may be any time in the future or in the past such that they are applied with immediate effect. If the effective date and time is set in the future, these parameters shall take effect on the specified date and time without further operator intervention.
- 4.3.48 The AFC system shall be able to handle at least two versions of future parameters. However, there shall only be one current parameter list in the system and the system shall ensure that only one version of parameters takes effect in the system at any one time. Once the parameters take effect, they shall be locked to prevent any modification.

- 4.3.49 The system shall allow only authorized staff to maintain parameters. A facility shall be provided as part of the CC2 whereby the operational parameters can be modified and once verified can be transmitted to the SC for implementation at a date and time to be specified. It shall be possible to use back-up media to allow for change in operational parameters to be implemented in the event that the communication links are down.
- 4.3.50 Parameters shall be grouped in files according to the different levels of validation required such that, for example, AG over ride parameters can be sent separately from fare tables and without the same level of validation.

Data Storage

- 4.3.51 The design of the database system shall be arranged to keep track of all valid CSC in circulation. This information shall aid in reporting any abnormal usage of stored value or trips and in providing refunds for corrupted CSC.
- 4.3.52 The database system shall satisfy the following requirements:
- i) Full-function, RDBMS based on SQL
 - ii) Support complicated data structure, multi-user, multiprocessing, large capacity operation
 - iii) Offer data integration, data recovery and security
 - iv) Support parallel processing
 - v) Provide disk mirroring functions
 - vi) Authority control shall be independent of that of the operating system.
 - vii) Offer multilevel safety management of database.
- 4.3.53 Data storage capacity shall be sufficient to maintain a minimum of six months transaction data available on line for adhoc report generation and other investigations.
- 4.3.54 The volume of data to be calculated for this requirement shall assume 0.2 million transactions per day.
- 4.3.55 To maximize the utilization of the disk space of the system, system data shall undergo a regular housekeeping process. Housekeeping shall cover the files created by the CC2 and the files relative to each subsystem.
- 4.3.56 Any outdated or invalid files shall not be archived. Duplicated records in the database and records where only the latest data need to be retained shall be merged and archived.
- 4.3.57 The system shall be able to backup and recover data according to different modes and periods of backup required based on their criticality and data volume.
- 4.3.58 It shall be possible to restore archived data covering periods up to six (6) months at a time and use this data for the preparation of adhoc enquiries and reports.

- 4.3.59 The system shall have the functionality to backup and recover all key data (usage data, system data) and files.

CC2 Security

- 4.3.60 The Central Computer System shall implement security systems to manage equipment authentication and administer the control over authority given to administrators of the operating system and others. It shall manage administrator accounts doing administrative and operational tasks to comply with external audit procedures. It shall also manage the operating authority of Station Level AFC equipment.
- 4.3.61 The CC2 shall be capable of handling a suitable number of PIN and password combinations per station. However system should be capable to handle more number of operator subject to upgradation of Hardware (no software related change is required)

Clock Management

- 4.3.62 The Central Computer System shall obtain the standard date and time and synchronize its clock automatically from the Employer's master clock system or CC1 subject to review by Employer's representative. The CC2 shall synchronize its clock at least once every fifteen (15) minutes.
- 4.3.63 If the clock is not synchronous to the standard time, the correction shall be completed in one second.
- 4.3.64 The clock information shall be downloaded to all SC and all other Station Level AFC equipment. When the clock time of Station Level AFC equipment is different to the downloaded clock time, the Station Level AFC equipment's clock shall be corrected automatically to the downloaded clock time.
- 4.3.65 When the hosts or the Station Level AFC equipment of the system are restarted, they shall be able to download or receive the clock data and synchronize their own clock automatically.

4.3.66 Functions

4.3.66.1 Data Categories

- a). Data to be transmitted from AFC equipment to the SC and further to CC2 & CC1 shall be divided into the following categories.

i). Transaction Data	Accounting and statistical data including cash accounting, ticket sales, passenger traffic, gate data, origin and destination data etc.
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- b) Data will be transmitted from AFC equipment to the SC & further to CC2 shall be divided in the following

i). Audit Data/Cut-off Data	Details of audit data/cut-off data of each machine including data of non-resettable registers
ii). Status Data	Status data including faults, maintenance alerts, mode of operation Alarms, Events and Warnings data etc.

- c). Data will also be downloaded from the CC1 TO CC2 and further to the SCs. This data will be operational and security data such as:

Operational Data	EOD such as fare tables, date and time, peak and off-peak, promotional features, discounts etc.
Security Data	Security data will include keys and list of black listed tickets.
Control data	Modes of operation of equipment and station
Maintenance data	

- d). System should have inbuilt process to ensure completeness of data from different levels.
- e). Data format and transfer of Transaction Data from CC2 to CC1 shall be as per requirements of CC1.
- f). There shall be a provision to download new version of SC software from CC2. This download shall be configurable at CC2 to be applied station wise or at a few stations or all stations at once.
- g). There shall be a provision to download new version of Station Level Equipments and other device related software from CC2 to SC and then to SLE. This download shall be configurable at both CC2 and SC to be applied equipment wise or on a group of SLE or equipment category wise or station wise or on all equipments at once.

4.3.66.2 Equipment Management

- (i). Contractor to propose and follow secure equipment management of all AFC devices including new equipment registration, equipment removal or deletion.
- (ii). The CC1 shall manage and initialise all equipment and associated SAMs for the metro equipments that shall be further sent to the CC2. The CC2 shall further distribute and manage the SAM for the equipments.
- (iii). The equipments will be physically managed by the CC2 whereas the information for all the CC2's equipment will be maintained at the CC1 level. Each equipment will be uniquely identified by equipment ID. Each equipment owner will be allocated a series of IDs from which they will allocate IDs to new equipment. Addition of new equipment or updation of equipment will be done at CC2 level and these additions/changes will be confirmed to CC1 via equipment updation file. CC1 shall receive the file and update the database.

- (iv). Identification and blacklisting of fraudulent, stolen / lost equipments and updated information shall be sent to CC1. Blacklist entry for lost /stolen equipment shall be done at CC1 and distributed as global blacklist parameters.

4.3.66.3 Security Management

Security requirements: - Security shall cover following aspects applicable to AFC system:

- (i). Physical protection of equipment
- (ii). Security of data and transactions
- (iii). System security
- (iv). Protection of revenue
- (v). Security of cash through audit trails

4.3.66.4 Key Management

Key management shall be done at CC1 level. The DSM and/or SAM (having Security keys) of all the equipments shall be issued from CC1. Blank SAM as per CC1 requirement shall be procured & provided by JS21(1B) contractor to CC1.

4.3.66.5 Equipment security

- (i). The AFC machines shall resist tamper by either passengers or unauthorized staff of the Employer's representative or unauthorized access by staff.
- (ii). Valid identification shall be required before opening any machine containing cash or tickets.
- (iii). All machines shall have locked enclosures to satisfy the overall security requirement.
- (iv). All fare media shall be protected from being tampered with during the period that they are being processed within a machine. It shall be impossible to substitute a ticket or card and validate it once a transaction has been initiated.
- (v). The contractor shall provide multiple set of keys for every equipment. Similar equipment shall be keyed similarly. The keying arrangement shall be with the approval of the Employer's engineer.

4.3.66.6 Revenue Security

- (i). The AFC machines and system shall provide a complete audit trail of all transactions, transfers of cash and other payments.
- (ii). Non-resettable transaction and audit registers shall be provided in gates, and TOMs to record essential information sent to the SC. These registers shall be easily visible and shall be readable when the machine is switched off or on.
- (iii). The equipment shall be designed with features, which deter possibility of revenue losses from altering, copying or counterfeiting of the tickets.

- (iv). Unique ticket id - Fail-safe features shall be incorporated to check that no duplicate ticket ids are introduced in the system, either through hardware or software failures. System shall address any other fraud mechanism for revenue erosion from automatic fare collection and accountal system. Sufficient security shall be provided to prevent an increase in the remaining value of the ticket except at machines having revaluation function.

4.3.66.7 System Security

- (i). System design shall ensure protection from unauthorized access and changes to the systems and software
- (ii). All software / firmware supplied by the Contractor shall be free of virus.
- (iii). Suitable mechanisms to handle any possibility of system being infected by any virus shall be incorporated.
- (iv). Upgradation of such measures, from time to time shall be the responsibility of the AFC contractor during DLP period.

4.3.66.8 EOD and Configuration Management

- (i). EOD will be as per CC1-CC2 Interface Requirements.
- (ii). CC2 shall receive global EOD from CC1 and transfer to equipments through SC.
- (iii). EOD parameters shall be common between Phase-I A and Phase-I B systems.
- (iv). In addition, CC2 shall send other local EOD parameters to equipments as required.

4.3.66.9 Report Management

- (i). See attached Reports List in Appendix '4.1'. This list is only for reference. Global reports shall be printed at CC1 level. Reporting data shall be sent to CC1 as per CC1 requirements. However, CC2 shall be capable to produce reports for its stations.
- (ii). The CC2 shall generate reports automatically at end of day. The CC2 shall collate, format and enable end of day and ad hoc reports to be printed from the data transmitted by the various AFC machines. Data shall be stored in a relational data base structure to permit adhoc and detailed log reporting.
- (iii). The entire "End of Day" routine should not take longer than 30 minutes in total to prepare and print each day report at a configurable time.
- (iv). Station specific reports shall be available at SC after validation routine at CC.
- (v). System shall have capability to generate reports in different format i.e. pdf, excel etc.

- (vi). The Contractor shall finalize report design during design review with the Employer's engineer. Suitable web intelligence software for accessing reports remotely shall be provided.
- (vii). The reports shall include but not be limited to:

Daily Summary Report	Summary of all ticketing, financial transactions / cash received or refunded. Stationwise, ticketwise
Shift consultancy reports	All ticketing, financial transactions. Each transaction with date and time stamped.
Aggregated / Consolidation reports	for matching all Transaction based, Audit registers based and Revenue figures.
Traffic reports	Entry/Exit Gate passenger flow. Ticket wise, stationwise
Individual ticket transaction history	
Operator action reports	
Log reports	Chronological report of daily activities. Each event shall have date and time recorded.
Ticket stock inventory reports	Detailed reports for global stock position, token leakage (available at CC level only) and stationwise stock reconciliation (available at CC and SC both)
Equipment inventory	for equipment installed and removed
Events, alarms, warnings	
Quarterly stock position	Station ticket stock report by 15 minutes frequency
Quarterly Traffic	To calculate number of passengers at station or access at that time Traffic report by 15 minutes frequency and passengers in and passengers out per 15 minutes frequency throughout the operating day, with sub-totals for each hour and grand total for the day.
RAMS analysis (for reliability, accessibility,	For MTTR, MTBF, MCBF

maintainability measurements)	
Maintenance and failure reporting	
System reports	System configuration related
Non AFC revenue	Station wise as well as at CC2 level
Any other report required by Employer's engineer at subsequent implementation stage.	

(viii). Complete list of reports shall be finalized during design phase.

4.3.66.10 Revenue Reconciliation

- 1). The purpose of the functionality is to provide an efficient revenue management system for JMRC.
- 2). There shall be provision for manual entry of cash amount (other than AFC revenue at stations) through GUI at SC. This information shall be uploaded to CC2 for daily revenue reconciliation and should be shown as part of non AFC revenue.
- 3). Central system shall have feature for automatic generation of daily, monthly & yearly reports for revenue reconciliation using the revenue data - transactions, audit register and cash amount. Reports shall be generated global, stationwise, operatorwise and shiftwise.
- 4). The functionality shall have flexibility to take care of any manual entry errors. There shall be provision for entry correction (stating reasons) within a defined period.
- 5). It shall provide a transparent accountal of revenue figures. Any discrepancy highlighted in revenue figures reconciliation shall be visible in the detailed reports.

4.3.66.11 Maintenance Analysis Mgmt.

- (i). Customized reporting tool for detailed periodic reports for maintenance log - failure information, corrective action, faulty / replaced module (with unique serial no.), calculation of MTTR, MTBF, MCBF etc.
- (ii). It shall include inventory flow and management feature - Accountal of movement and stock of faulty, replaced, repaired, workshop and spare equipments / modules.

4.3.66.12 Software / Document version Mgmt.

Contractor shall provide utility for managing all submitted documents and installed software versions.

4.3.66.13 Status Monitoring

Geographic area layout based GUI for monitoring and controlling

- (i). Equipment status, Station/ Equipment mode of operation, EOD information
- (ii). Individual modules of equipment
- (iii). Current stock status
- (iv). Traffic information (every 15 minutes)
- (v). Configuration parameters

4.3.66.14 Alarms, Events & Warnings

Alarm signals shall be transmitted automatically for display on the SC and CS. All important alarms shall have to be acknowledged. Alarms shall be for:

- (i). Power failure to any AFC machine having in built UPS facility..
- (ii). Communication failure to any AFC machine.
- (iii). Application program or parameter files download error to any AFC machine.
- (iv). Other unwanted events.
- (v). Unauthorised entry/intrusion, tampering with cash handling modules.
- (vi). Other mechanical and electronic problems or anomalies output from the device's own diagnostic and condition monitoring system.
- (vii). Encoding errors in Gate/TOM, Ticket stock threshold level at Gate, TOM, Station
- (viii). Alarms related to Status Monitoring etc.

4.3.66.15 Stock Management for Smart Media

- i). The AFC system shall have functionality for automatic stock management of CSC and CST at central / station level. This includes stock registration, distribution, return etc.
- ii). Detailed reports for Media global stock position & Media leakage (available at CS level only) and stationwise stock reconciliation (available at CS and SC both) at the end of the day shall be provided. Any discrepancy in the stock accounting figures shall be evident in the report.

4.3.66.16 Archiving, Back-up and Restore mechanism

See 'Performance requirements'.

4.3.66.17 Performance Requirements

(i). Availability	99.9%
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(ii).	CC able to handle transactions per day	0.2 million
(iii).	Transactions in peak hour	0.05 million
(iv).	Fare table configuration	50 stations
(v).	System spare capacity	Over 50%
(vi).	Connect a maximum of station computers (configurable, not to be limited by any parameter)	25
(vii).	Handle a maximum of station equipments	700
(viii).	Total CC system rebuild (reinstallation of AFC application and database restore from tape)	within 4 Hr.
(ix).	On-line data	30 day
(x).	Off-line data	6 months
(xi).	Data on tape	36 months
(xii).	Daily database and system backup on backup server and tape	1 Hr
(xiii).	Data restore Tape to backup server	1 Hr
(xiv).	Backup server to system	1 Hr
(xv).	Transaction update interval at CS	5 min.
(xvi).	AR update interval	15 min.
(xvii).	Time for completion of all end of business day tasks.	within 4 Hr.

4.3.66.18 Hardware Configuration

- 1) Contractor to specify system architecture to meet the Employer's requirement.
- 2) System should have inbuilt redundancy including that of CC2 database.
- 3) Failure of any one module / server should not result in disruption of operation.

Provisions for Automatic Add Value

4.3.67 The Contractor shall make provision in the hardware and software for automatic top-up of CSC through credit cards/debit cards or similar banking instruments.

4.3.68 Not used.

4.3.69 Automatic top-up of CSC shall be possible on reaching a predefined threshold value. Operational mode and requirements are to be defined as per existing JMRC rules in co-operation with banks and credit card providers.

4.3.70 Software Development Centre (SDC)

- 1). A Test platform cum Software development system of suitable configuration shall be included in the CC delivery.
- 2). It shall include replica of complete AFC system (as per final design) including all System level components and Station level components.
- 3). It shall include all software, hardware, simulators and interfaces required for the purpose of system testing (before deployment) and future modifications and upgrades.

4.4 Other Considerations

- 4.4.1 The Contractor shall provide an external interface and integration manual ("External Interface and Integration Manual") which shall detail the features of the AFC System, interface points, protocols, software and hardware requirements for interface and integration with other service providers/CCHS together with guidelines and other requirements for integration and testing of the AFC System with other service providers/CCHS in future.
- 4.4.2 The Employer desires that it shall be possible for integration of AFC system with other similar AFC systems when the Jaipur Metro system expands in future. To ensure seamless integration between AFC systems of different manufacturers an interface specification shall be made available incorporating all the above software and hardware features in detail.

Appendix 5.3:ADD Value through TR cum AVM

1. Add Value on JMRC Smart Card (CSC) through TR cum Add Value Machine

The proposed process for doing Add Value on CSC through TR cum AVM is as under-

- a) User will go to existing JMRC website User will create his account by giving personal information.
- b) Name
- c) Card engraved ID
- d) Email address
- 1.1. After receiving above information, engraved id will be validated at CC1.
- 1.2. In case, engraved ID is valid, user account will be created at existing JMRC data base server and mail will be sent to user through existing web server for activation of user account.
- 1.3. After activation of account, the information will be updated in existing JMRC database server.
- 1.4. Now when user wants to do add value in his/her card, he /she will go to JMRC website, login into the system, select the option for payment (Debit card/Credit card/Net Banking/other options).
- 1.5. After selection, the user will make the payment through Payment Gateway. Now bank server will send this information (engraved id and add value amount) to existing JMRC AVM CC database server which will set the flag against this card.
- 1.6. Now user will go to any AVM installed at any JMRC station and show the card in front of Add value machine and press OK & this information will go to database server through online inquiry application.
- 1.7. The CSC physical id will be cross checked from database server & if any transaction is pending, AVM will do the Add value on the card & reset the flag.
- 1.8. AVM will send this transaction to CC1 and accordingly update the existing AVM CC.
- 1.9. The TR cum add value machine shall also be used as ticket reader to check the balance / validity of CSC and CST and last five transactions on CSC.
- 1.10. In offline mode, AVM should only perform the ticket enquiry function.

Appendix 6.1: CODES and STANDARDS:

Safety of information technology equipment, including electrical business equipment.	EN 60950-1:2006
Power Transformers	IEC 60076, EN 60076
Protection Class for Components	As specified for individual equipment in this PS.
Surge Protective Devices	IEC 61643 – 1
EMC – Immunity	IEC 60801, EN 60801
EMC – Emission	VDE 0875, IEC 60555, EN 60555
Electromagnetic compatibility Testing and Measurement Techniques	IEC 61000-4, EN 61000-4, BS EN 50121
RFI Suppression	EN55022A or VDE 0878
Level measuring systems utilizing ionising radiation with continuous or switching output	IEC 60982
Sound Level of Noise Source	ISO 3746, BS 4196–6
Flammability Tests	IEC 60707
Valve Regulated Sealed Lead Acid Rechargeable Single Cells	IRS: S93-96, DOT: TQ510G 92
Low-voltage Switchgear and Control gear Assemblies	IEC 60439 – 1, EN 60439–1
Low-voltage Switchgear and Control gear	IEC 60947, EN 60947, IEC947-3, IEC 60898 or EN 60898
Specification for contactors	IEC60947 – 4, EN 60947-4
Code of practice for Earthing	IEEE1100, NFPA 780, IEC1024
Transient Protection	MIL-STD-7041A

Lightning Protection	BS-6651
Quality	ISO9001
International Standard MPEG-4 Video	ISO/IEC 13818-2:2002 or later edition
Specification for Safety of Information technology equipment including electrical business equipment.	BS EN 60950-1:2006
Electromagnetic Compatibility (EMC) : Generic standards immunity for Industry environments.	BS EN 61326 (Annex A)
Specification for safety requirements for equipment to be connected to telecommunication networks.	BS EN 41003:1999
Safety requirements for electrical equipment for measurement, control & laboratory use. Part 1: General requirements.	BS 61010-1:2003/A2:1995
Secondary protectors for Communication Circuits.	Underwriters Laboratory safety std 497A

APPENDIX 12.1

Business Manual

No. JMRC/O&S/DO/Business Manual/2015

Date 02-04-2015

CORRECTION SLIP No. 01

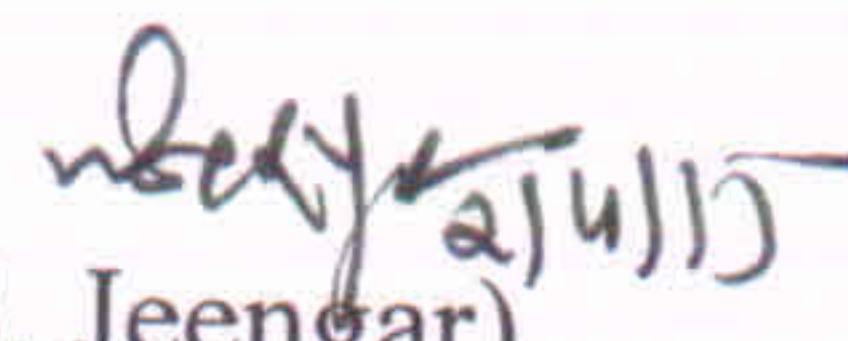
Sub.:- Business Manual for Fare Collection System, JMRC, 2015 (Ver:00).

Ref.:- 1. Director (O&S)'s U.O. Note No. JMRC/DO/General dated 05 & 21.03.15.
2. Minutes of 22nd Board Meeting issued vide letter dated 23.03.15.

1. Following typographical error indicated in the Business Manual for Fare Collection System of JMRC, issued in February, 2015 shall be corrected as under:-

SN	Para Number	Detail	Page No.
1	2.5 (v)	In last line, 13.5 (d) shall be read as 13.4 (d)	2
2	11.2.6 (c)	30 days shall be read as 90 days	15
3	11.3.1	In second line, 30 days shall be read as 90 days	15
4	11.3.4	In last line, 30 days shall be read as 90 days	15

2. Accordingly, all the custodian officials issued with the Business Manual shall take action as indicated in assurance & correction management chapter of the manual for ensuring & implementing the correction slip.


(C.S. Jeengar)

Director (Operations & Systems)

Copy to: PS to CMD, JMRC

DP, DF, DC, OSD (S&V), JMRC, DCP, Jaipur Metro

Executive Director/OP/RS/Tr./S&T, GM/ OP, S&T, Finance

JGM (Civil), DGM (S&T), Manager/ Commercial, OP, TO, Tele, EO/Finance

OCC, CSS, Commercial Inspector, Station Supdt-2 Nos.

All Station Controllers (9 nos.) and Commercial Cell (1 no.)

All 9 Stations with two CCC and two TOM office (9 x 4 = 36)



JAIPUR METRO

JAIPUR METRO RAIL CORPORATION LIMITED**Directorate of Operations & Systems**2nd Floor, RSIC Wing, Udyog Bhawan, Tilak Marg, C-Scheme, Jaipur-302005

Tel. No. 0141- 5192400 (O) & 5192401 (F), E-mail –dos.jmrc@gmail.com

No. JMRC/O&S/DO/Business Manual/2015

Date 30-06-15

CORRECTION SLIP No. 02**Sub.:- Business Manual for Fare Collection System, JMRC, 2015 (Ver:00).**

Ref.:- E-mail dated 20.06.2015 on addition of new Annexure:K-1.

1. It is noted that Annexure: K of the Business Manual for Fare Collection System, JMRC, 2015, indicating Shift Abstract Form (SAF) to be submitted by TOM Operator.

The responsibility for fare collection and levy of penalties etc. as per the Business Manual, JMRC is also handled by EFO Operator/ Customer Care Centre (CCC). Therefore, a separate Shift Abstract Form (SAF), Annexure: K-1 meant for EFO Operator/ CCC is provisionally approved for addition/ inclusion to Annexure: K. A copy of the Annexure: K-1 is attached herewith.

2. Similarly, following addition/ deletion are made in the Business Manual, JMRC as under:-
 - i) Addition: Group Booking – As per Clause (vii) of Notification on fare structure, JMRC dated 20.02.2015.
 - ii) Deletion: Annexure-K, [See Clause 2.5 (iv), 2.8.2 (b) & 3 (b)], with addition/ inclusion of Annexure: K-1.

SN	Para No.	Detail	Page No.
1	16 (addition)	Group Booking: It can be done if the group exceeds 20 people, on their request at a discount of 10% of total fare of the group.	24
2	Annexure-K (deletion)	[See Clause 2.5 (iv), 2.8.2 (b) & 3 (b)]	40

3. Accordingly, all the custodian officials issued with the Business Manual shall take action as indicated in assurance & correction management chapter of the manual for ensuring & implementing the correction slip.

Encl. Annexure: K-1

(Signature)
30/6/15
(C.S. Jeengar)

Director (Operations & Systems)

Copy to: PS to CMD, JMRC

DP, DF, DC, OSD (S&V), JMRC, DCP, Jaipur Metro

Executive Director/OP/RS/Tr./S&T, GM/ OP, S&T, Finance

JGM (Civil), DGM (S&T), Manager/ Commercial, OP, TO, Tele, EO/Finance

OCC, CSS, Commercial Inspector, Station Supdt-2 Nos.

All Station Controllers (9 nos.) and Commercial Cell (1 no.)

All 9 Stations with two CCC and two TOM office (9 x 4 = 36)



JAIPUR METRO RAIL CORPORATION

Issued to

Name of EFO Operator.....

Signature

Sr. No. COM

Imprest (Rs.)

Signature of SC
(With Date & Time)

JAIPUR METRO RAIL CORPORATION

SHIFT ABSTRACT FORM- SAF (EFO OPERATOR)-Annexure:K-1

[Refer Clause 2.5 (iv), 2.8.1 (b), 2.9 & 3 (b) of Business Manual]

Station Code	Month	Year	Sr. No.
			REV
TOM No.			
Duty to perform from			hrs. to

Date:-	
Name:-	
Designation:-	
Emp. No./File No.:-	
Imprest given to operate counter (In Rs.) (Y)	

Details of Stock

Item	Container No.	Qty. (A)	Qty. Sold (B)	Defective Tokens (C)	Refunded Tokens (D)	Cancelled Tokens (E)	Loose Tokens (F)	Quantity Returned (A-B+C+D+E+F)
CST								
CSC	Issued (Fresh)=	Sold=	Refunded=	Resold=	Return=	Fresh=	Refunded=	Defective=

Summary of Notes (Handed over to SC)

Denomination	No.	Amount
1000		
500		
100		
50		
20		
10		
5		
Coins		
Total		

END OF SHIFT RECEIPT NO.:

Serial No of Currency
Rs. 500/- & Rs. 1000/-

Summary of Sale			
Particulars	Quantity	Amount	
CST	Single Journey Token		
	Free Exit		
	Paid Exit		
CSC Sale			
Add Value			
Adjustments/ Surcharge			
Sub-Total(a)			
CSC	Refund		
	Cancel		
	Add Value Cancel		
	Manual Refund		
CST	Refund		
	Cancel		
	Manual Refund		
Payback Amount			
Sub Total (b)			
Group Booking			
Penalty			
Excess in Booking (EIB)			
MISC			
Sale of Forms			
Fraction Value Round Off			
Sub-Total (c)			
Net Amount (X) (X=a-b+c)			
Non Cash (POS)	CSC Sale		
	Add Value		
	Others		

Gross Amount handed over to SC (X+Y):

Remarks If any:

Signature of EFO Operator	
At Start of Shift	
At End of Shift	

Signature Of SC	
At Start of Shift	
At End of Shift	

Name			Emp. No				Shift Time=			
Sr. No.	ID of Fresh CSC Issued	Tick if Sold	CSC Refunded				Tick if Resold	ID of CSC Returned to SCR		
			ID	AFC Amt.	Actual Refund	Diff. (if Any)		Fresh	Refunded	Defected
1.										
2.										
3.										
4.										
5.										
6.										
7.										
8.										
9.										
10.										
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										
19.										
20.										
21.										
22.										
23.										
24.										
25.										
26.										
27.										
28.										
29.										
30.										
Total										

DETAIL OF REFUNDED CST'S					
Sr. No.	ENGRAVED ID	REASON	Sr. No.	ENGRAVED ID	REASON
1.			6.		
2.			7.		
3.			8.		
4.			9.		
5.			10.		

DETAIL OF DEFECTIVE CST'S & CSC'S					
Sr. No.	ENGRAVED ID	REASON	Sr. No.	ENGRAVED ID	REASON
1.			6.		
2.			7.		
3.			8.		
4.			9.		
5.			10.		

DETAILS OF INVALID/LOOSE CSC'S					
Sr. No.	ENGRAVED ID	REASON	Sr. No.	ENGRAVED ID	REASON
1.			6.		
2.			7.		
3.			8.		
4.			9.		
5.			10.		

DETAILS OF DECOY CHECK DONE DURING THE SHIFT									
TIME	CHECK BY	DESIG.	EMP. NO.	AS PER SHIFT		AS PER CHECK		MISMATCH IN CASH	SIGNATURE
				QTY.	AMT.	QTY.	AMT.		

REMARKS	
---------	--

No. JMRC/O&S/DO/Business Manual/2015

Date 07-10-15

CORRECTION SLIP No. 03

Sub.:-Group Booking.

Ref.:- Clause 16 of Business Manual for Fare Collection System, JMRC, 2015.

1. Detailed guidelines and procedure for group booking as cash collection of non-AFC items has been specified under Clause 16 of the Business Manual for Fare Collection System, JMRC, 2015 (Version: 00).
2. Even though, provision exists for handling group booking with AFC system. But, non-issuance of four foils of receipt by ticket office machine at Customer Care Centre restricts the extant procedure for the group booking from AFC system. S&T department to ensure that group booking features are enabled in the AFC system. For reconciliation of daily group booking with AFC system, the CC Operator at EFO shall ensure to deposit the cash collected through manual receipt with AFC system. A sample copy of deposit receipt and End of Shift report on group booking through AFC system is attached herewith.
3. Looking to above, following addition are made in **bold letters** in the Business Manual, JMRC as under:-

SN	Para No.	Detail	Page No.
1	16.4 (8) (Addition)	Record Foil: Within 30 minute of the validity time from hrs. indicated on the group ticket foils of group booking receipt book, deposit receipt of the group ticket shall also be generated through AFC system (EFO) by CC Operator, and same shall be pasted on back side of the same record foil of the group booking receipt book. This foil will be kept at the originating station permitting group booking.	25

4. Accordingly, all the custodian officials issued with the Business Manual shall take action as indicated in assurance & correction management chapter of the manual for ensuring & implementing the correction slip.

Encl. As above

(Signature) 07.10.15
(C.S. Jeengar)
Director (Operations & Systems)

Copy to: Executive Director/OP/RS/Tr./S&T, GM/ OP, S&T, Finance
JGM (Civil), DGM (S&T), Manager/ Commercial, OP, TO, Tele, EO/Finance
OCC, CSS, Commercial Inspector, Station Supdt-2 Nos.
All Station Controllers and Commercial Cell

Annexure To CORRECTION SLIP NO. 03
 Date 07.10.15
 Clause 16: GROUP BOOKING - Business manual
 JMRC

Max Stay Time : 07/10/2015 11:00:20
 Max Travel Time : 90 Min After Entry
 Transaction Time : 07/10/2015 11:40:19
 Station Code : 0101 (Nandavaram)
 Equipment ID : 0030
 Operator ID : 121365
 Operator Name : Kavitha Mehra

Travel Type : Group Ticket
 Departure : Knsaraovar
 Unit Price : Rs 13.50
 Travelers : 54
 Total Amount : Rs 729.00
 Destination : Chandpole

Administrative Handling
 No. 07102015-0000000473-0101-0030-0001

Station : 0101
 Equipment ID : 0030
 Agent ID : 121365
 Shift ID : 473
 Shift Start : 07/10/2015 10:39:40
 Shift End : 07/10/2015 10:48:41

Transaction		
CST Sale NonCash	0	0.00
CSC Sale NonCash	0	0.00
Activation	0	0.00
Multi AddValue	0	0.00
AddValue NonCash	0	0.00
Cancel NonCash	0	-0.00
Adjustment NonCash	0	0.00
*Other Deduct	80	80.00
TOTAL NONCASH	0	0.00
CST Sale	0	0.00
SV Sale	0	0.00
TCT Sale	0	0.00
Tourist Sale	0	0.00
Period Sale	0	0.00
1. TOTAL SALE	0	0.00
SV AddValue	0	0.00
TCT AddValue	0	0.00
2. TOTAL ADDVALUE	0	0.00
CST Refund	0	-0.00
CSC Refund	0	-0.00
TCT DeAct	0	-0.00
Tourist DeAct	0	-0.00
CSC Cancel	0	-0.00
3. TOTAL RFND/CNCL	0	-0.00
Adjustment	0	0.00
Act AutoTop-up	0	0.00
DeAct AutoTop-up	0	0.00
Admin Penalty	0	0.00
Admin Payback	0	-0.00
Free Exit Token	0	0.00
Paid Exit Token	0	0.00
Group Ticket	1	729.00
Lost/Stolen	0	0.00
CSC Unlock	0	0.00
Def Refund Request	0	0.00
4. TOTAL OTHER TRX	1	729.00
TOTAL CASH	1	729.00
SHIFT TOTAL	1	729.00

Stack Data

Items Remaining : 35

JAIPL

(In Nu...
 From...
 From...
 (In Num...
 1. Name
 2. Address



No. JMRC/O&S/DO/Business Manual/2015

Date 29-12-15

CORRECTION SLIP No. 04

Sub.-Group Booking and Penalties.

Ref.:- 1. Clause 16 and 17 of Business Manual for Fare Collection System, JMRC, 2015.

2. Correction Slips No. 2 and 3 dated 30.06.15 and 07.10.2015.

1. Presently, group booking and levy of penalties are manually exercised through printed money value books as per Clause 16 and 17 of the Business Manual for Fare Collection System, JMRC.
2. The AFC system is working satisfactorily since last 7 months of passenger operation of Jaipur Metro. It is noted that the Automatic Fare Collection (AFC) system, JMRC has features for handling group booking and levy of penalties through it.
3. In order to avoid manual intervention & usage of printed money value books and to introduce paperless working and online accountal features of the AFC system for the group booking and penalties to be levied, the existing Clause 16: Group Booking (at page 24 and 25) and Clause 17: Penalties (at page 26) of the Business Manual for Fare Collection System is revised as per the detail given below:

16 Group Booking: Group Booking can be done if number of people in a group are in between 21 to 100. If number of people are more than 100 then group shall be splitted into two or more as per the size of the group.

16.1 Normally, first and/or last coach of a metro train is identified for travel of the group from originating to terminating station. Depending upon the occupancy/ waiting passengers on platform of the originating station, the group may be accommodated in the next trains.

16.2 Normally, the group booking ticket shall be issued through AFC system only on request of the group leader at a discount of 10% of total fare of the journey to be undertaken by the group. Access of the group into the paid area will be through side gate. Concerned SC/ CRA will ensure proper entry/ exit of the group through side gate. Time limit for single journey (one side) will be 90 minutes.

16.3 Once issued, refund (partial/ full) of Group Booking is not applicable, except in emergency and incident fare modes as specified in clause 13.4 of this Manual.

16.4 Return or extension of journey for Group Booking is not permissible.

16.5 Procedure for Group Booking: Following procedure is to be followed for proper account of Group Booking : -

- i. The Group Ticket will be issued through Customer Care Centre. The CC Operator/ Station Controller shall open the side gate for entry of the group as per the group booking receipt and after that return the ticket to the group leader.
- ii. Station Controller of the originating station of the group booking shall inform the Station Controller of the destination station, about the group booking.
- iii. On duty Station Controller or his authorized representative of the destination station, shall be ready in advance to open the side gate and allow same number of passengers to exit as per the group booking receipt, and after that return the ticket to the group leader.
- iv. Station Controller of the Originating Station will keep the group booking record in a concise list on format as per Annexure- F, and forward the daily detail to Revenue/ Commercial Cell.

17 Penalties:

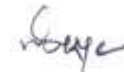
17.1 Normally, all the penalties shall be levied through AFC system only.

17.2 Penalties to be levied are as per Appendix-I or otherwise specifically mentioned in this manual.

17.3 Procedure order for flying squad

- i. If any passenger is caught with unauthorized ticket by the flying squad, they will seize the unauthorized ticket (for CST). When the passenger reaches his destination station, paid exit token shall be issued to the passenger after levying penalty as per Sr. No. 6 of Appendix-I.
 - ii. In case of unauthorized CSC, member of flying squad team will take the passenger to the nearest station EFO and the passenger will be penalized as per Sr. No. 6 of Appendix-I.
 - iii. After completion of flying squad duties, the collected unauthorized tickets shall be deposited by the flying squad at Mansarovar station on the same day.
4. Accordingly, all the custodian officials issued with the Business Manual shall take action as indicated in assurance & correction management chapter of the manual for ensuring & implementing the correction slip.
5. The **Group Booking and Penalties to be levied through the AFC system**, as per the Correction Slip No. 4 is to be implemented w.e.f. 01.01.2016 onwards, till further orders.

Encl. Appendix-I as above.



(C.S. Jeengar)
Director (Operations & Systems)

Copy to: Executive Director/OP/RS/Tr./S&T, GM/ OP, S&T, Finance
JGM (Civil), DGM (S&T/ Commercial), Manager/ OP, TO, Tele & AFC, EO/Finance
OCC, CSS, TIA, CRI, Station Supdt-2 Nos.
All Station Controllers and CC Operators

Appendix-I

JAIPUR METRO RAIL CORPORATION

(See Clause 17.2)

<u>OFFENCES AND PENALTIES TO BE LEVIED FOR EACH OFFENCE FROM EACH OFFENDER</u>					
SN	AS PER METRO RAILWAYS (O&M) ACT, 2002		PENALTIES TO BE LEVIED AS PER AFC SYSTEM		
	OFFENCE	SECTION	CODE	DISPLAY AT EFO AND RECEIPT	AMT. (RS.)
1	Drunkness or nuisance or act of indecency of interfering in any way with the comfort of any passenger of metro railway	59 (1)	29	59 (1)-Nuisance/Indecency	200
2	Taking or causing to take offensive material upon metro railway	60 & 30 (1)	38	60/30(1)-Offensive material	200
3	Demonstration on any kind and pasting posters, writing or drawing anything in the compartment, carriage or premises	62	30	62-Demonstration	500
4	Travelling on roof, etc., of a train	63	31	63-Travelling on roof	50
5	Unlawfully entering or remaining upon metro railway even when requested to leave	64 (1)	40	64(1)-Unlawful entry	200
6	Walking on metro track without lawful authority	64 (2)	41	64(2)-Walking on metro track	200
7	Obstructing, running of train, etc., by squatting, picketing or interfering in any manner	67	42	67-Obstructing train	2000
8	Obstructing metro railway official in his duties	68	39	68-Obstructing official	500
9	Travelling without proper pass or ticket or beyond authorised distance	69	15	69-Invalid ticket	50 plus max. fare
	Travelling beyond authorised distance		16	69-Over travelling	Difference of fare
10	Interfering with means of communication in a train or misuse of alarm bell of the train	70	32	70-Misuse of Communication	500
11	Defacing or pulling down public notices put up by metro railway	72	33	72-Defacing Public Notices	200
12	Unauthorized sale of articles on metro railway train or premises	73	34	73-Unauthorized article sale	500
13	Unauthorized sale of tickets	75	35	75-Unauthorized ticket sale	200
14	Endangering safety of persons travelling by metro railway by rash or negligent act or omission	77	36	77-Endangering safety	500
15	Making a false claim for compensation from metro railway administration	80	37	80-False compensation claim	500
16	Lost of SV-4 Duty Card	NA	43	SV4/SV8/Login ID lost	100
17	Lost of SV-8 Card				
18	Loss of Login ID Card				
19	Tailgating	NA	22	Illegal Entry	50 plus max. fare
			23	Illegal Exit	
20	Carry away token	NA	20	Carry away token	50
21	Any other	NA	44	Others	To be notified

Note: Except Sr. No. 9, 19 & 21 all other penalty amounts are fixed and non-editable, till further orders.

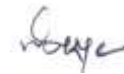
No. JMRC/O&S/DO/Business Manual/2015**Date 19-01-16****CORRECTION SLIP No. 05****Sub.:- Carriage of goods or luggage in Jaipur Metro.**

Ref.:- Notification No. JMRC/O&S/DO/O&M Rules/MoUD/2015 dated 19.01.2016.

1. While considering passengers suggestions and to enhance the ridership of Jaipur Metro, Jaipur Metro Rail Corporation (JMRC) has decided to revise the provisions on carry of luggage by a passenger in Jaipur Metro vide above referred notification dated 19.01.2016.
2. Accordingly, following corrections are to be incorporated in the Business Manual, JMRC, 2015.

Clause/ Title	Page	Existing	To be corrected/ replaced as
10/ Luggage Limit	14	Luggage up to a maximum weight of 15 Kg and dimensions of upto 60cms (length) X 45 cms (breadth) X 25 cms (height) is permitted, except with the prior approval of JMRC	While travelling in Jaipur Metro, a passenger may carry with him one or more baggage not exceeding 25 kilograms in total gross weight and no baggage exceeding 100 cm x 60 cm x 30 cm in size, except with the prior approval of JMRC

3. Accordingly, all the custodian officials issued with the Business Manual shall take action as indicated in assurance & correction management chapter of the manual for ensuring & implementing the correction slip.
4. The luggage limit as per the Correction Slip No. 5 is to be implemented with immediate effect, till further orders.



(C.S. Jeengar)

Director (Operations & Systems)

Copy to: Executive Director/OP/RS/Tr./S&T, GM/ OP, S&T, Finance

JGM (Civil), DGM (S&T/ Comm.), Manager/ OP, TO, Tele & AFC, EO/Finance

OCC, CSS, TIA, CRI, Station Supdt-2 Nos.

All Station Controllers and CC Operators



JAIPUR METRO

JAIPUR METRO RAIL CORPORATION LIMITEDRoom No. 205, 2nd Floor, Admin Building, Mansarovar Depot,
Bhrigu Path, Mansarovar, Jaipur -302020

Tel. No. 0141- 5153700 (O) & 5153701 (F), E-mail – dos.jmrc@gmail.com

No. JMRC/O&S/DO/Business Manual/2015**Date 28-03-16****CORRECTION SLIP No. 06****Sub.:- Introduction of Peak Hours and Off-peak Hours Fare.**

Ref.:- (i) Notification No. F7(C-23)JMRC/Fare Matrix/2013 dated 28.03.2016.

(ii) Business Manual for Fare Collection System, JMRC, Revision: 00 of February, 2015, upto correction Slip No. 05 dated 19.01.2016.

- (1) Based on the pattern of actual ridership data and other relevant factors, the management of JMRC has decided to introduce Peak Hours and Off-peak Hours Fare with effect from 01.04.2016, vide notification under reference (i).
- (2) Therefore, following corrections are incorporated in the Business Manual for Fare Collection System, JMRC, 2015 (updated with Correction Slip No. 05 dated 19.01.2016) through this Correction Slip No. 06:-

Clause/ Title	Page	Existing	To be corrected/ replaced as
I	1	<p>Business Day Hours</p> <ul style="list-style-type: none"> • From 05:00 Hrs to 23:00 Hrs. • The Metro Administration may from time to time decide to divide the business day hours into peak hours and off- peak hours, depending upon its assessment of the ridership patterns and other relevant factors. 	<p>Business Day Hours</p> <ul style="list-style-type: none"> • From 05:00 Hrs to 23:00 Hrs. <p>(i) The Metro Administration may from time to time decide to divide the business day hours into peak hours and off- peak hours, depending upon its assessment of the ridership patterns and other relevant factors.</p> <p>(a) The Peak Hours and Off-peak Hours Fare has been first time introduced from 01.04.2016 vide Notification No. F7(C-23)JMRC/Fare Matrix/2013 dated 28.03.2016 (copy attached).</p> <p>(b) Entry time reckoned at the AFC gate with valid ticket of that metro station shall decide the applicability of Off-peak Hours Fare and Peak Hours Fare.</p> <p>(c) However, purchase time of the Group Ticket from AFC System i.e. at Customer Care Centre (CCC) shall decide applicability of Off-peak Hours Fare or Peak Hours Fare.</p>

			(d) A transition time of total 5 minutes, 4 minutes prior and 1 minute after introduction of the Off-peak Hours to Peak Hours or vice versa is allowed as system resetting time for TOM only. The TOM Operators at ticket offices and CCCs shall refrain from selling tokens and/or to perform any kind of transactions during the period.
			(e) Normally, passengers purchasing tokens within 10 minutes prior to introduction of Peak Hours Fare from TOM/TVM/ CCC shall be warned/ counselled that they have to enter in paid area of that station using its AFC entry gates before introduction of the Peak Hours. Otherwise, their unused tokens shall be refunded by the CCC Operator at full amount and they will be required to purchase new tokens of applicable Peak Hours Fare.
2.2.2	2	The maximum number of Token, which is to be issued by the operator to a passenger, is six.	The maximum number of Token, which is to be issued by the TOM/ TVM/ CCC at a time, to a passenger, is six.
2.3	2	Electronic Validity of tokens - The token shall be valid for use within 30 minutes from the sale time on the Business Day of purchase only.	Electronic Validity of tokens - The token shall be valid for use within 30 minutes from sale time on the Business Day of purchase only, except for the tokens purchased with Off-peak Hours Fare and use them at the entry AFC gates of that station during applicability of Peak Hours Fare.

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2.5 II	2	<p>The refund of an unused Single Journey Token is permissible within same business day of issuing of token from token issuing station only, subject to passenger still being in unpaid area</p>	<p>(a) The refund of an unused Single Journey Token is permissible within same business day of issuing of token from token issuing station only, subject to passenger still being in unpaid area.</p> <p>(b) A passenger holding token with Off-peak Hours Fare shall not be allowed to enter during Peak Hours through the AFC entry gates in paid area of that station. The unused token shall have to be refunded at full amount only from CCC and shall not be adjusted.</p> <p>(c) However, if CCC Operator still adjust it, system will not allow the passenger to enter in paid area of that station with the adjusted token, and the outstanding thereof shall only be bear by the CCC Operator.</p>
2.7 II	3	<p>Under fare (Error Code-31): Once a patron has purchased a token/ticket for any destination, he is authorized to travel to any destination in the direction of his travel in terms of JMRC operational Guidelines. If in the direction of travel, he oversteps his journey beyond the destination for which he has paid the fare, he will have to pay additional fare of the overstepped distance only. CCC Operator will do adjustment in the same token/ticket. However, if he is caught trying to exit the gate (tailgating, jumping over the gate etc) without paying the difference of fare, he will be liable to pay excess fare of Rs 50/- in addition to difference in fare of the overstepped distance.</p>	<p>Once a patron has purchased a token/ticket for any destination, he is authorized to travel to any destination in the direction of his travel, in terms of JMRC operational Guidelines. If in the direction of travel, he oversteps his journey beyond the destination for which he has paid the fare, he will have to pay additional fare of the overstepped distance only, and the additional fare for this overstepped journey shall be the difference of maximum fare of the system (i.e. of peak hours) minus the fare already paid. Accordingly, CCC Operator will do adjustment in the same token/ticket. However, if he is caught trying to exit the gate (tailgating, jumping over the gate, carry away token, etc) without paying the difference of fare, he will be liable to pay excess fare of Rs 50/- in addition to difference of maximum fare of the system (i.e. of peak hours) minus the fare already paid.</p>

July

2.9	4	The loose tokens collected through Refund/MAC Error in entire of the Business Day will be added to Station Stock in the night before start of next Business Day.	The loose tokens collected through Refund in entire of the Business Day will be added to Station Stock in the night before start of next Business Day.
3	4	If a passenger is found without valid ticket in paid area of a station, the passenger shall be permitted to exit using Paid Exit Token. In this case, the cost of the Paid Exit Token shall be equal to sum of excess charge of Rs 50/- and Maximum Fare of the System.	If a passenger is found without valid ticket in paid area of a station, the passenger shall be permitted to exit using Paid Exit Token. In this case, the cost of the Paid Exit Token shall be equal to sum of excess charge of Rs 50/- and Maximum Fare of the System i.e. of peak hours.
4 (b)	4	If the passenger having token with 'MAC Error (Error Code 167)' of proper fare at exit point	This clause to be deleted.
4 (e)	4	The reason for issue of 'Free Exit Token' must be mentioned on penalty register.	The reason for issue of 'Free Exit Token' must be mentioned on Free Exit/ Surcharge Register.
5.3	5	Sale of Smart Cards: - Contactless Smart Cards can be sold from CCCs/Nominated TOMs and pre-activated Smart Cards can be further sold by Authorized Outlets specially permitted by JMRC.	Sale of Smart Cards:- Contactless Smart Cards shall be sold only from unpaid area of CCCs/Nominated TOMs and pre-activated Smart Cards can be further sold by Authorized Outlets specially permitted by JMRC.
6.8	6	Refund of Store Value Smart Cards: - The Smart Cards can be refunded from CCC only.	Refund of Store Value Smart Cards: - The Smart Cards shall be refunded only from unpaid area of CCC.
6.8.26 (I)	8	Refunded CSC shall not be re-sold on same day	Refunded CSC shall be re-sold only after re-initialization.
See Clause 17.2 (Appendix-I) C.S. No. 4	26	(See Clause 17.2) SN 9: Penalties to be levied as per AFC System: Code 15 & 16 Amt (Rs) Code 15 (69 – Invalid ticket) Amt (Rs) 50 plus max. fare. Code 16 (69 – Over travelling) Amt (Rs) difference of fare	(See Clause 17) Code 15 (69 – Invalid ticket) Amt (Rs) 50 plus maximum fare of the system (i.e. of peak hours). Code 16 (69 – Over travelling) Amt (Rs) Difference of maximum fare of the system (i.e. of peak hours) minus the fare already paid.

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	SN 19 Tailgating Amt (Rs) 50 plus max. fare	SN 19 Tailgating, jumping over the gate, carry away token, etc. Amt (Rs) 50 plus maximum fare of the system (i.e. of peak hours).
	SN 20 Carry away token	SN 20 – TO BE DELETED

- (3) Accordingly, all the custodian officials issued with the Business Manual shall take action as indicated in assurance & correction management chapter of the manual for ensuring & implementing the correction slip.

(Signature)
(C.S. Jeengar)

Director (Operations & Systems)

Encl. Updated Appendix-I (See Clause 17) on offences and penalties to be levied for each offence from each offender.

Copy to: PS to CMD, DF – for kind information to CMD & DF

All EDs/ GMs/ JGMs/ DGMs/ Managers/ SSs/ Station Controllers

CHC, TIA, CRI of O&S directorate

All Station Controllers to ensure assurance of the correction slip from all CRAs, CCC Operators, TOM Operators and TVM facilitators.

JAIPUR METRO RAIL CORPORATION

(See Clause 17)

OFFENCES AND PENALTIES TO BE LEVIED FOR EACH OFFENCE FROM EACH OFFENDER					
SN	AS PER METRO RAILWAYS (O&M) ACT, 2002		PENALTIES TO BE LEVIED AS PER AFC SYSTEM		
	OFFENCE	SECTION	CODE	DISPLAY AT EFO AND RECEIPT	AMT. (RS.)
1	Drunkenness or nuisance or act of indecency of interfering in any way with the comfort of any passenger of metro railway	59 (1)	29	59 (1)-Nuisance/Indecency	200
2	Taking or causing to take offensive material upon metro railway	60 & 30 (1)	38	60/30(1)-Offensive material	200
3	Demonstration on any kind and pasting posters, writing or drawing anything in the compartment, carriage or premises	62	30	62-Demonstration	500
4	Travelling on roof, etc., of a train	63	31	63-Travelling on roof	50
5	Unlawfully entering or remaining upon metro railway even when requested to leave	64 (1)	40	64(1)-Unlawful entry	200
6	Walking on metro track without lawful authority	64 (2)	41	64(2)-Walking on metro track	200
7	Obstructing, running of train, etc., by squatting, picketing or interfering in any manner	67	42	67-Obstructing train	2000
8	Obstructing metro railway official in his duties	68	39	68-Obstructing official	500
9	Travelling without proper pass or ticket or beyond authorised distance	69	15	69-Invalid ticket	50 plus maximum fare of the system (i.e. of peak hours)
	Travelling beyond authorised distance		16	69-Over travelling	Difference of maximum fare of the system (i.e. of peak hours) minus the fare already paid
10	Interfering with means of communication in a train or misuse of alarm bell of the train	70	32	70-Misuse of Communication	500
11	Defacing or pulling down public notices put up by metro railway	72	33	72-Defacing Public Notices	200
12	Unauthorized sale of articles on metro railway train or premises	73	34	73-Unauthorized article sale	500
13	Unauthorized sale of tickets	75	35	75-Unauthorized ticket sale	200
14	Endangering safety of persons travelling by metro railway by rash or negligent act or omission	77	36	77-Endangering safety	500
15	Making a false claim for compensation from metro railway administration	80	37	80-False compensation claim	500
16	Lost of SV-4 Duty Card	NA	43	SV4/SV8/Login ID lost	100
17	Lost of SV-8 Card				
18	Loss of Login ID Card				
19	Tailgating, jumping over the gate, carry away token, etc.	NA	22	Illegal Entry	50 plus maximum fare of the system (i.e. of peak hours)
			23	Illegal Exit	
20	Any other	NA	44	Others	To be notified

Note: Except Sr. No. 9, 19 & 20 all other penalty amounts are fixed and non-editable, till further orders.

No. JMRC/O&S/DO/Business Manual/2015

Dated: 02-06-2016

CORRECTION SLIP No. 07

Sub.- Manual Refund of Unreadable Smart Cards (URC) cases.

Ref:- Clause 6.8.5 to 6.8.17 and Clause 15 of the Business Manual for Fare Collection System, JMRC, Revision: 00 of February, 2015, upto C.S. No. 06.

- (1) It is noted that during the first 10 months of operation of Jaipur Metro (June, 15 to March, 16), hardly 10% of total passengers travelled by Smart Cards, which is a lowest figure for any metro in India. While analyzing it, one of the reason for poor patronage to use of Smart Cards was found that as many as 1166 cards have been returned by the passengers at Customer Care Centres of metro stations, being found electronically unreadable but physically OK i.e. Unreadable Smart Cards (URC).

Even though the URC cases were purely on administrative account, but the procedure stipulated in the Business Manual, JMRC to refund of such cards to the patron causes inordinate delay, and in turn it discourage the usage of Smart Cards by the passengers.

- (2) Thus for ease of doing business and to arrange refund of URC to the patron within 30 minutes, if he is willing to wait for it, following corrections are incorporated in the Business Manual for Fare Collection System, JMRC, 2015 (updated with Correction Slip No. 06 dated 28.03.2016) through this Correction Slip No. 07:-

Clause	Page	Existing	To be corrected/replaced as
6.8.7	7	The CCC operator will give proper receiving of the card to passenger in "Unreadable Card Receipt Book" (Annexure-B) duly filling all columns.	The CCC operator will give proper receiving of the card to passenger in "Unreadable Card Receipt Book" (Annexure-B) duly filling all columns. CCC operator shall mark validity of refund as "Refund will be entertained within 90 days from the date of submission of the URC" on all foils of Unreadable Card Receipt Book.
6.8.8	7	After end of shift the CCC operator will submit Unreadable Cards with details to on duty Station Controller. On duty Station Controller will cross verify the status of physical condition of card. Station Superintendent will be final authority to declare the physical Condition of Unreadable card.	On duty Station Controller will cross verify the status of physical condition of card. Station Controller / Station Superintendent will be final authority to declare the physical Condition of Unreadable card.
6.8.13	7	The summary (Annexure-A) of the visible ID Unreadable Cards will be segregated by physical condition i.e. physical OK or Damaged have to be submitted on periodic basis (01-10, 11-20 & 21-31) within five days after period ends to the Revenue/Commercial Cell.	The summary (Annexure-A) of the visible ID Unreadable Cards will be segregated by physical condition i.e. physical OK or Damaged have to be submitted on periodic basis (01-10, 11-20 & 21-31), with physical submission of URC within five days after the period ends to Revenue/Commercial Cell.



Clause	Page	Existing	To be corrected/replaced as
6.8.15	8	System analyst/ Manager (Tele & AFC) will analyze the detail of Unreadable Cards and certify the remaining refundable value of Smart Card after receiving the card in physical form & report shall be given to Revenue/ Commercial Cell.	System analyst/ Manager (Tele & AFC) / Authorized AFC staff will analyze the detail of the Unreadable Cards mailed by the Station Controller , and certify the remaining refundable electronic value of Smart Card & reply report of the URC by mail to the Station Controller with his personal details (Name and EID) . After receiving the card in physical form, AFC Cell shall submit periodical consolidated report to Revenue/ Commercial Cell.
6.8.16	8	Within four working days of the online submission of Unreadable Cards details, the refundable value of Unreadable Cards will be uploaded on JMRC Website. In case the reply is not found on the given web address, the same should be reported to Revenue/Commercial Cell immediately.	Within 30 minutes of the online submission of Unreadable Cards details i.e. URC Foil No. & Engraved ID of the CSC through mail with telecom message by the Station Controller , the AFC Cell shall certify the remaining refundable electronic value of the Unreadable Card by return mail with telecom message to the Station Controller with his personal details (Name and EID) .
15	24	<u>Manual Refund of Unreadable Smart Cards:</u> In accordance to Clause 6.8.5 to 6.8.10, following procedure should be followed for proper accountal of Manual Refund in system: -	<u>Manual Refund of Unreadable Smart Cards:</u> In accordance to Clause 6.8.5 to 6.8.10, following procedure should be followed for proper accountal of Manual Refund in system: -
		<ol style="list-style-type: none"> 1. The receipt book of Manual Refund will be kept in Station Control Room. 2. On duty Station Controller on behalf of Station Superintendent is authorized to refund after making proper entries in Manual Refund Receipt Book. No staffs below the rank of on duty Station Controller is authorized to make refund of Unreadable Cards. 3. It is mandatory to mention address and phone number of passenger on receipt foil. While filling receipts, good quality carbon should be used. Incomplete foils will attract disciplinary action against errant staff. 4. Receipt book is having three foils (Finance Foil, Record Foil & Passenger Foil). 5. Finance Foil: This foil will be submitted to Finance at the End of Every Month, through Revenue/ Commercial Cell along with Balance Sheet & Returns. 	<ol style="list-style-type: none"> 1. The receipt book of Manual Refund will be kept in Station Control Room. 2. On duty Station Controller on behalf of Station Superintendent is authorized to refund after making proper entries in Manual Refund Receipt Book. No staffs below the rank of on duty Station Controller is authorized to make refund of Unreadable Cards. 3. It is mandatory to mention address and phone number of passenger on receipt foil. While filling receipts, good quality carbon should be used. Incomplete foils will attract disciplinary action against errant staff. 4. Receipt book is having three foils (Finance Foil, Record Foil & Passenger Foil). 5. Finance Foil: This foil will be submitted to Finance at the End of Every Month, through Revenue/ Commercial Cell along with Balance Sheet & Returns.

Clause	Page	Existing	To be corrected/replaced as
		<p>6. Record Foil: This foil will be kept at respective station granting Manual Refund.</p> <p>7. Passenger Foil: - This foil will be given to passenger after refund of amount and taking proper signature at nominated space.</p> <p>8. Refund of Unreadable CSC is only possible from the same station where it was originally submitted and after producing Unreadable Receipt Memo.</p> <p>9. Station Controller will refund the Amount after judging the genuineness of the passenger and as per details of Balance of unreadable CSC.</p> <p>10. After refund, Station Controller will issue Passenger Copy of Refund Memo and collect the Unreadable Receipt Memo from passenger.</p>	<p>6. Record Foil: This foil will be kept at respective station granting Manual Refund.</p> <p>7. Passenger Foil: - This foil will be given to passenger after refund of amount and taking proper signature at nominated space.</p> <p>8. Refund of Unreadable CSC is only possible from the same station where it was originally submitted and after producing Unreadable Receipt Memo.</p> <p>9. Station Controller will refund the Amount after judging the genuineness of the passenger and as per details of Balance of unreadable CSC.</p> <p>10. Then, a system generated refund receipt (In Administrative Handling - Other Payback option) shall be taken out by the Station Controller/ CCC Operator. Station Controller/ CCC Operator will fill Unreadable card detail in patron name mentioning Unreadable CSC No./ Unreadable Receipt Memo No. (example: xxxxxxxxxxxx/ URC Foil xxxx). After refund, Station Controller will issue Passenger Copy of Refund Memo and collect the Unreadable Receipt Memo from passenger.</p>
		<p>11. Unreadable Receipt Memo should be kept in Station Record duly mentioning amount, Refund Memo receipt number and date of refund. The unreadable Receipt Memo will be pasted on the back of Record foil of Manual Refund Memo foil.</p>	<p>11. Unreadable Receipt Memo should be kept in Station Record duly mentioning amount, Refund Memo receipt number and date of refund. The Unreadable Receipt Memo, AFC reply mail and System generated receipt will be pasted on the back of Record foil of Manual Refund Memo foil duly mentioning system generated receipt no. and Station Controller Name & EID.</p>
		<p>12. In case of cancellation of Receipt Foil, Station Superintendent will personally give remarks on all the foil. The finance copy and passenger copy shall be sent to Revenue/ Commercial Cell with balance sheet.</p>	<p>12. In case of cancellation of Receipt Foil, Station Superintendent will personally give remarks on all the foil. The finance copy and passenger copy shall be sent to Revenue/ Commercial Cell with balance sheet.</p>
		<p>13. Station Superintendent will prepare a concise list of Manual Refunded in format enclosed at Annexure-E, and sent to Revenue/ Commercial Cell at the end of every month along with Balance Sheet and through E-Mail.</p>	<p>13. Station Superintendent will prepare a concise list of Manual Refunded in format enclosed at Annexure-E, and sent to Revenue/ Commercial Cell at the end of every month along with Balance Sheet and through E-Mail.</p>

Signature

Clause	Page	Existing	To be corrected/replaced as
		14. Station Superintendent will ensure that no staff below Station Controller should grant manual refund to the passenger	<p>14. Station Superintendent will ensure that no staff below Station Controller should grant manual refund to the passenger.</p> <p>15. For the new arising cases for refund of URC shall commence after 45 minute start of revenue service and end before 45 minutes of revenue service, respectively.</p> <p>16. If the refund is not collected by the claimant within 90 days from the date of its submission at CCC of the station, the electronic balance and security deposits (if any) shall be forfeited & later on no claim for any refund will be entertained.</p> <p>17. However, past URC cases till 31st May 2016 shall be refunded to the claimants upto 31st August 2016. After that, its electronic balance and security amount (if any) shall be forfeited.</p> <p>18. Station Controller will mark "Amount Forfeited" in Unreadable Card Detail Register for the cases which are more than 90 days old. Any refund of URC beyond 90 days by the Station Controller shall be his cost.</p>

(3) Accordingly, all the custodian officials issued with the Business Manual shall take action as indicated in assurance & correction management chapter of the manual for ensuring & implementing the correction slip.

(Signature)
21/6/16

(C.S. Jeengar)

Director (Operations & Systems)

Copy to: PS to CMD, DF – for kind information to CMD & DF.

All EDs/ GMs/ JGMs/ DGMs/ Managers/ SSs/ Station Controllers.

CHC, TIA, CRI of O&S directorate.

All Station Controllers to ensure assurance of the correction slip from all CRAs, CCC Operators, TOM Operators and TVM facilitators.



No. JMRC/O&S/DO/Business Manual/2015

Dated: 01-03-2017

CORRECTION SLIP No. 08**Sub.:- No cash-out or refund of Multi Purpose Store Value Smart Card (SV-1).**


Ref.:- Clause 6.6.2 and 6.8.1 to 6.8.4 of the Business Manual for Fare Collection System, JMRC, Revision: 00 of February, 2015 (upto Correction Slip No. 07).

- (1) In pursuant to the guidelines issued on Prepaid Payment Instrument (PPI) for Mass Transit Systems by Reserve Bank of India on 09.07.15, cash-out or refund will not be permitted from the PPI, herein Multi Purpose Store Value Smart Card (SV-1) operative in Jaipur Metro Rail Corporation.
- (2) Accordingly, the guidelines are to be implemented in JMRC as follows:
 - i) the Smart Cards (SV-1) sold w.e.f. 1st April, 2017 onwards shall be non-refundable only;
 - ii) the present Smart Cards (SV-1) in circulation will also become non-refundable w.e.f. 1st April, 2017. The passengers are given a sunset period from 2nd March till 31st March, 2017, during which the passengers, if they so desire, may take refund of their Smart Cards (SV-1) from the Metro Stations as per existing procedure in vogue;
 - iii) for both, new card sold from 1st April, 2017 and existing card converted to non-refundable from 1st April, 2017, only security deposit after deduction of relevant charges, shall be returned on surrender of the card;
 - iv) corrections as below are hereby incorporated **w.e.f. 01.04.2017** in the Business Manual for Fare Collection System, JMRC, 2015 (updated with Correction Slip No. 07) through this Correction Slip No. 08:-

Clause	Page	Existing	To be corrected/replaced as
6.6.2	7	If no add value is done during validity period, then at the end of validity the card will not work and shall be refunded or revalidated (if permitted by system in future).	If no add value is done during validity period, then at the end of validity the card will not work and neither electronic balance nor the security deposit shall be returned.
6.8.1	7	Refund of Electronically Readable Store Value Smart Cards: - During refund, processing charges of Rs. 25/- will be charged from the electronic balance. If because of this, the electronic balance becomes negative the same will be adjusted from the security deposit. Thus, the Electronic Balance plus Security Deposit minus Rs. 25/- will be refundable.	Refund of Electronically Readable Store Value Smart Cards: - The electronic balance in the smart card shall not be refunded. If, the electronic balance is negative, if any, the same will be adjusted from the Security Deposit of Rs. 50/-. During refund, processing charges of Rs. 25/- will be charged from the balance security deposit. Therefore, maximum upto Rs. 25/- will be refundable

6.8.2	7	Refund of physically damaged but Electronically Readable Store Value Smart Cards: - During refund, entire security deposit will be forfeited, although no processing charges of Rs. 25/- will be chargeable. Hence, the electronic balance will be refundable in full.	Refund of physically damaged but Electronically Readable Store Value Smart Cards: - During refund, entire security deposit of Rs. 50/- will be forfeited, and remaining electronic balance in the smart card also shall not be refunded. However, a fresh card shall be issued to the passenger as per Clause 6.1 (Issue of Store Value Smart Card), Clause 6.2 (Add value operation) and Clause 6.3 (Total maximum possible store value) by adjusting the said remaining electronic balance and difference amount, if any, shall be charged from the passenger.
6.8.3	7	Physically damaged and Electronically Unreadable Store Value Smart Cards:- No refund of security deposit and electronic balance, if any	No change
6.8.4	8	Refund of Physically OK but Electronically Unreadable Store Value Smart Cards:- Full electronic balance amount including security deposit will be refundable.	Refund of Physically OK but Electronically Unreadable Store Value Smart Cards:- Electronic balance in the smart card shall not be refunded. However, a fresh card shall be issued to the passenger as per Clause 6.1 (Issue of Store Value Smart Card), Clause 6.2 (Add value operation) and Clause 6.3 (Total maximum possible store value) by adjusting the said electronic balance plus security deposit, and the difference amount, if any, shall be charged from the passenger.

Accordingly, all the custodian officials issued with the Business Manual shall take action as indicated in assurance & correction management chapter of the manual for ensuring & implementing the correction slip.


 (C.S. Jeengar)
 Director (Operations & Systems)

Copy to: PS to CMD, DF – for kind information to CMD & DF.
 All EDs/ GMs/ JGMs/ DGMs/ Managers/ SSs/ Station Controllers.
 CHC, TIA, CRI of O&S directorate.
 All Station Controllers to ensure assurance of the correction slip from all CRAs/ CCC Operators.



JAIPUR METRO

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No. JMRC/O&S/DO/Business Manual/2015

Dated: 05-07-2017

CORRECTION SLIP No. 09**Sub.: Refund of Tourist Cards (Smart Cards with unlimited rides).**

Ref.: 1. Correction Slip No. 08 dated 01.03.2017.
2. Clause 8.2 of the Business Manual for Fare Collection System, JMRC, Revision: 00 of February, 2015 (upto Correction Slip No. 08).

- (1) Vide Correction Slip under reference-1, it has been stipulated that after expiry of validity period, the multi-purpose store value smart card (SV-1) will not work and neither electronic balance nor the security deposit shall be returned.
- (2) On the similar stipulation of multi-purpose store value smart card (SV-1), after expiry of validity of one or three business day tourist card, these invalid card shall also not work and the security amount is not to be refunded.
- (3) Accordingly, following correction in clause 8.2 in the Business Manual for Fare Collection System, JMRC, 2015 (updated with Correction Slip No. 08) through this Correction Slip No. 09 are hereby incorporated with immediate effect:-

Clause	Page	Existing	To be corrected/replaced as
8.2	13	Refund: The Tourist Card can be refunded from CCC only. Only the security deposit of Rs. 50 is refundable after issue if the cards are used more than once at AFC Gates. However, after issuance of Tourist Card, if it is not used, system will allow refund of security plus Tourist Card cost. If the Tourist Cards could not be refunded through system then in such cases the refund may be given manually with the consent of Revenue/ Commercial Cell and the outstanding amount thus created may be waived off after approval of the competent authority.	Refund: The Tourist Card can be refunded from CCC only. Only the security deposit of Rs. 50 is refundable after issue if the cards are used more than once at AFC Gates. However, after issuance of Tourist Card, if it is not used, system will allow refund of security plus Tourist Card cost. If the Tourist Cards could not be refunded through system then in such cases the refund may be given manually with the consent of Revenue/ Commercial Cell and the outstanding amount thus created may be waived off after approval of the competent authority. However, after expiry of validity of one or three business day, as the case may be, the tourist card will not work and even the security deposit amount of Rs. 50 shall not be returned.

Accordingly, all the custodian officials issued with the Business Manual shall take action as indicated in assurance & correction management chapter of the manual for ensuring & implementing the correction slip.

(Signature)
(C.S. Jeengar)

Director (Operations & Systems)

Copy to: All EDs/ GMs/ JGMs/ DGMs/ Managers/ SSs/ Station Controllers.
CHC, TIA, CRI of O&S directorate.

All Station Controllers to ensure assurance of the correction slip from all CRAs/ CCC Operators.



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No. JMRC/O&S/DO/Business Manual/2015

Dated: 22-11-2017

CORRECTION SLIP No. 10**Sub.-: Functioning of Ticket Vending Machines (TVMs).**

Ref.-: Clause 14 of the Business Manual for Fare Collection System, JMRC, Revision: 00 of February, 2015 (upto Correction Slip No. 09).

- (1) Since last 29 months of passenger operation in Jaipur Metro, nearly 87 lacs passengers (53% of total ridership) have purchased their Single Journey Tokens from the 18 Ticket Vending Machines (TVMs) installed at all 9 metro stations of Phase-1A project in operation of JMRC.
Hardly one case out of one lac tokens sold by TVMs was reported by the stations likewise token is not dispensed & issue of under fare token, etc. from the TVMs due to intermittent technical failure of the TVMs, which led to passenger complaint(s) also. Such cases are looked into with required modification in the TVMs, if required, through OEM M/s. Samsung & in house operation & maintenance staff.
- (2) Similarly, technical compatibility of the TVMs for the new currency notes of Rs. 50, Rs. 200, Rs. 500 & Rs. 2000 introduced in the market after demonetization of Rs. 500 & Rs. 1000 Indian currency notes from 08.11.2016 is under process.
- (3) For effective dealing of the above situations, following new clause **14.3 (A)** in the Business Manual for Fare Collection System, JMRC, 2015 (updated with Correction Slip No. 09) through this Correction Slip No. 10 is hereby incorporated with immediate effect:-

New clause
<p>i) If token is not get dispensed by TVM after token vending command, SC/CRA (authorized for operation) shall immediately put the TVM in "out of service" mode, till it is certified as fit for operation by the authorized Tele & AFC maintenance staff. Record of the incidence shall be maintained at CSS and SCR.</p> <p>ii) If dispensing of under fare token by TVM is reported by a passenger at exit station, SC/CRA should analyze the token, and report it to SC/CRA of the token issuing station. The issuing station will check the cash available with concerned TVM Facilitator, if positioned, for any mismatch, and will immediately revert back to the exit station.</p> <p>(a) If cash mismatch is found at token issuing station, exit station will allow the passenger to exit without levying any penalty. Record of such incidence shall be maintained at both the SCRs.</p> <p>(b) If cash mismatch is not found at the token issuing station, exit station will allow the passenger to exit without levying any penalty, after ascertaining his genuineness. Besides, the concerned TVM shall be put in "out of service" mode by the token issuing station, till it is certified as fit for operation by the authorized Tele & AFC maintenance staff. Record of such incidence shall be maintained at Commercial Cell, CSS & both the SCRs.</p> <p>iii) For any failure of TVM, that may cause passengers inconvenience, the concerned TVM shall be put in "out of service" mode, till it is certified as fit for operation by the authorized Tele & AFC maintenance staff. Record of such incidence shall be maintained at CSS & SCR.</p> <p>Note: Whenever any TVM is put in out of service mode, token sale/ add value shall be resorted at Customer Care Centre and/ or Ticket Office Machine, as per need, till it is certified as fit for operation.</p> <p>iv) Till the TVMs are made compatible for the new currency notes of Rs. 50, Rs. 200, Rs. 500 and Rs. 2000 issued after 08.11.2016, such notes shall only be entertained at Customer Care Centre, both for Add Value in Smart Cards and Sale of Token(s).</p>

- (4) Accordingly, all the custodian officials issued with the Business Manual shall take action as indicated in assurance & correction management chapter of the manual for ensuring & implementing the correction slip.

22-11-17
(C.S. Jeengar)

Director (Operations & Systems)

Copy to: All EDs/ GMs/ JGMs/ DGMs/ Managers/ SSs/ Station Controllers.

CHC, TIA, CRI of O&S directorate.

All Station Controllers to ensure assurance of the correction slip from all

CRAs/ CCC Operators and TVM Facilitators.



No. JMRC/O&S/DO/Business Manual/2015

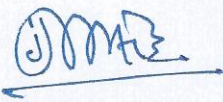
Date 29-06-18

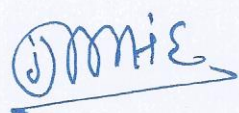
CORRECTION SLIP No. 11**Sub.:- Introduction of Peak Hours and Off-peak Hours Fare.**

Ref.:- (i) Notification No. F7(C-23)JMRC/Fare Matrix/2013 dated 29.06.2018.

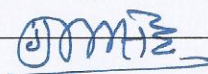
(ii) Business Manual for Fare Collection System, JMRC, Revision: 00 of February, 2015, upto correction Slip No. 10 dated 22.11.2017.

- (1) Based on the pattern of actual ridership data and other relevant factors, the management of JMRC has decided to introduce Off-peak Hours Fare throughout the Business Day with effect from 01.07.2018, vide notification under reference (i).
- (2) Therefore, following corrections are incorporated in the Business Manual for Fare Collection System, JMRC, 2015 (updated with Correction Slip No. 10 dated 22.11.2017) through this Correction Slip No. 11:-

Clause/ Title	Page	Existing	To be corrected/ replaced as
See clause I C.S No.6	1	<p>Business Day Hours</p> <ul style="list-style-type: none"> • From 05:00 Hrs to 23:00 Hrs. <p>(i) The Metro Administration may from time to time decide to divide the business day hours into peak hours and off- peak hours, depending upon its assessment of the ridership patterns and other relevant factors.</p> <p>(a) The Peak Hours and Off-peak Hours Fare has been first time introduced from 01.04.2016 vide Notification No. F7(C-23)JMRC/Fare Matrix/2013 dated 28.03.2016 (copy attached).</p> <p>(b) Entry time reckoned at the AFC gate with valid ticket of that metro station shall decide the applicability of Off-peak Hours Fare and Peak Hours Fare.</p> <p>(c) However, purchase time of the Group Ticket from AFC System i.e at (CCC) shall decide applicability of Off-peak Hours Fare or Peak Hours Fare.</p>	<p>Business Day Hours</p> <ul style="list-style-type: none"> • From 05:00 Hrs to 23:00 Hrs. <p>(i) The Metro Administration may from time to time decide to divide the business day hours into peak hours and off- peak hours, depending upon its assessment of the ridership patterns and other relevant factors. Peak Hour will be reduced to zero and Off peak hours will be extended throughout the business day w.e.f. 01.07.2018.</p> <p>(a) The Off-peak Hours Fare has been introduced from 01.07.2018 vide Notification No. F7(C-23)JMRC/Fare Matrix/2013 dated 29.06.2018 (copy attached).</p> <p>(b) To be deleted</p> <p>(c) To be deleted</p> <p></p>

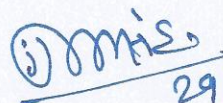
		<p>(d) A transition time of total 5 minutes, 4 minutes prior and 1 minute after introduction of the Off-peak Hours to Peak Hours or vice versa is allowed as system resetting time for TOM only. The TOM Operators at ticket offices and CCCs shall refrain from selling tokens and/ or to perform any kind of transactions during the period.</p> <p>(e) Normally, passengers purchasing tokens within 10 minutes prior to introduction of Peak Hours Fare from TOM/TVM/ CCC shall be warned/ counselled that they have to enter in paid area of that station using its AFC entry gates before introduction of the Peak Hours. Otherwise, their unused tokens shall be refunded by the CCC Operator at full amount and they will be required to purchase new tokens of applicable Peak Hours Fare.</p>	<p>(d) To be deleted</p> <p>(e) To be deleted</p>
See clause 2.3 C.S No.6	2	<p>Electronic Validity of tokens - The token shall be valid for use within 30 minutes from sale time on the Business Day of purchase only, except for the tokens purchased with Off-peak Hours Fare and use them at the entry AFC gates of that station during applicability of Peak Hours Fare.</p>	<p>Electronic Validity of tokens - The token shall be valid for use within 30 minutes from the sale time on the Business Day of purchase only.</p>
See clause 2.5 II C.S No.6	2	<p>(a) The refund of an unused Single Journey Token is permissible within same business day of issuing of token from token issuing station only, subject to passenger still being in unpaid area.</p> <p>(b) A passenger holding token with Off-peak Hours Fare shall not be allowed to enter during Peak Hours through the AFC entry gates in paid area of that station. The unused token shall</p>	<p>(a) The refund of an unused Single Journey Token is permissible within same business day of issuing of token from token issuing station only, subject to passenger still being in unpaid area.</p> <p>(b) To be deleted</p> <p></p>

		<p>have to be refunded at full amount only from CCC and shall not be adjusted.</p> <p>(c) However, if CCC Operator still adjust it, system will not allow the passenger to enter in paid area of that station with the adjusted token, and the outstanding thereof shall only be bear by the CCC Operator.</p>	(c) To be deleted
See clause 2.7 II C.S No.6	3	<p>Once a patron has purchased a token/ticket for any destination, he is authorized to travel to any destination in the direction of his travel, in terms of JMRC operational Guidelines. If in the direction of travel, he oversteps his journey beyond the destination for which he has paid the fare, he will have to pay additional fare of the overstepped distance only, and the additional fare for this overstepped journey shall be the difference of maximum fare of the system (i.e. of peak hours) minus the fare already paid. Accordingly, CCC Operator will do adjustment in the same token/ticket. However, if he is caught trying to exit the gate (tailgating, jumping over the gate, carry away token, etc) without paying the difference of fare, he will be liable to pay excess fare of Rs 50/- in addition to difference of maximum fare of the system (i.e. of peak hours) minus the fare already paid.</p>	<p>Once a patron has purchased a token/ticket for any destination, he is authorized to travel to any destination in the direction of his travel, in terms of JMRC operational Guidelines. If in the direction of travel, he oversteps his journey beyond the destination for which he has paid the fare, he will have to pay additional fare of the overstepped distance only, and the additional fare for this overstepped journey shall be the difference of maximum fare of the system (i.e. of off peak hours) minus the fare already paid. Accordingly, CCC Operator will do adjustment in the same token/ticket. However, if he is caught trying to exit the gate (tailgating, jumping over the gate, carry away token, etc) without paying the difference of fare, he will be liable to pay excess fare of Rs 50/- in addition to difference of maximum fare of the system (i.e. of off peak hours) minus the fare already paid.</p>
See clause 3 C.S No.6	5	<p>If a passenger is found without valid ticket in paid area of a station, the passenger shall be permitted to exit using Paid Exit Token. In this case, the cost of the Paid Exit Token shall be equal to sum of excess charge of Rs 50/- and Maximum Fare of the System i.e. of peak hours.</p>	<p>If a passenger is found without valid ticket in paid area of a station, the passenger shall be permitted to exit using Paid Exit Token. In this case, the cost of the Paid Exit Token shall be equal to sum of excess charge of Rs 50/- and Maximum Fare of the System i.e. of off peak hours.</p>
See Clause 17.2 (Appendix-I) C.S. No. 6	45	<p>(See Clause 17.2)</p> <p>Code 15 (69 – Invalid ticket) Amt (Rs) 50 plus maximum fare of the system (i.e. of peak hours).</p>	<p>(See Clause 17.2)</p> <p>Code 15 (69 – Invalid ticket) Amt (Rs) 50 plus maximum fare of the system (i.e. of off peak hours).</p>



		Code 16 (69 - Over travelling) Amt (Rs) Difference of maximum fare of the system (i.e. of peak hours) minus the fare already paid.	Code 16 (69 - Over travelling) Amt (Rs) Difference of maximum fare of the system (i.e. of off peak hours) minus the fare already paid.
	45	SN 19 Tailgating, jumping over the gate, carry away token, etc. Amt (Rs) 50 plus maximum fare of the system (i.e. of peak hours).	SN 19 Tailgating, jumping over the gate, carry away token, etc. Amt (Rs) 50 plus maximum fare of the system (i.e. of off peak hours) .

- (3) Accordingly, all the custodian officials issued with the Business Manual shall take action as indicated in assurance & correction management chapter of the manual for ensuring & implementing the correction slip.


 (G. S. Bhawaria)
 Director (Operations & Systems)

Encl. Updated Appendix-I (See Clause 17) on offences and penalties to be levied for each offence from each offender.

Copy to: PS to CMD, DF – for kind information to CMD & DF
 All EDs/ GMs/ JGMs/ DGMs/ Managers/ SSs/ Station Controllers
 CHC, TIA, CRI of O&S directorate
 All Station Controllers to ensure assurance of the correction slip from all CRAs,
 CCC Operators, TOM Operators and TVM facilitators.

JAIPUR METRO RAIL CORPORATION

(See Clause 17)

OFFENCES AND PENALTIES TO BE LEVIED FOR EACH OFFENCE FROM EACH OFFENDER					
SN	AS PER METRO RAILWAYS (O&M) ACT, 2002		PENALTIES TO BE LEVIED AS PER AFC SYSTEM		
	OFFENCE	SECTION	CODE	DISPLAY AT EFO AND RECEIPT	AMT. (RS.)
1	Drunkenness or nuisance or act of indecency of interfering in any way with the comfort of any passenger of metro railway	59 (1)	29	59 (1)-Nuisance/Indecency	200
2	Taking or causing to take offensive material upon metro railway	60 & 30 (1)	38	60/30(1)-Offensive material	200
3	Demonstration on any kind and pasting posters, writing or drawing anything in the compartment, carriage or premises	62	30	62-Demonstration	500
4	Travelling on roof, etc., of a train	63	31	63-Travelling on roof	50
5	Unlawfully entering or remaining upon metro railway even when requested to leave	64 (1)	40	64(1)-Unlawful entry	200
6	Walking on metro track without lawful authority	64 (2)	41	64(2)-Walking on metro track	200
7	Obstructing, running of train, etc., by squatting, picketing or interfering in any manner	67	42	67-Obstructing train	2000
8	Obstructing metro railway official in his duties	68	39	68-Obstructing official	500
9	Travelling without proper pass or ticket or beyond authorised distance	69	15	69-Invalid ticket	50 plus maximum fare of the system (i.e. of Off-peak hours)
	Travelling beyond authorised distance		16	69-Over travelling	Difference of maximum fare of the system (i.e. of Off-peak hours) minus the fare already paid
10	Interfering with means of communication in a train or misuse of alarm bell of the train	70	32	70-Misuse of Communication	500
11	Defacing or pulling down public notices put up by metro railway	72	33	72-Defacing Public Notices	200
12	Unauthorized sale of articles on metro railway train or premises	73	34	73-Unauthorized article sale	500
13	Unauthorized sale of tickets	75	35	75-Unauthorized ticket sale	200
14	Endangering safety of persons travelling by metro railway by rash or negligent act or omission	77	36	77-Endangering safety	500
15	Making a false claim for compensation from metro railway administration	80	37	80-False compensation claim	500
16	Lost of SV-4 Duty Card	NA	43	SV4/SV8/Login ID lost	100
17	Lost of SV-8 Card				
18	Loss of Login ID Card				
19	Tailgating, jumping over the gate, carry away token, etc.	NA	22	Illegal Entry	50 plus maximum fare of the system (i.e. of Off-peak hours)
			23	Illegal Exit	
20	Any other	NA	44	Others	To be notified

Note: Except Sr. No. 9, 19 & 20 all other penalty amounts are fixed and non-editable, till further orders.

APPENDIX 15.1

JP/JS21 (1B): Key Dates

1 KEY DATES

The work includes a number of stages. These stages, which are inter-related with, and essential to, the completion of the AFC SYSTEM, are to be achieved by the Key Dates.

If the identified stage is not achieved by the stated Key Date, liquidated damages may become applicable as set out in the Contract.

1.1 STAGE 1 – Key Date 1 (KD1): Preliminary Design and Application Engineering Finalization (Submission & approval by Employer)

Achievement: Submission to, and concurrence by, the Employer's Representative of the Preliminary System Design which consists of details as specified in the Employer's Requirements for this JP/JS21 (1B) Contract

1.2 STAGE 2 – Key Date 2 (KD2): Final Design and Application Engineering Finalization (Submission & approval by Employer)

Achievement: Submission to, and concurrence by, the Employer's Representative of the Final Design which consists of all the above documents as specified in the Employer's Requirements for this JP/JS21(1B) Contract

1.3 STAGE 3 – Key Date 3 (KD3): AFC Equipment Shipment

Achievement: Delivery of equipments for the AFC SYSTEM of the specified quantity at Contractor's Premises in Jaipur and their inspection by Employer's Representative.

1.4 STAGE 4 – Key Date 4 (KD4): Installation, Commissioning & Testing of AFC Equipment for Phase 1B.

Achievement: Putting into service the AFC SYSTEM after completion of Installation Test, PAT at all stations & OCC .These achievements shall also include the necessary PAT at OCC equipment.

1.5 STAGE 5 – Key Date 5 (KD5): Completion of System Acceptance Tests, Integrated testing including full integration of new stations with OCC AFC Network/System and Service Trials. This also includes delivery of As Built Drawings, O&M manuals to employer.

1.6 STAGE 6 – Key Date 6 (KD6): Completion of Contract

Achievement: Delivery of Contract Spares, Completion of DLP requirement to the satisfaction of Employer's Representative. Completion of Period of Supervision of Maintenance for Phase 1B section works, Issue of Performance Certificate in accordance with GCC/SCC.

Schedule of Key Dates (tentative)**

Sr. No.	Key Date	Phase 1B {Choti Chouper- Badi Chouper}
1	KD1	Within 04 weeks from LOA
2	KD2	Within 08 weeks from LOA
3	KD3	Within 14 weeks from LOA
4	KD4	8 weeks prior to ROD
5	KD5	4 weeks prior to ROD
6	KD6	Two years after ROD & end of completion of DLP

** Tentative date for ROD is 30.09.2019.

APPENDIX 15.2

SCHEDULE OF ACCESS DATES FOR AFC:

SNo.	Section	Access Date for			
		Equipment Room	Permanent Power	Station Concourse	Telecom
1	Choti Chaupar to Badi Chaupar	January 2019	March 2018	April 2019	May 2019

* Tentative Date for Revenue Operation Date (ROD) is 30.09.2019.

APPENDIX 15.3

Below mentioned test are only indicative, the system related test will be finalized during design phase.

TOM TEST

<u>S.No.</u>	<u>TOM TEST</u>	<u>REMARKS</u>
1	Operator Log On	
2	Operation Pause	
3	Main Menu	
4	Module Status Checking in Maintenance Mode	
5	Token Replenishing	
6	CST Issuing	
7	CSC Selling	
8	CSC Add Value	
9	Free Exit Token Issuing	
10	Paid Exit Token Issuing	
11	Group Ticket Issuing	
12	Ticket Cancel	
13	Ticket Adjustment for the excess time ticket	
14	Ticket Adjustment for the excess fare ticket	
15	Ticket Adjustment for the entry/exit mismatch ticket	
16	Extension	
17	Administrative Disposal	
18	Daily Report	
19	Daily Logs	
20	Version Inquiry	
21	End of Shift	
22	Data transmission to SC (Transaction, Revenue, Shift data)	
23	Transmitting Alarm to SC	
24	Mode Set From SC	
25	Transmitting Operation Status to SC	
26	Parameter Sync with SC	
27	CST issued in future date is working at AG.	
28	If Moxa(TDM) cables is unplugged during issuing of tokens, CSC selling and add value then information should come in end of shift.	
29	If computer is rebooted during issuing of	

	tokens, CSC selling and add value then information should come in end of shift.	
30	If Tour card is refunded by fast swift, its deposit become zero but Tour card is working at AG.	
31	In case of MAC error token should be able for analysis.	
32	All events should come at SC/CC.	
33	In case of Incident mode refunded tokens should work at AG.	
34	Machine Black list feature should be applicable to TOM.	
35	During add value/vending of the media, full information should be written in the media.	
36	If TOM is not in LAN, then it works ok, without showing any error message. Also it is found in some stations that after passing of SC authentication, some features in TOM disappear (like CST sale.....)	
37	If there is CST having 159 Error, it is adjusted with penalty. But if go to entry gate at that station where it was showing 159 error, it allows entry by that CST, then exit is possible without any penalty. The error should not be rectified till the proper adjustment of penalty.	
38	TOM should not pause frequently during add value & analysis of CSC.	
39	TOMs should not hang very frequently.	
40	Refund of tokens should be configurable after from time of issue at same station.	
41	On analysis of Tokens, TOM ID is displayed in terms of Hex code rather than the Equipment ID	
42	System Error code list and its detailed description should be submitted for the use at sites for all possible code & their description.	
43	During the writing information to media (CST), it is possible to vend a token with updated token but information is not updated in TOM. It may lead to potential fraud. Because the updated token is working on Gate.	
44	Add value in the CSC should not be permitted when deposit is zero	
45	TOUR card should not work on Gate when deposit is zero.	
46	Shift end time and date problem	
47	Amount of token sale is displayed at PID for a very small time	
48	Cancel function for all Media (CST & CSC)	

49	During the writing information to media (CST), it is possible to vend a token with updated token but transaction information is not updated in TOM. It may lead to potential fraud. Because the updated token is working on Gate	
50	Fraud sale of CSC by swift attempt.	
51	Fraud sale of CST (SJT and paid exit token) via card reader, by swift attempt.	
52	Sometimes it shows the message "SCconnectretrng", after restart of SC-SLE comm application, it is connecte&working OK.	
53	Refund of tokens is not possible after 20 minutes from time of issue at same station. It should be refundable within business day.	
54	In the PID during add value time, it shows default RS.50 amount, while add value amount is different.	
54	For a particular ticket type, it should be able to give permission regarding add-value and sale functionality.	
56	When LAN connection is recovered after disconnection, sometimes some function features like CST sale are disappeared.	
57	Add value in the CSC should not be permitted when deposit is zero	
58	TOUR card should not work on Gate when deposit is zero.	
59	TOM/EFO shouldn't adjust tokens issued in past/future date	

TVM TEST:-

SI. NO	TVM EST DESCRIPTION	REMARK
1.	Agent Log In (ID/PASSWORD)	Input ID and password by Maintenance Panel And log in is also possible by agent card
2.	CST Hopper Replenishment	
3.	Change Service Mode	In Service, out of Service, maintenance mode
4.	Status Monitoring	Normal, SJT issuing only, add value only Cash, coin not use, banknote not use, No change
5.	Destination Station Selection	Destination station or fare selection by passenger
6.	SJT Issuing	
7.	Coin Hopper Replenishment	
8.	CSC Add Value	Add value the CSC card with banknote
9.	CST Hopper Clearing	
10.	Coin Hopper Clearing	
11.	Coin Box Retrieval	Coin box retrieval and clearing
12.	Banknote Box Retrieval	
13.	Total Clearing	CST, coin clearing and box retrieval
14.	Reprint Account Report	Reprint old account report
15.	TVM Shut Down	
16.	Control Command From SC	In service / out of service
17.	Transmitting Operating status to SC	Operational Mode, Connecting Status
18.	Data transmission to SC (Transaction, Revenue, Cut-off)	Transaction data (SJT Selling, Purse) Revenue data (Coin box, Note box, Coin loading, Coin clearing, Token loading, Token clearing) Cut-off data
19.	TVM should not accept fake bank note	
20.	TVM should not accept fake coins	
21.	TVM should not do over recharge	
22.	Test for no of coins	Max 25 for one type
23.	Checking of data on SC	
24.	Report checking	
25.	Report printing and reprinting	
26.	Test for money return if there is no coin in TVM	TVM will generate a slip for returning money
27.	Torn notes not accepted by TVM	

SC TEST

SI . NO.	SC TEST DESCRIPTION	REMARK
1.	Monitoring of AG status	
2.	Monitoring of TOM status	
3.	Monitoring of Traffic data	
4.	Monitoring of Stock data	
5.	Command for Special mode setting (Emergency)	
6.	Command for Special mode setting (Entry/Exit override)	
7.	Command for Special mode setting (Time override)	
8.	Command for Special mode setting (incident)	
9.	Command for Special mode setting (station close)	
10.	Command for door mode changing to AG	
11.	Inquiry of Detail Information of Equipment	
12.	Monitoring of Detail status of Equipment	
13.	Summary Data Inquiry	
14.	Status Data Inquiry	
15.	Transaction Data Inquiry	
16.	TOM Shift Data Inquiry	
17.	Revenue Data Inquiry	
18.	Cut-Off Data Inquiry	
19.	Inquiry of Parameter	
20.	Equipment Parameter Version Management	
21.	Current Ticket Stock Data Inquiry	
22.	History Data Inquiry	
23.	Transaction data audit	
24.	CS interface Data Query	
25.	Web Report Inquiry and Printing	
26.	CS Communication status	
27.	Transaction data Request to Equipment	
28.	Transmission of parameter to AG/TOM	
29.	Apply high security to a particular CSC	
30.	Import/Export of data manually	
31.	Send parameter to individual equipment at station	
32.	Apply high security to a particular CSC	
33.	Remote login	
34.	All the reports attached in PS annexure.	

TR TEST

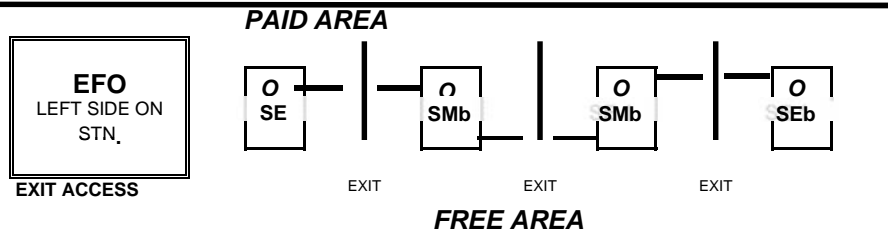
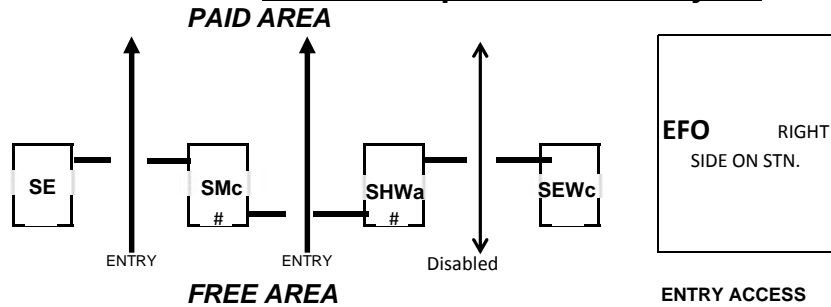
SI.NO.	TR TEST DESCRIPTION	REMARK
1	Analysis and Display of Ticket Information	
2	LED & Buzzer for ticket status	
3	When we show CST at TR it should show <ul style="list-style-type: none">- Entry/Exit station- Last used status (sell or entry)- Fare tier- Last transaction date/time	
4	When we show CSC at TR it should show <ul style="list-style-type: none">Electronic value- Ticket validity duration- Last recharge amount- Last recharging date/time	Last five TXNs

AG TEST

S. NO.	AG TEST DESCRIPTION
1.	AG can handle a valid CST and allow passenger to pass the gate from free area to paid area.
2.	AG can handle an invalid CST and inhibit passenger from passing the entry gate.
3.	AG can handle a valid CSC and allow passenger to pass the gate from free area to paid area.
4.	AG can handle an invalid CSC and inhibit passenger from passing the gate at the entry gate.
5.	Usage for the different types of card like SV1, SV2, SV3, and etc
6.	Usage for A(Desfire) and C(Sony)
7.	AG can handle a valid CST and allow passenger to pass the gate from paid area to free area.
8.	AG can handle an invalid CST and inhibit passenger from passing the exit gate.
9.	AG can handle a valid CSC and allow passenger to pass the gate from paid area to free area
10.	AG can handle an invalid CSC and inhibit passenger from passing the gate at the exit gate.
11.	AG can test Barrier door, Sensor, and Card Reader.
12.	AG is entered to maintenance function.
13.	Reasonable level of noise, caused by Barrier(Sector) Door
14.	AG can perform 45 persons/min
15.	To change and monitor the operation status of AG
16.	AG should not accept token issued in future/past date
17.	AG should not accept black listed token/CSC
18.	AG should not accept any media issued/add value by black listed m/c
19.	AG should not accept token/ CSC of deposit ZERO value except free exit
20.	AG should check TOUR card properly
21.	AG should send event log to SC
22.	UPS status should be there on maintenance menu of AG
23.	Parameter Sync
24.	Transmitting Operation Status to SC
25.	Mode set from SC
26.	Data Transmission to SC
27.	Transmitting Alarm to SC
28.	Functional Test in Special mode
29.	Functional Test in Failure Mode
30.	Device Reset
31.	Check Device Parameter / Settings
32.	Shutdown / Reboot
33.	Sound Test

34.	Token Capture Unit Test
35.	Gate Control Unit Test
36.	Token Box Retrieval
37.	Data Inquiry in maintenance mode
38.	Door Mode set from AG
39.	Operational Mode set from AG
40.	Passenger Flow logic Control Test

Choti Chaupar AFC Gate layout



ACCESS 1						ACCESS 2					
SMc		1		SMb	2	SMc		1		SMb	2
SEWc		1		SEb	1	SEWc		1		SEb	1
SHWa		1		SE	1	SHWa		1		SE	1
SE		1				SE		1			
Entry		4		Exit		4		Entry		4	

Total Entry Cabinet **8**

Total Exit Cabinet **8**

Se- Standard Extreme

SM- Standard Middle

SHW-Standard Hybrid Wide

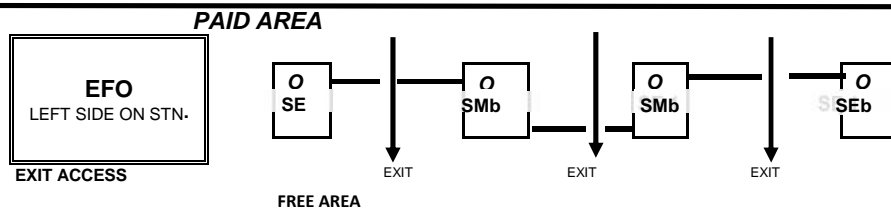
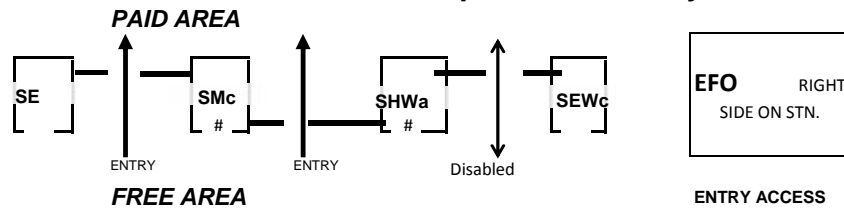
SEW-Standard Extreme Wide

a= Cabinet having Smart Media Validator and Smart Media Acceptor

b= Cabinet having Smart Media Acceptor

c= Cabinet having Smart Media Validator

Badi Chaupar AFC Gate layout



	ACCESS 1							ACCESS 2					
	SMc		1		SMb	2		SMc	1		SMb	2	
	SEWc		1		SEb	1		SEWc	1		SEb	1	
	SHWa		1		SE	1		SHWa	1		SE	1	
	SE		1					SE	1				
	Entry		4		Exit	4		Entry	4		Exit	4	

Total Entry Cabinet

8

Total Exit Cabinet

8

Se- Standard Extreme

SM- Standard Middle

SHW-Standard Hybrid Wide

SEW-Standard Extreme Wide

a= Cabinet having Smart Media Validator and Smart Media Acceptor

b= Cabinet having Smart Media Acceptor

c= Cabinet having Smart Media Validator

Drawing-2



Procurement of Works

JAIPUR METRO RAIL CORPORATION LIMITED

BIDDING DOCUMENT

for

Procurement on International Competitive Bidding Mode

of

ICB No.- JP/JS 21 (Phase-1B)

**DESIGN, MANUFACTURE, SUPPLY, INSTALLATION, TESTING &
COMMISSIONING OF AUTOMATIC FARE COLLECTION SYSTEM
FOR JMRC PHASE 1B**

PART - II REQUIREMENTS

Section 6 – Employer's Requirements

Volume – III Safety, Health and Environment (SHE) Manual

**3rd Floor, RAJSICO Building, Udhog Bhawan, Tilak Marg,
C- Scheme, Jaipur (Rajasthan) PIN-302005
Country: India**



JAIPUR METRO RAIL CORPORATION LIMITED

SAFETY, HEALTH AND ENVIRONMENT (SHE) MANUAL

CONDITIONS OF CONTRACT ON
SAFETY, HEALTH AND ENVIRONMENT
(NOVEMBER 2013)



Safety, Health and Environment (SHE) Manual



Safety, Health and Environment (SHE) Manual

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PART – I : SHE MANAGEMENT



1.0 General

1.1 Scope

- 1.1.1 This document defines the principal requirements of the Employer on Safety, Health and Environment (SHE) associated with the contractor / sub-contractor and any other agency to be practiced at construction worksites at all time.

1.2 Definition / languages

1.2.1 In this document

- i) The use of 'shall' indicates a mandatory requirement.
- ii) The use of 'should' indicates a guideline that is strongly recommended.
- iii) The use of 'may' indicates a guideline that is to be considered.
- iv) 'SHE' means Safety, Health and Environment.
- v) **"Employer"** means JAIPUR METRO RAIL CORPORATION LIMITED (JMRC), its legal successors and assignees
- vi) **"Designer"** means the Contractor, or part of the group forming the contractor, person, firm or company or group of companies, or any replacement, carrying out the Design of Works or part thereof.
- vii) Chief Safety Officer means an officer nominated by JMRC who is overall responsible for monitoring all SHE functions prescribed in this document.
- viii) BOCWA means Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996
- ix) BOCWR means Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Central Rules, 1998
- x) RBOCWR means Rajasthan Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Rules, 2009
- xi) CIIBC means Chief Inspector of Inspection of Building and Other Construction as appointed by Govt. of Rajasthan.

1.3 Application of this document

- 1.3.1 This document applies to all aspects of the contractor's scope of work, including all aspects conducted by sub-contractors and all other agencies. There shall be no activity associated to the contract, which is exempted from the purview of this document.

1.4 Purpose of this document

- 1.4.1 The objective of these guidelines is to ensure that adequate precautions are taken to avoid accidents, occupational illness and harmful effects on the environment during construction.

1.4.2 This document:

- i) Describes the SHE interfaces between Employer and the Contractor.
- ii) Details the processes by which the contractor shall manage SHE issues while carrying out the work under the contract.
- iii) Describes by reference, the practices and procedures as given in the JMRC Project Safety, Health & Environment manual for best SHE performance.



- 1.4.3 These requirements shall be read together with JMRC Project SHE Manual, OHSAS 18001-1999, Occupational Health and Safety Management System and ISO 14001: 2004 Environmental Management Systems. Definition of key terms used in these requirements related to OHSAS 18001 and ISO 14001 standard are found in JMRC's Project SHE Manual.

2.0 'SHE' Targets and Goals

- 2.1 The SHE targets, goals and aim for the Works are to achieve:
- i) Zero total recordable injuries.
 - ii) Zero reportable environmental incidents
 - iii) All personnel inducted in accordance with the approved contractor SHE plan
 - iv) Total compliance of conducting inspections and audits as per approved SHE plan
 - v) 100% incident recording and reporting
 - vi) 100% adherence of usage of appropriate PPEs at work.
 - vii) Executing construction work with least disturbance to the environment, adjoining road users and traffic.

3.0 Compliance

3.1 Memorandum of Understanding (MOU)

- 3.1.1 A Memorandum of Understanding placed at **Appendix No.: 1** shall be executed before the award of contract by the contractor with regard to various provisions on Safety, Health and Environment to be practiced during the construction work.

3.2 JMRC's SHE Policy and Management Systems

- 3.2.1 The construction works shall be undertaken in accordance with JMRC's SHE Policy and Management Systems as amended from time to time provided in Project SHE Manual.

3.3 Indian statutory requirements

3.3.1 Primary statutory regulations

- 3.3.1.1 **Contractor shall develop thorough understanding about Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act 1996, Central Rules 1998, Rajasthan BOCW Rules 2009, Building and Other Construction Workers' Welfare Cess Act, 1996 and Central Rules, 1998 and Rajasthan Building Construction Workers' Welfare Board Rules, not only to satisfy the Inspectors' perspective but the use of legislation as the strong tool for effective SHE management at construction worksites. Contractor is strongly advised to practice the principle of voluntary compliance.**

- 3.3.1.2 In order to facilitate the contractor for better understanding on the various provisions of the above Act and Rajasthan Govt. Rules, a tabulated information highlighting the Sections/Rules referring to the corresponding registration of contractors, maintenance of registers and records, hours of work and wages, welfare, medical facilities and safety requirements are given in **Appendix No.: 2**. It is an indicative one and not a limiting list.



3.3.2 In addition, the construction works shall be undertaken in accordance with all applicable legislation including amendment made hereunder and Indian statutory requirements listed below but not limiting to:

- i) The Metro Railways (Construction of Works) Act 1978 and rules made thereunder
- ii) The Metro Railways (Operation and Maintenance) Act 2002 and rules made thereunder
- iii) The Electricity Act 2003 and The Indian Electricity Rules 1956
- iv) National Building Code, 2005
- v) The Factories Act, 1948, Rajasthan Factories Rules 1951.
- vi) Motor Vehicles Act as amended in 1994 and The Central Motor Vehicles Rules, 1989.
- vii) Indian Road Congress Code IRC: SP: 55-2001 'Guidelines on Safety In Road Construction Zones.
- viii) The Petroleum Act, 1934 and Rules 2002
- ix) Gas Cylinder Rules, 2004
- x) Indian Explosives Act. 1884, along with the Explosives substance Act 1908 and the Explosives Rules 1983
- xi) The (Indian) Boilers Act, 1923, Rajasthan Boiler Rules, 1954
- xii) The Public Liability Insurance Act 1991 and Rules 1991
- xiii) Minimum Wages Act, 1948 and Rules 1950
- xiv) Contract Labour Act, 1970 and Rules 1971
- xv) Child Labour (Prohibitions & Regulations) Act, 1986 and Rules 1988
- xvi) Environment Protection Act, 1986 and Rules 1986
- xvii) Air (Prevention and control of Pollution) Act, 1981 and Rules 1982
- xviii) Water (Prevention and Control of Pollution) Act, 1974 and Rules 1975
- xix) The Noise Pollution (Regulation & Control) Rules, 2000
- xx) Notification on Control of Noise from Diesel Generator (DG) sets, 2002
- xxi) Recycled Plastic Usage Rules, 1998
- xxii) Notification, Central Ground Water Board, Act January 1997
- xxiii) Manufacture, Storage & Import of Hazardous Chemicals Rules, 1989
- xxiv) The Hazardous Waste (Management & Handling) Rules, 1989
- xxv) Hazardous Waste Management Rules 1989 (amended 1999)
- xxvi) The Bonded Labour System (Abolition) Act, 1976 and Rules 1976
- xxvii) Batteries (Management and Handling) Rules, 2012
- xxviii) Fly ash utilization notification, Sept 1999 as amended in August 2003

3.3.3 The Employee's Compensation Act, 1923 along with allied Rules

3.3.3.1 The contractor shall ensure that all his employees / workmen are covered under 'Employee Compensation Act' and shall pay compensation to his workmen as and when the eventuality for the same arises.

3.3.4 Notwithstanding the above Act/Rules, there is nothing in those to exempt the contractor from the purview of any other Act or Rule in Republic of India for the safety of men and materials.

3.3.5 If the requirements stated in this document are less stringent than or in conflict with the country's applicable legislation, the latter shall apply.



- 3.4 International Standards, Guidelines & ISO Certifications
- 3.4.1 The works should be undertaken in accordance with the applicable international guidelines, standards and specifications on SHE and every contract shall aim to achieve ISO certifications listed below during the currency of the contract:
- OHSAS 18001-1999 : Occupational Health and Safety Management System.
ISO 14001-2004 : Environmental Management Systems.
- 3.4.2 The process of certification shall start immediately after the award of the work and complete within reasonable time. Towards this, the contractor shall undertake the required steps including appointment of ISO consultant for obtaining the certification on Occupational Health and Safety Management System and Environment Management System.
- 3.4.3 **In case of failure on the part of the contractor, the Employer at the cost of the contractor shall do the same.**
- 4.0 Contractor SHE Policy and Plan**
- 4.1 The contractor as per Section 39 of the BOCW Act shall formulate a SHE policy and get it approved by DG/CIIBC respectively and display it at conspicuous places at work sites in Hindi and a local language understood by the majority of construction workers.
- 4.2 Within 4 weeks of the notification of acceptance of the tender, the Contractor shall submit a detailed and comprehensive Contract specific SHE Plan. The SHE Plan shall include detailed policies, procedures and regulations which, when implemented, will ensure compliance of the contract provisions. The SHE Plan shall include the following but not be restricted to:
- i) A statement of the Contractor's policy, organisation and arrangements for SHE
 - ii) The name(s) and experience of person(s) within the Contractor's proposed management who shall be responsible for co-ordinating and monitoring the Contractor's SHE performance;
 - iii) The number of SHE staff who shall be employed on the Works, their responsibilities, authority and line of communication with the proposed Contractor's agent;
 - iv) A statement of the Contractor's policy and procedures for identifying and estimating hazards, and the measures for addressing the same;
 - v) A list of SHE hazards anticipated for this Contract and sufficient information to demonstrate the Contractor's proposals for achieving effective and efficient health and safety procedures;
 - vi) A description of the SHE training courses and emergency drills which shall be provided by the Contractor, with an outline of the syllabus to be followed;
 - vii) Details of the safety equipment which shall be provided by the Contractor, including personal protective equipment;
 - viii) A statement of the Contractor's policy and procedures for ensuring that Contractor's Equipment used on the Project Site are maintained in a safe condition and are operated in a safe manner;
 - ix) A statement of the Contractor's policy and procedures for ensuring that sub-contractors comply with the Contractor's safety plan;
 - x) A statement of the Contractor's disciplinary procedures with respect to SHE related matters, and



- xi) A statement of the Contractor's procedure for reporting and investigating accidents, dangerous occurrences or occupational illnesses
- 4.3 The Contractor shall, from time to time and as necessary are required by the Employer to produce supplements to the SHE Plan such that it is at all times a detailed, comprehensive and contemporaneous statement by the Contractor of his site safety, industrial health and environment obligations, responsibilities, policies and procedures relating to work on Site. Any and all submissions of supplements to the SHE Plan shall be made to the Employer in accordance with the agreed procedures.
- 4.4 If at any time the SHE plan is, in the Employer's opinion, insufficient or requires revision or modification to ensure the security of the Works and the safety of all workmen upon and visitors to the Site, the Employer may instruct the Contractor to revise the SHE plan and the Contractor shall within 7 days submit the revised plan to the Employer for review.
- 4.5 Any omissions, inconsistencies and errors in the SHE Plan or the Employer's acceptance or rejection of the SHE Plan and/or supplements thereto shall be without prejudice to the Contractor's obligations with respect to site safety, industrial health and environment and shall not excuse any failure by the contractor to adopt proper and recognised safety practices throughout the execution of the Work.
- 4.6 The Contractor shall adhere to the SHE Plan and shall ensure, as far as practically possible, that all sub-contractors of all tiers require that contracting parties each have a copy of the Site SHE Plan and comply with its provisions.
- 4.7 The details of contents to be covered in the site SHE plan are given in **Appendix No.: 3**

5.0 Designer's role

5.0 Designer's role in Safety, Health and Environment

- 5.1 Designer's primary role includes to minimise the risk to health and safety of those who are going to construct, maintain, clean, repair, dismantle or demolish the structures and any one else like adjoining road users/general public, who might be affected by the work.
- 5.2 General philosophy
 - 5.2.1 When considering health and safety in designer's work, they shall be expected to do what is reasonable at the time the design is prepared. It may be possible for hazards, which cannot be addressed at the feasibility stage to be looked at during detailed design. In deciding what is reasonably practicable, the risk to health and safety produced by a feature of the design has to be weighed against the cost of excluding the feature. The overall design process does not need to be dominated by a concern to avoid all risks during the construction phase and maintenance. However, a judgement has to be made by weighing up one consideration against another so the cost is counted not just in financial terms, but also those of fitness for purpose, aesthetics, buildability or environmental impact. By applying these principles, it may be possible to make decisions at the design stage, which will avoid or reduce risks during construction work. In many cases, the large number of design considerations will allow a number of equally valid design solutions. What is important is the approach to the solutions of design problems. This should involve a proper exercise of judgement, which takes account of health and safety issues.
- 5.3 Hierarchy of Risk Control



- 5.3.1 Designers shall need, so far as reasonably practicable, to avoid or reduce risks by applying a series of steps known as the hierarchy of risk control or principles of prevention and protection. The steps to be adopted shall include the following:
- i) consider if the hazard can be prevented from arising so that the risk can be avoided (eg, alter the design to avoid the risk);
 - ii) if this cannot be achieved, the risk should be combated at source (eg, ensure the design details of items to be lifted include attachment points for lifting);
 - iii) failing this, priority should be given to measures to control the risk that will protect all people;
 - iv) only as a last resort should measures to control risk by means of personal protection be assumed (eg, use of safety harnesses).

5.4 Duty to provide health and safety risks in the drawing itself

- 5.4.1 In case of situations where the designers have carried out the design work and concluded that there are risks, which was not reasonably practicable to avoid, detailed information shall be given about the health and safety risks, which remain. This information needs to be included with the design to alert others to the risks, which they cannot reasonably be expected to know. This is essential for the parties who have to use the design information.

- 5.4.2 If the designers' basic design assumptions affect health or safety, or health and safety risks are not obvious from the standard design document, the designer shall provide additional information. The information shall include a broad indication of the assumptions about the precautions for dealing with the risks. The information will need to be conveyed in a clear manner; it shall be included on drawings, in written specifications or outline method statements. The level of detail to be recorded will be determined by the nature of the hazards involved and the associated level of risk.

5.5 Employer's approval

- 5.5.1 Every structure like scaffold, false work, launching girder, earth retaining structures etc. shall have its design calculations included in the method statements in addition to health and safety risks. Employers' designer or his approved proof check consultants as applicable as per the contract conditions shall approve all these designs.

- 5.6 Any non-standard structures like trestles made up of re-bars or structures which are very old, corroded, repaired for many times etc. for which no design calculations can be made accurately from any national standards, shall not be allowed to be used at sites even for short duration.

- 5.7 If any of the above mentioned clauses are not adhered to, penalty shall be imposed depending upon the gravity of the unsafe act and/or condition.

6.0 Contractor SHE Organisation

6.1 Education and Experience

- 6.1.1 The contractor shall appoint the required SHE personnel as prescribed in General Instruction **JMRC/SHE/GI/001** (enclosed at the end) based upon the statutory requirement and establish the safety organisation based upon the contract value. The minimum educational qualification and the work experience are given in General Instruction **JMRC/SHE/GI/002**.



- 6.1.2 **In order to effectively interact on labour welfare matters with the Employer and the statutory authorities enforcing the labour welfare legislations every contractor shall employ a full time Labour Welfare Officer duly qualified and experienced as per Clause 6.1.1.**
- 6.2 Conduct and competency
- 6.2.1 The conduct and functioning of the contractor SHE personnel shall be monitored by the Employer. Any default or deficiency shall attract penalty as per details given under penalty clause 56.0 of this document.
- 6.2.2 The Contractor shall ensure that all personnel are competent to perform the job assigned to them. In the event that the Contractor is unable to demonstrate the competency of any person whose activities can directly impact on the Works' SHE performance, the Employer shall remove that person from the site without any procedural formalities.
- 6.3 Approval from Employer
- 6.3.1 The name, address, educational qualification, work experience and health condition of each personnel deployed for SHE jobs shall be submitted to the Employer in the format prescribed for the purpose for comments and approval well before the start of the work. Only on approval by the Employer these personnel are authorised to work. In case any of the SHE personnel leaves the contractor the same shall be intimated to the Employer. The contractor shall recruit new personnel and fill up the vacancy.
- 6.4 **Responsibility of SHE personnel**
- 6.4.1 **For all works carried out by the contractor and his sub-contractors, the responsibility of ensuring the required SHE manpower lies with the main contractor only. The minimum required manpower indicated by the Employer includes the sub-contractors' work also. It shall be the responsibility of the main contractor to provide required SHE manpower for all the works executed by all contractors. Necessary conditions shall be included in all sub-contract documents executed by the main contractor.**
- 6.5 Employment status of SHE personnel
- 6.5.1 No contractor shall engage SHE manpower from any outsourcing agencies in which case the effectiveness would be lost. All SHE manpower shall be on the payroll of the main contractor only and not on the payroll of any subcontractor or outsourcing manpower agencies etc. This condition does not apply to positions like traffic marshals who are engaged almost on a daily requirement basis.
- 6.6 Reporting of SHE personnel
- 6.6.1 All SHE personnel are to report to the Chief SHE Manager who shall report directly to the Chief Project Manager. The Employer shall monitor adherence to this procedure at all times. In case of non-adherence penalty shall be levied as indicated in the penalty clause.
- 6.7 **Inadequate SHE personnel**



- 6.7.1 In case if the contractor fail to provide the minimum required manpower as illustrated in General Instruction JMRC/SHE/GI/001, or fail to fill up vacancies created within 14 days, the same shall be provided by the Employer at contractor's cost. Any administrative expenses involved to provide the same like paper advertisement or manpower consultant charges, etc shall also be at the cost of contractor.
- 6.8 Prohibition of performance of other duties
- 6.8.1 As per Schedule VI of RBOCWR no SHE personnel shall be required or permitted to do any work which is unconnected to, inconsistent with or detrimental to the performance of the SHE duties for respective category mentioned in General Information JMRC/SHE/GI/001
- 6.9 Facilities to be provided to SHE personnel
- 6.9.1 As per schedule VIII of BOCWR, the contractor shall provide all SHE personnel with such facilities, equipment and information that are necessary to enable him to dispatch his duties effectively.
- 6.9.2 The minimum Employer's requirements of such facilities / equipments to be provided for SHE personnel are given in the General Instruction JMRC/SHE/GI/003.
- 7.0 Contractor SHE Committee**
- 7.1 All employees should be able to participate in the making and monitoring of arrangements for safety, industrial health and environment at their place of work. The establishment of site SHE committees in which employees and Contractor and sub-contractor management are represented can increase the involvement and commitment of employees. The contractor shall ensure the formation and monitor the functioning of contractor SHE committees.
- 7.2 Terms of Reference
- 7.2.1 The Terms of Reference for the committee shall be as follows;
- i) To establish company safety policies and practices
 - ii) To monitor the adequacy of the contractor's site SHE plan and ensure its implementation
 - iii) To review SHE training
 - iv) To review the contractor's monthly SHE report.
 - v) To identify probable causes of accident and unsafe practices in building or other construction work and to suggest remedial measures.
 - vi) To stimulate interest of Employer and building workers in safety by organizing safety week, safety competition, talks and film-shows on safety, preparing posters or taking similar other measures as and when required or as necessary.
 - vii) To go round the construction site with a view to check unsafe practices and detect unsafe conditions and to recommend remedial measures for their rectifications including first-aid medical and welfare facilities.
 - viii) Committee team members should perform a site inspection before every committee meetings and to monitor SHE inspection reports.
 - ix) To bring to the notice of the Employer the hazards associated with use, handling and maintenance of the equipment used during the course of building and other construction work



Safety, Health and Environment (SHE) Manual

- x) To suggest measures for improving welfare amenities in the construction site and other miscellaneous aspect of safety, health and welfare in building or other construction work.
- xi) To look into the health hazards associated with handling different types of explosives, chemicals and other construction materials and to suggest remedial measures including personal protective equipment.
- xii) To review the last safety committee meeting minutes and to take action against persons/sub-contractors for non-compliance if any.

7.3 Within 14 days of award of contract, the SHE committee shall be constituted and notification regarding the same shall be communicated to the members and employees as per the format provided in **Form No.: SF 001**

7.4 Site SHE Committee meeting shall be conducted at least once in a **month** with the minimum members listed below:

Chairman	Project Manager
Secretary	SHE Manager (In-charge)
Members	<ul style="list-style-type: none">i) Labour Welfare Officerii) In charge of plant and machineryiii) In charge of site electricsiv) In charge of stores.v) Senior Managers/ Engineers heading different sub functions.vi) Sub – contractor's representativevii) Labour Contractor's representativeviii) Workers' representativeix) Co-contractor representative.x) SHE staffs
Employer's Representatives	JMRC SHE in charge and other representatives

7.5 Construction SHE Committee meeting shall be conducted at least once in a **week** with the minimum members listed below:

Chairman	Project Manager
Secretary	SHE Manager (In-charge)
Members	<ul style="list-style-type: none">i) Labour Welfare Officerii) In charge of plant and machineryiii) In-charge of site electricsiv) Senior Managers / Engineers heading different sub functionsv) Sub- Contractor's representativevi) Labour contractor's representativevii) Workers' representativesviii) All SHE Staffs



- 7.6 Co-contractors' participation
- 7.6.1 In case of depot, station and other contiguous areas where more than one main contractors are working together, the Employer shall instruct the other contractors to join for the monthly SHE committee meeting of the main civil contractor, so as to discuss and decide about the common provision of security, lighting, toilet, drinking water etc. and sharing the maintenance cost of the same etc.
- 7.6.2 **The general principle for sharing the cost shall be either based on the contract value of works executed at the contiguous area or the daily average number of workmen employed by each contractor in the contiguous area.**
- 7.7 Minimum time between two monthly SHE Committee meetings
- 7.7.1 A minimum period of **21 days** shall be maintained between any two SHE monthly committee meetings.
- 7.8 **Agenda**
- 7.8.1 The Secretary shall circulate the agenda of the meeting at least seven working days in advance of the scheduled date of the meeting to all members.
- 7.8.2 The agenda should broadly cover the following:
- i) Confirmation of minutes
 - ii) Chairman's review/overview of site SHE performance / condition
 - iii) Previous month SHE statistics
 - iv) Incident and Accident Investigation / dangerous occurrence / near miss report
 - v) Site SHE inspection
 - vi) Sub-contractors' SHE issues
 - vii) Safety presentation by Members
 - viii) Report from Employer
 - ix) Matters arising
 - x) Any other business
- 7.9 Minutes of the meeting
- 7.9.1 The Minutes of the meeting shall be prepared as per the format provided at **Form No.: SF-002** and sent to all members within 2 working days preferably by mail/fax followed by hardcopy. Safety Committee meeting minutes shall also be displayed in the notice board for wider publicity to all concerned.
- 7.10 **Disciplinary Action**
- 7.10.1 The chairman shall inform the members of any outstanding issues in the meeting and in case of repeated offence/ non-compliance by some members or other co/sub contractors and propose suitable disciplinary action including provisions of monetary penalty as per the relevant contract clauses, the Employer shall ensure that the same is implemented.



8.0 ID Card and First day at work, SHE orientation training

- 8.1 The Contractor shall ensure that all personnel working at the site receive an induction SHE training explaining the nature of the work, the hazards that may be encountered during the site work and the particular hazards attached to their own function within the operation. The training shall cover the contents as given in the General Instruction **JMRC/SHE/GI/004.**
- 8.2 **All personnel shall be issued a photo identity card of size 85mm x 55mm duly signed by the authorized representative of the contractor before they are engaged for any work as per the format given in the General Instruction **JMRC/SHE/GI/005.****
- 8.3 Contractor shall also issue a personnel SHE handbook in a language known to the workers, which provides information on SHE and emergency procedures that all personnel working on contract are required to know and the need to follow. Contractor shall ensure that this is distributed and its content introduced to all personnel working at the site.

9.0 SHE Training

- 9.1 The behaviour of people at all levels of the contractor is critical for SHE performance.
- 9.2 The contractor shall organise quality SHE training to engage Managers, supervisors and other personnel in behavioural change and improve safety performance.
- 9.3 The Contractor shall analyse the training requirements for all the employees and initiate a training program to demonstrate that all persons employed, including subcontractors, are suitably qualified, competent and fit. This will include:
- i) Detailed Job descriptions for all personnel, to include their specific SHE responsibilities
 - ii) Specification of qualifications, competency and training requirements for all personnel
 - iii) Assessment and recording of training needs for all personnel, including subcontractors' employees in the workforce, vendor representatives and site visitors
 - iv) A system for assessing new hirers e.g. previous training
 - v) A means of confirming that the system is effective
 - vi) A matrix and schedule of training requirements, covering general, task-specific and SHE-related training, showing the training frequency and interval between refresher courses
 - vii) Timely, competent delivery of training courses
- 9.4 The contractor shall arrange behavioural-based training programmes for all the executives to identify, recognise and eliminate unsafe act and unsafe conditions.
- 9.5 The minimum Employer's requirement of training needs for various categories of employees are given in general instruction **JMRC/SHE/GI/006**
- 9.6 The contents of SHE training to Managers/Supervisors as given in general instruction **JMRC/SHE/GI/007** shall be conducted.
- 9.7 **The refresher-training programme to all employees shall be conducted once in six months.**



- 9.8 **Toolbox talk as given in the Employer's Project SHE manual shall be conducted to all high-risk workmen everyday.**
- 9.9 **On-the spot practical skill development training on height safety including scaffold safety, crane safety, welding safety, electrical safety, traffic safety for marshals shall also be conducted to all foremen/ workmen who were associated to the concerned jobs.**
- 9.10 **Daily Safety Oath as given in Project SHE manual shall be taken by every employee including workman without fail.**
- 9.11 **All vehicle drivers including Hydra operators shall be trained on defensive driving at any Government authorized Institute or Maruti Institute of Driver Training and Research at Wazirabad Road, Adjoining Loni Road Flyover, Delhi-110094. All vehicle drivers shall also undergo refresher training on defensive driving provided by the same institute once in 6 months.**
- 9.12 All the above listed training programmes except at Clause **9.11** shall be organised by the contractor only after taking approval from the Employer for the training faculty / organisation, content and durations.
- 9.13 **In case of failure on the part of the contractor to provide all the above-mentioned training programs to all employees in time, the same shall be provided by the Employer through accredited agencies if required by formulating a common scheme to all contractors. Any administrative expenses and training fee towards the same shall be at the cost of the contractor.**
- 10.0 SHE Inspection**
- 10.1 The contractor shall evolve and administer a system of conducting SHE inspections and other risk management analysis on a periodical basis.
- 10.2 The purpose of SHE inspection is to identify any variation in construction activities and operations, machineries, plant and equipment and processes against the SHE Plan and its supplementary procedures and programs.
- 10.3 Following SHE inspections program shall be adopted.
- i) Planned General Inspection
 - ii) Routine Inspection
 - iii) Specific Inspection
 - iv) Other Inspection
- 10.3.1 Planned General Inspection
- 10.3.1.1 Planned general inspections are performed at predetermined intervals and it usually involves the representation from both Contractor and the Employer.
- 10.3.1.2 Inspections that will be classified under this inspection program are:
- i) Monthly contractor and subcontractors site safety committee Inspection.
 - ii) Weekly safety inspection by construction supervisors (Contractors and Sub-contractors).



- iii) Daily safety inspection by contractor site SHE team.

10.3.2 Routine Inspection

- 10.3.2.1 Routine inspections are often referring to the inspection of work site, equipment and temporary structures performed by site and equipment operators and temporary structure erectors.

Inspections that will be classified under this inspection program are:

- i) Daily Inspection of plant and equipment by operator
- ii) Weekly Inspection of scaffold by scaffolding supervisor
- iii) Monthly Inspection of electrical hand tools by competent electrical supervisor
- iv) Quarterly Inspection of temporary electrical systems by competent electrical supervisor
- v) Half-yearly inspection of lifting machinery, lifting appliances, equipment and gears by Govt. approved competent person.

- 10.3.2.2 The list mentioned above is not exhaustive. Contractor may add additional categories. Contractors' Site SHE Manager will ensure that a system of routine inspections are carried out periodically to all plants, equipment, powered tools and any other temporary structures that will pose a hazard to operators and workmen.

10.3.3 Specific Inspection

- 10.3.3.1 Specific inspections are performed on activities without a predetermined date. Competent supervisors usually perform inspections for ensuring an activity whether it is executed in accordance to a general set of rules; method statement submitted or developed procedures.

The following are examples that will be commonly performed as required on the construction site:

- i) Inspection performed before a heavy lifting operation.
- ii) Inspection performed before and after the entry of person into a confined space.
- iii) Inspection performed before and after a welding and gas cutting operation.
- iv) Inspection of formwork before concreting by formwork erector.

The list mentioned above is not exhaustive. The contractor shall ensure that a competent supervisor inspects all high-risk processes and activities.

10.3.4 Other Inspection

Other inspections includes the following:

- i) Mandatory Inspections by Labour Department of Government.
- ii) JMRC site SHE management team

- 10.3.5 The contractor shall prepare all required safety inspection checklist for all activity operations and equipment. Checklists will be prepared based on the Indian standards, rules and regulations and Employer's requirements. The formats provided in the Project SHE manual may be referred.

- 10.3.6 All inspection records and reports will be properly kept and filed for audit purpose. Inspection reports of Planned General Inspection and Routine Inspection will be used for discussion during Safety Committee Meetings.



11.0 SHE Audit

11.1 General

11.1.1 The purpose and scope of SHE audit is to assess potential risk, liabilities and the degree of compliance of construction Safety, Health & Environmental plan and its supplementary procedures and programs against applicable and current SHE legislation regulations and requirements of the employer.

11.1.2 Project Manager holds the ultimate responsibility in ensuring implementation of SHE audit program during the construction work.

11.2 Monthly Audit Rating Score (M A R S)

11.2.1 **Monthly Audit Rating Score (MARS) will be performed once in a month. A team consisting of Project manager and Employer representative based on the pre-designed score-rating format will conduct it. The details of the pre-designed monthly audit score rating formats are given in the Project SHE manual.**

11.2.2 This Monthly SHE Audit Rating Score (MARS) report will enable the Employer to evaluate the general compliance by the Contractor with the Conditions of Contract, the Employer's Project SHE Manual and the Contractor's site specific SHE Plan.

11.2.3 Monthly Audits will be conducted in accordance with JMRC Guidelines. The Project Manager accompanied by the Employer's representatives shall carry out the Audit. The Contractor's senior manager and SHE in-charge should also be invited to attend.

11.2.4 Timing

The Monthly Audit Rating Score (MARS) should be conducted at least 7 days prior to the scheduled date of Monthly SHE Committee meeting.

11.2.5 Evaluation

11.2.5.1 The numerical scoring has been weighed on a 1-10 scale. The audit team will use their observations noted in evaluating the points to be awarded against each of the elements of the audited section. Wherever some topics and sub-topics are not applicable the score rating need not be given. The overall audit ratings shall be achieved by:

$$\text{Overall Audit rating} = \frac{\text{Actual Score Achieved}}{\text{Maximum Possible Score}} \times 100$$

11.2.5.2 The criticality of the required actions for the respective sections of the Audit will be classified as:

Sl. No.	Score	Description	Action
1	< 60%	Immediate	Require Contractor to rectify within 24 hours and confirm in writing to Employer
2	< 75%	Improvement Necessary	Contractor rectification within 7 days and



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			confirmed in writing to Employer
3	< 90%	Improvement Desirable	Contractor rectification within one month and confirmed in writing to Employer

11.2.6 Report

A copy of each Audit Report will be sent to Employer and to all subcontractors, with whom it will then be discussed in detail at the Monthly SHE Committee Meeting in order to ensure that any corrective actions are agreed upon.

11.3 Monthly Electrical Safety Audit

11.3.1 A team comprising of contractor's senior SHE (Electrical) engineer and Employer's representative shall conduct monthly electrical safety audit covering the following and submit the report to Employer.

- i) Electrical accidents investigation findings and remedy
- ii) Adequacy of power generation and power requirements
- iii) Power distribution and transmission system in place
- iv) Updated electrical single line diagram showing the current condition of power source and distribution including the IP44 DBs arrangement.
- v) Electrical protection devices – selection, installation and maintenance.
- vi) Earth or ground connection and earth pit maintenance details
- vii) Education and training of electrical personnel undertaken
- viii) Routine electrical inspection details
- ix) Electrical maintenance system and register.
- x) Name plate details of major electrical equipment
- xi) Classified zones in the site, if any.

11.4 External SHE Audit

11.4.1 External SHE audits are to be conducted by external agencies that are competent with ISO qualified auditors with the prior approval of the Employer.

11.4.2 Areas of competence of Audit team

11.4.2.1 Practical understanding of BOCW Act and Rules, statutory requirements on health/medical and welfare of workmen, construction hazards and its prevention and control, traffic management, electrical safety, rigging, safety of construction equipment and environment management.

11.4.2.2 Audit shall be conducted as per the guidelines of ISO, ILO, and national standards. Audit report shall also be presented as per the above formats.

11.4.3 External SHE audit shall be conducted on a quarterly basis throughout the currency of the contract.

11.4.4 Targets of SHE Audit:

The contents and coverage of the external audit shall include the following items



11.4.4.1 SHE management:

- i) Organization
- ii) Communication and Motivation
- iii) Time office
- iv) Inspection
- v) Emergency preparedness
- vi) Budget allocation
- vii) Education and Training
- viii) Work permit system

11.4.4.2 Technical:

- i) Building and Structure
- ii) Construction operational safety
- iii) Material safety
- iv) Hand tools and Power tools
- v) Electrical system
- vi) Safety Appliances
- vii) Fire prevention and control
- viii) Housekeeping
- ix) Maintenance and Machinery safety
- x) First-aid and Medical Facilities
- xi) Welfare measures
- xii) Environmental Management

11.4.5 Audit Documents:

11.4.5.1 Contractor shall make the below listed documents available for the review by the Audit team.

- i) **SHE policy**
- ii) **SHE manual**
- iii) **SHE Rules and Regulation**
- iv) **SHE organization chart**
- v) **Annual SHE objectives / programs**
- vi) **Accident / near miss statistics and analysis**
- vii) **SHE Training program / records for all personnel**
- viii) **Operating manuals and maintenance manual of all equipments**
- ix) **Safe worthiness certificates of all lifting appliances and gears**
- x) **Medical fitness record for all personnel**
- xi) **Risk identification, assessment and control details**
- xii) **Environmental management reports**
- xiii) **Emergency management records including mock drill**

11.4.6 Audit Preparation:



- i) Audit team members are required to gather information by observations through interviews and by checks of hardware and documentation.
- ii) Audit team shall prepare checklist to cover all parts based on SHE legislations rules and regulations and JMRC requirements.
- iii) Audit team members shall verify the facts and findings leading to the identified gaps and weakness.
- iv) Audit leader has overall responsibility for reaching a conclusion.

11.4.7 Reporting:

11.4.7.1 Audit report shall be prepared and directly sent to the Employer within 7 days of conducting the audit with a copy to the contractor.

11.4.8 Report contents:

- i) Executing summary - based on the finalized checklists as written the findings to the Employer by the audit team members, the audit leader will compile a concise and accurate summary of observations and findings.
- ii) Introduction - this will contain basic information regarding the facilities or organization audited, the specific audit dates (inclusion of those for preparation and post-audit activities).
- iii) Principal positive findings - This will contain the summary of positive aspects as observed by the auditors. It will also contain highlights of those issue, which may warrant dissemination as best practice regarding methodology used or achievement.
- iv) Audit Findings - All audit findings as detailed in the audit checklists shall be grouped together as priority 1 and 2 as detailed below in a separate listing.
 - a) Priority 1: Actions to rectify gaps or weakness should generally be implemented within two-weeks time, if risk potential is high or unacceptable.
 - b) Priority 2: Actions should be generally implemented or rectified with a maximum of 3 – 4 weeks, if not rectified would create a likelihood of minor injury or business loss.

11.4.9 Conformity Report & Action by Employer

11.4.9.1 The auditor shall inspect the site after 14 days of conducting initial audit for checking the adequacy of implementation of items maintained under priority 1 by the contractor and shall submit a conformity / non-conformity report to the Employer with a copy to the contractor.

11.4.9.2 The auditor shall again inspect after 28 days of conducting initial audit for checking the adequacy of implementation of items mentioned under priority 2 by the contractor and shall submit a conformity / non-conformity report to the Employer with a copy to the contractor.

11.4.9.3 In case of non-conformity of items mentioned by auditor, the Employer shall take necessary steps including stoppage of work and or imposing any penalty for getting the item implemented.

11.4.10 Failure of contractor to conduct External SHE Audit

11.4.10.1 **If the contractor fails to conduct the external SHE audit in time, the Employer at the cost of contractor shall get it done.**



12.0 SHE Communication

- 12.1 The contractor shall take every effort to communicate the Safety, Occupational health and Environment management measures through posters campaigns / billboards / banners / glow signs being displayed around the work site as part of the effort to rise safety awareness amongst to the work force. Posters should be in Hindi, English and other suitable language deemed appropriate. Posters / billboards / banners/ glow signs should be changed at least once in a month to maintain the impact.
- 12.2 The contractor shall also observe important days as listed in General Instruction **JMRC/SHE/GI/008** and printing and displaying safety signage and posters as listed in General Instruction **JMRC/SHE/GI/009**.
- 12.3 The list indicated are the minimum requirements of the Employer and the contractor is encouraged to further the SHE communication activities by formulating suitable reward schemes for safety performers and any other activities, which deem fit for the purpose.

13.0 SHE Submittals to the Employer

- 13.1 The contractor's SHE management should send the following reports to the Employer periodically:
- i) Daily Reporting of total no of workmen (as given in Clause **13.2**)
 - ii) Monthly SHE Report (as given in Clause **13.3**)
 - iii) SHE Committee Meeting Minutes (as given in Clause **7.9.1**)
 - iv) SHE Inspection Reports
 - v) SHE Audit Reports
 - a) Monthly Audit Rating Score (MARS) report
 - b) External SHE Audit
 - c) Electrical Safety Audit
 - vi) Air and Noise Quality monitoring report
- 13.2 **Daily Reporting of total no of workmen**
- 13.2.1 **The contractor shall report to the Employer the total no of workmen engaged by all including any subcontractor within 2 hours of starting of any shift in any day. This reporting shall be the primary duty of the Chief SHE Manager of the contractor and reporting shall be through tele-fax / email. The onus of checking the receipt of the same by the Employer lies with the contractor. If the information is not received or received more than 2 hrs after starting of the shift, penalty shall be levied as per relevant clause.**
- 13.3 Monthly SHE Report
- 13.3.1 The contractor shall prepare a monthly SHE report consisting of the following and submit 3 copies within 7th of next month to the Employer as specified in the Project SHE manual.
- i) Monthly man-hour details as specified in the Project SHE manual
 - ii) Monthly accident / incident details as specified in the Project SHE manual
 - iii) SHE committee details



- iv) Details of SHE training conducted in the month
- v) SHE Inspection
- vi) SHE internal audit details like electrical audit etc.
- vii) SHE Communication activities under taken in the month indicating the number of posters displayed and balance availability in stock.
- viii) Air quality / Noise monitoring details
- ix) Toolbox talks details
- x) PPE details: Quantity purchased, issued to the workmen and stock available.
- xi) Details on IP 44 panel boards, lighting poles, welding and cutting equipments, Ladders, Hoists, tools & tackles.
- xii) Monthly Lux meter study results
- xiii) Housekeeping
- xiv) Barricade maintenance details
- xv) No of critical excavations
- xvi) Health & Welfare activities
- xvii) Safety walk conducted by Contractors' Project Manager in the month
- xviii) SHE Activities Planned for next month

14.0 Accident reporting and investigation

14.1 Reporting to Employer

14.1.1 All accidents and dangerous occurrences shall immediately be informed verbally to the Employer. This will enable the Employer to reach to the scene of accident / dangerous occurrences to monitor/assist any rescue work and/or start conducting the investigation process so that the evidences are not lost.

14.1.2 Reports of all accidents (fatal / injury) and dangerous occurrences shall also be sent within 24 hours as per format provided in the Employer's Project SHE manual.

14.1.3 No accident / dangerous occurrences is exempted from reporting to the Employer.

14.1.4 Any wilful delay in verbal and written reporting to the Employer shall be penalised as per relevant clause.

14.2 Reporting to Government organisations

14.2.1 In addition to the above verbal and written reporting to the Employer, as per Rule 210 of BOCWR, notice of any accident to a worker at the building or construction site that:

- a) causes loss of life; or
- b) disables a worker from working for a period of 48 hours or more immediately following the accident;
- c) shall forthwith be sent by telegram, telephone, fax, or similar other means including special messenger within four hours in case of fatal accidents and 72 hours in case of other accidents, to:
 - i) the Regional Labour Commissioner (central), wherein the contractor has registered the firm/work
 - ii) the board with which the worker involved was registered as a beneficiary;



- iii) Director General and
- iv) the next of kin or other relative of the worker involved in the accident;

14.2.2 Further, notice of accident shall be sent in respect of an accident which

- (a) causes loss of life; or
- (b) disables the injured worker from work for more than 10 days to
 - i) the officer-in-charge of the nearest police station;
 - ii) the District Magistrate or, if the District Magistrate by order so desires, to
 - iii) the Sub-Divisional Magistrate

14.2.3 In case of an accident causing minor injury, first-aid shall be administered and the injured worker shall be immediately transferred to a hospital or other place for medical treatment.

14.2.4 Where any accident causing disablement that subsequently results in death, notice in writing of such death, shall be sent to the authorities mentioned in clause 14.2.1 and 14.2.2 above within 72 hours of such death.

14.2.5 Reporting of dangerous occurrences:

14.2.5.1 The following classes of dangerous occurrences shall be reported to the Inspector having jurisdiction, whether or not any disablement or death caused to the worker, namely:

- (a) collapse or failure of lifting appliances, or hoist, or conveyors, or similar equipment for handling of building or construction material or breakage or failure of rope, chain or loose gears; or overturning of cranes used in construction work;
- (b) falling of objects from height;
- (c) collapse or subsidence of soil, tunnel, pipe lines, any wall, floor, gallery, roof or any other part of any structure, launching girder, platform, staging, scaffolding or means of access including formwork;
- (d) explosion of receiver or vessel used for storage of pressure greater than atmospheric pressure, of any gas or gases or any liquid or solid used as building material;
- (e) fire and explosion causing damage to any place on construction site where building workers are employed;
- (f) spillage or leakage of any hazardous substance and damage to their container;
- (g) collapse, capsizing, toppling or collision of transport equipment;
- (h) leakage or release of harmful toxic gases at the construction site;

14.2.6 In case of failure of launching girder, lifting appliance, loose gear, hoist or building and other construction work, machinery and transport equipment at a construction site, such appliances, gear, hoist, machinery or equipment and the site of such occurrence shall, as far as practicable, be kept undisturbed until inspected by the Authorities;

14.2.7 Every notice given for fatal accidents or dangerous occurrences shall be followed by a written report to the concerned Authorities under Section 39 of BOCWA and the Director General in the specified Form XIV of BOCWR.

14.3 Accident investigation



14.3.1 General

14.3.1.1 Investigations should be conducted in an open and positive atmosphere that encourages the witnesses to talk freely. The primary objective is to ascertain the facts with a view to prevent future and possibly more serious occurrences

14.3.1.2 Accidents and Dangerous Occurrences which result in death, serious injury or serious damage must be investigated by the Contractor immediately to find out the cause of the accident/occurrence so that measures can be formulated to prevent any recurrence.

14.3.1.3 Near misses and minor accidents should also be investigated by the Contractor as soon as possible as they are signals that there are inadequacies in the safety management system.

14.3.2 Procedure of incident investigation

14.3.2.1 It is important after any accident or dangerous occurrence that information relating to the incident is gathered in an organised way. The following steps shall be followed;

- a) take photographs and make sketches
- b) examine involved equipment, workpiece or material and the environmental conditions
- c) interview the injured, eye-witnesses and other involved parties
- d) consult expert opinion where necessary
- e) identify the specific contractor or sub-contractor involved.

14.3.2.2 Having gathered information, it is then necessary to make an analysis of incident

- a) establish the chain of events leading to the accident or incident
- b) find out at what stage the accident took place
- c) consider all possible causes and the interaction of different factors that led up to the accident, and identify the most probable cause. The cause of an accident should never be classified as carelessness. The specific act or omission that caused the accident must be identified.

14.3.2.3 The next stage is to proceed with the follow-up action

- a) report on the findings and conclusions
- b) formulate preventive measures to avoid recurrence
- c) publicise the findings and the remedial actions taken

14.4 Employers' independent incident investigation

14.4.1 In case of fatal / dangerous occurrence the Employer shall also conduct independent investigation. Contractor and his staff shall extend necessary co-operation and testify about the accident.

14.4.2 The contractor shall take every effort to preserve the scene of accident till the Employer completes the investigation.

14.4.3 All persons summoned by the Employer in connection to witness recording shall obey the instructions without delay. Any wilful suppression of information by any person shall be removed from the site immediately and / or punishable as per relevant penalty clause.



15.0 Emergency preparedness plan

- 15.1 The Contractor shall prepare an Emergency Response Plan for all work sites as a part of the Contractor SHE Plan. The plan shall integrate the emergency response plans of the Contractor and all other subcontractors. The Emergency Response Plan shall detail the Contractor's procedures, including detailed communications arrangements, for dealing with all emergencies that could affect the Site. This include where applicable, injury, sickness, evacuation, fire, chemical spillage, severe weather and rescue.
- 15.2 The contractor shall ensure that an Emergency Response Plan is prepared to deal with emergencies arising out of:
- i) Fire and explosion
 - ii) Collapse of lifting appliances and transport equipment
 - iii) Collapse of building, sheds or structure etc.
 - iv) Gas leakage or spillage of dangerous goods or chemicals
 - v) Bomb threatening, Criminal or Terrorist attack
 - vi) Drowning of workers
 - vii) Landslides getting workers buried floods, Earthquake, storms and other natural calamities.
- 15.3 Arrangements shall be made for emergency medical treatment and evacuation of the victim in the event of an accident or dangerous incident occurring, the chain of command and the responsible persons of the contractor with their telephone numbers and addresses for quick communication shall be adequately publicized and conspicuously displayed in the workplace.
- 15.4 Contractors shall require to tie-up with the hospitals and fire stations located in the neighbourhood for attending to the casualties promptly and emergency vehicle kept on standby duty during the working hours for the purpose.
- 15.5 Contractor shall conduct an onsite emergency mock drill once in every month for all his workers and his subcontractor's workers.
- 15.6 It shall be the responsibility of the contractor to keep the Local Law & Order Authorities informed and seek urgent help, as the case may be, so as to mitigate the consequences of an emergency. Prompt communication to JMRC, telephonically initially and followed by a written report, shall be made by the contractor.

16.0 Experts / Agencies for SHE services

- 16.1 Contractors may utilise the services of experts/agencies empanelled under Rule 250 of BOCWR and Rule 277 of RBOCWR for the purpose of training, internal audit and any other SHE services with prior approval of the Employer.
- 16.2 As an aide to contractors, a list of experts/agencies and the offered service are given in General Instruction **JMRC/SHE/GI/010** for ready reference. In addition to it if the contractor would like to use any expert/agencies' services for any SHE activities the same can also be allowed provided that they are competent and meet to the general requirements of Employer. In every case prior approval of the Employer is mandatory.



PART – II : SAFETY



17.0 Housekeeping

- 17.1 Housekeeping is the act of keeping the working environment cleared of all unnecessary waste, thereby providing a first-line of defence against accidents and injuries.
- 17.2 Contractor shall understand and accept that improper housekeeping is the primary hazard in any construction site and ensure that a high degree of house keeping is always maintained. Indeed "Cleanliness is indeed next to Godliness"
- 17.3 Housekeeping is the responsibility of all site personnel, and line management commitment shall be demonstrated by the continued efforts of supervising staff towards this activity.
- 17.4 General House keeping shall be carried out by the contractor and ensured at all times at Work Site, Construction Depot, Batching Plant, Labour Camp, Stores, Offices and toilets/urinals. Towards this the Contractor shall constitute a special group of house keeping personnel as per General Instruction **JMRC/SHE/GI/001**. This group shall ensure daily cleaning at work sites and surrounding areas and maintain a register as per the approved format by the Employer.
- 17.5 Adequate time shall be assigned to ensure that good housekeeping is maintained. This shall be carried out by team of housekeeping squad.
- 17.6 The contractor shall be responsible to provide segregated containers for disposal of debris at required places and regular cleaning of the same.
- 17.7 Full height fence, barriers, barricades etc. shall be erected around the site in order to prevent the surrounding area from excavated soil, rubbish etc, which may cause inconvenience to and endanger the public. The barricade especially those exposed to public shall be aesthetically maintained by regular cleaning and painting as directed by the Employer. These shall be maintained in one line and level.
- 17.8 The structure dimension of the barricade, material and composition, its colour scheme, JMRC logo and other details shall be in accordance with specifications laid down in tender document.
- 17.9 All stairways, passageways and gangways shall be maintained without any blockages or obstructions. All emergency exits passageways, exits fire doors, break-glass alarm points, fire fighting equipment, first aid stations, and other emergency stations shall be kept clean, unobstructed and in good working order.
- 17.10 Lumber with protruding nails shall be either bent / removed and properly stacked.
- 17.11 All surplus earth and debris are removed/disposed off from the working areas to officially designated dumpsites. Trucks carrying sand, earth and any pulverized materials etc. in order to avoid dust or odour impact shall be covered while moving. **The tyres of the trucks leaving the site shall be cleaned with water, wherever the possibility of spillage on carriageways meant for regular road traffic exists.**
- 17.12 No parking of trucks/trolleys, cranes and trailers etc. shall be allowed on roads, which may obstruct the traffic movement.



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- 17.13 Roads shall be kept clear and materials like: pipes, steel, sand boulders, concrete, chips and brick etc. shall not be allowed on the roads to obstruct free movement of road traffic.
- 17.14 Water logging or bentonite spillage on roads shall not be allowed. If bentonite spillage is observed on road endangering the safety of road users, the contractor shall be penalised as per relevant clause.
- 17.15 Proper and safe stacking of material are of paramount importance at yards, stores and such locations where material would be unloaded for future use. The storage area shall be well laid out with easy access and material stored / stacked in an orderly and safe manner.
- 17.16 Flammable chemicals / compressed gas cylinders shall be safely stored.
- 17.17 Unused/surplus cables, steel items and steel scrap lying scattered at different places within the working areas shall be removed to identified locations(s).
- 17.18 All wooden scrap, empty wooden cable drums and other combustible packing materials, shall be removed from work place to identified location(s).
- 17.19 Empty cement bags and other packaging material shall be properly stacked and removed.
- 17.20 The Contractor shall ensure that all his sub-contractors maintain the site reasonably clean through provisions related to house keeping

18.0 Working at Height

18.1 Definitions

- 18.1.1 "access" and "egress" include ascent and descent.
- 18.1.2 "fragile surface" means a surface, which would be able to fail if any reasonably foreseeable loading were to be applied to it.
- 18.1.3 "line" includes rope, chain or webbing
- 18.1.4 "personal fall protection" means -
(a) a fall prevention, work restraint, work positioning, fall arrest or rescue system, other than a system in which the only safeguards are collective safeguards; or
(b) rope access and positioning techniques;
- 18.1.5 "work at height" means -
(a) work in any place, including a place at or below ground level;
(b) obtaining access to or egress from such place while at work, except by a staircase in a permanent workplace,
where, if protective measures were not taken, a person could fall a distance liable to cause personal injury;
- 18.1.6 "work equipment" means any machinery, appliance, apparatus, tool or installation for use at work (whether exclusively or not) and includes
(a) a guard-rail, toe-board, barrier or similar collective means of protection



- (b) a working platform
 - (c) a net, airbag or other collective safe guard for arresting falls.
 - (d) personal fall protection system
 - (e) ladders
- 18.1.7 “working platform”
 - (a) means any platform used as a place of work or as a means of access to or egress from a place of work;
 - (b) includes any scaffold, suspended scaffold, cradle, mobile platforms, trestle, gangway, gantry and stairway which is so used.
- 18.2 Organisation and planning
The contractor shall ensure that work at height is
 - i) properly planned for any emergencies and rescue
 - ii) appropriately supervised; and
 - iii) carried out in a manner, which is reasonably practicable safe.
- 18.3 The contractor shall ensure that work at height is carried out only when the weather conditions do not jeopardise the health or safety of persons involved in the work.
- 18.4 Competence
The contractor shall ensure that no person engages in any activity, including organization, planning and supervision, in relation to work at height or work equipment for use in such work unless he is competent to do so or, if being trained, is being supervised by a competent person.
- 18.5 Avoidance of risks from work at height
The contractor shall ensure that work is not carried out at height where it is reasonably practicable to carry out the work safely otherwise than at height.
- 18.6 Where work is carried out at height, the contractor shall take suitable and sufficient measures as given below to prevent, so far as is reasonably practicable, any person falling a distance liable to cause personal injury.
 - (a) his ensuring that the work is carried out
 - (i) from an existing place of work; or
 - (ii) (in the case of obtaining access or egress) using an existing means, complying to the requirements as given in **18.15** where it is reasonably practicable to carry it out safely and under appropriate ergonomic conditions; and
 - (b) where it is not reasonably practicable for the work to be carried out in accordance with sub-paragraph (a), his providing sufficient work equipment for preventing, so far as is reasonably practicable, a fall occurring.
- 18.7 Where the measures taken under clause **18.6** do not eliminate the risk of a fall occurring, every contractor shall
 - (a) so far as is reasonably practicable, provide sufficient work equipment to minimise -
 - (i) the distance and consequences; or
 - (ii) where it is not reasonably practicable to minimise the distance, the consequences, of a fall; and



- (b) Without prejudice to the generality of clause **18.4**, provide such additional training and instruction or take other additional suitable and sufficient measures to prevent, so far as is reasonably practicable, any person falling a distance liable to cause personal injury.

18.8 Selection of 'work equipment' for work at height

- 1) the contractor, in selecting work equipment for use in work at height, shall
 - a) give collective protection measures priority over personal protection measures; and
 - b) take account of
 - i) the working conditions and the risks to the safety of persons at the place where the work equipment is to be used;
 - ii) in the case of work equipment for access and egress, the distance to be negotiated;
 - iii) the distance and consequences of a potential fall;
 - iv) the duration and frequency of use;
 - v) the need for easy and timely evacuation and rescue in an emergency; and
 - vi) any additional risk posed by the use, installation or removal of that work equipment or by evacuation and rescue from it;
- (2) The contractor shall select work equipment for work at height which:
 - a) has characteristics including dimensions which:
 - (i) are appropriate to the nature of the work to be performed and the foreseeable loadings; and
 - (ii) allow passage without risk; and
 - b) is in other respects the most suitable work equipment, having regard in particular to the purposes specified in **18.5** and **18.6**.

18.9 Fragile surfaces

18.9.1 The contractor shall ensure that no person at work passes across or near, or working on, from or near, a fragile surface where it is reasonably practicable to carry out work safely and under appropriate ergonomic conditions without his doing so.

18.9.2 Where it is not reasonably practicable to carry out work safely and under appropriate ergonomic conditions without passing across or near, or working on, from or near, a fragile surface, every contractor shall,

- (a) ensure, so far as is reasonably practicable, that suitable and sufficient platforms, coverings, guard rails or similar means of support or protection are provided and used so that any foreseeable loading is supported by such supports or borne by such protection;
- (b) where a risk of a person at work falling remains despite the measures taken under the preceding provisions of this regulation, take suitable and sufficient measures to minimise the distances and consequences of his fall.



- 18.9.3 Where any person at work may pass across or near, or work on, from or near, a fragile surface, every contractor shall ensure that
- (a) prominent warning notices are so far as is reasonably practicable affixed at the approach to the place where the fragile surface is situated; or
 - (b) where that is not reasonably practicable, such persons are made aware of it by other means.
- 18.10 Falling objects
- 18.10.1 The contractor shall, where necessary to prevent injury to any person, take suitable and sufficient steps to prevent, so far as is reasonably practicable, the fall of any material or object.
- 18.10.2 Where it is not reasonably practicable to comply with the requirements of **18.9**, every contractor shall take suitable and sufficient steps to prevent any person being struck by any falling material or object which is liable to cause personal injury.
- 18.10.3 The contractor shall ensure that no material or object is thrown or tipped from height in circumstances where it is liable to cause injury to any person.
- 18.10.4 Every employer shall ensure that materials and objects are stored in such a way as to prevent risk to any person arising from the collapse, overturning or unintended movement of such materials or objects.
- 18.11 Danger areas
- 18.11.1 Without prejudice to the preceding requirements of these Regulations, every contractor shall ensure that
- (a) where a workplace contains an area in which, owing to the nature of the work, there is a risk of any person at work
 - i) falling a distance; or
 - ii) being struck by a falling object,which is liable to cause personal injury, the workplace is so far as is reasonably practicable equipped with devices preventing unauthorised persons from entering such area; and
 - (b) such area is clearly indicated.
- 18.12 Inspection of work equipment
- 18.12.1 The contractor shall ensure that, where the safety of work equipment depends on how it is installed or assembled, it is not used after installation or assembly in any position unless it has been inspected in that position.
- 18.12.2 The contractor shall ensure that work equipment exposed to conditions causing deterioration which is liable to result in dangerous situations is inspected
- (a) at suitable intervals; and
 - (b) each time that exceptional circumstances which are liable to jeopardise the safety of the work equipment have occurred,
- to ensure that health and safety conditions are maintained and that any deterioration can be detected and remedied in good time.



- 18.12.3 Without prejudice to paragraph **18.12.1**, the contractor shall ensure that a working platform
- (a) used for construction work; and
 - (b) from which a person could fall 2 metres or more,
- is not used in any position unless it has been inspected in that position or, in the case of a mobile working platform, inspected on the site, within the previous 7 days.
- 18.12.4 The contractor shall ensure that the reports of all inspections are properly maintained and shown to the Employer as and when required.
- 18.12.5 In this clause "inspection",
- (a) means such visual or more rigorous inspection by a competent person as is appropriate for safety purposes;
 - (b) includes any testing appropriate for those purposes,
- 18.13 Inspection of places of work at height
- 18.13.1 The contractor shall so far as is reasonably practicable ensure that the surface and every parapet, permanent rail or other such fall protection measure of every place of work at height are checked on each occasion before the place is used.
- 18.14 Duties of persons at work
- 18.14.1 Any workmen employed by the contractor shall report to the supervisor about any defect relating to work at height which he knows is likely to endanger the safety of himself or another person.
- 18.14.2 Every workmen shall use any work equipment or safety device provided to him for work at height by the contractor, in accordance with
- (a) any training in the use of the work equipment or device concerned which have been received by him; and
 - (b) the instructions respecting that use which have been provided to him by the contractor as per the requirements of the Employer
- 18.15 Requirements for existing places of work and means of access or egress at height
- Every existing place of work or means of access or egress at height shall
- (a) be stable and of sufficient strength and rigidity for the purpose for which it is intended to be or is being used;
 - (b) where applicable, rest on a stable, sufficiently strong surface;
 - (c) be of sufficient dimensions to permit the safe passage of persons and the safe use of any plant or materials required to be used and to provide a safe working area having regard to the work to be carried out there;
 - (d) possess suitable and sufficient means for preventing a fall;
 - (e) possess a surface which has no gap
 - (i) through which a person could fall;
 - (ii) through which any material or object could fall and injure a person; or
 - (iii) giving rise to other risk of injury to any person, unless measures have been taken to protect persons against such risk;



- (f) be so constructed and used, and maintained in such condition, as to prevent, so far as is reasonably practicable -
 - (i) the risk of slipping or tripping; or
 - (ii) any person being caught between it and any adjacent structure;
- (g) where it has moving parts, be prevented by appropriate devices from moving inadvertently during work at height.

18.16 Requirements for guardrails, toe-boards, barriers and similar collective means of protection

- i) Unless the context otherwise requires, any reference in this section to means of protection is to a guardrail, toe-board, barrier or similar collective means of protection.
- ii) Means of protection shall
 - (a) be of sufficient dimensions, of sufficient strength and rigidity for the purposes for which they are being used, and otherwise suitable;
 - (b) be so placed, secured and used as to ensure, so far as is reasonably practicable, that they do not become accidentally displaced; and
 - (c) be so placed as to prevent, so far as is practicable, the fall of any person, or of any material or object, from any place of work.
- iii) In relation to work at height involved in construction work
 - (a) the top guard-rail or other similar means of protection shall be at least 950 millimetres above the edge from which any person is liable to fall;
 - (b) toe-boards shall be suitable and sufficient to prevent the fall of any person, or any material or object, from any place of work; and
 - (c) any intermediate guardrail or similar means of protection shall be positioned so that any gap between it and other means of protection does not exceed 470 millimetres.
- iv) Any structure or part of a structure which supports means of protection or to which means of protection are attached shall be of sufficient strength and suitable for the purpose of such support or attachment.

18.17 Requirements for all Working Platforms

- i) Every working platforms requires a supporting structure for holding it
- ii) Any surface upon which any supporting structure rests shall be stable, of sufficient strength and of suitable composition safely to support the supporting structure, the working platform and any loading intended to be placed on the working platform.
- iii). Stability of supporting structure
Any supporting structure shall
 - (a) be suitable and of sufficient strength and rigidity for the purpose for which it is being used;
 - (b) in the case of a wheeled structure, be prevented by appropriate devices from moving inadvertently during work at height;
 - (c) in other cases, be prevented from slipping by secure attachment to the bearing surface or to another structure, provision of an effective anti-slip device or by other means of equivalent effectiveness;
 - (d) be stable while being erected, used and dismantled; and
 - (e) when altered or modified, be so altered or modified as to ensure that it remains stable.
 - (f) Have suitable base plates and properly footed thereby.
- iv). Stability of working platforms



A working platform shall

- (a) be suitable and of sufficient strength and rigidity for the purpose or purposes for which it is intended to be used or is being used;
- (b) be so erected and used as to ensure that its components do not become accidentally displaced so as to endanger any person;
- (c) when altered or modified, be so altered or modified as to ensure that it remains stable; and
- (d) be dismantled in such a way as to prevent accidental displacement.

v) Safety on working platforms

A working platform shall

- (a) be of sufficient dimensions to permit the safe passage of persons and the safe use of any plant or materials required to be used and to provide a safe working area having regard to the work being carried out there;
- (b) possess a suitable surface and, in particular, be so constructed that the surface of the working platform has no gap
 - i) through which a person could fall;
 - ii) through which any material or object could fall and injure a person; or
 - iii) giving rise to other risk of injury to any person, unless measures have been taken to protect persons against such risk; and
- (c) be so erected and used, and maintained in such condition, as to prevent, so far as is reasonably practicable
 - i) the risk of slipping or tripping; or
 - ii) any person being caught between the working platform and any adjacent structure.

vi) Loading

A working platform and any supporting structure shall not be loaded so as to give rise to a risk of collapse or to any deformation, which could affect its safe use.

vii) Additional requirements for scaffolding

Strength and stability calculations for scaffolding shall be carried out unless

- (a) a note of the calculations, covering the structural arrangements contemplated, is available; or
- (b) it is assembled in conformity with a generally recognised standard configuration.

viii) Depending on the complexity of the scaffolding selected, a competent person shall draw up an assembly, use and dismantling plan. This may be in the form of a standard plan, supplemented by items relating to specific details of the scaffolding in question.

- ix) A copy of the plan, including any instructions it may contain, shall be kept available for the use of persons concerned in the assembly, use, dismantling or alteration of scaffolding until it has been dismantled.
- x) The dimensions, form and layout of scaffolding decks shall be appropriate to the nature of the work to be performed and suitable for the loads to be carried and permit work and passage in safety.



- xi) While a scaffold is not available for use, including during its assembly, dismantling or alteration, it shall be marked with general warning signs in accordance with and be suitably delineated by physical means preventing access to the danger zone.
- xii) Scaffolding may be assembled, dismantled or significantly altered only under the supervision of a competent person and by persons who have received appropriate and specific training in the operations envisaged which addresses specific risks which the operations may entail and precautions to be taken, and more particularly in
 - (a) understanding of the plan for the assembly, dismantling or alteration of the scaffolding concerned;
 - (b) safety during the assembly, dismantling or alteration of the scaffolding concerned;
 - (c) measures to prevent the risk of persons, materials or objects falling;
 - (d) safety measures in the event of changing weather conditions which could adversely affect the safety of the scaffolding concerned;
 - (e) permissible loadings;
 - (f) any other risks which the assembly, dismantling or alteration of the scaffolding may entail.

18.18 Requirements for collective safeguards for arresting falls

- i) Collective safeguard are a safety net, airbag or other collective safeguard for arresting falls
- ii) A safeguard shall be used only if
 - (a) a risk assessment has demonstrated that the work activity can so far as is reasonably practicable be performed safely while using it and without affecting its effectiveness;
 - (b) the use of other, safer work equipment is not reasonably practicable; and
 - (c) a sufficient number of available persons have received adequate training specific to the safeguard, including rescue procedures.
- iii) A safeguard shall be suitable and of sufficient strength to arrest safely the fall of any person who is liable to fall.
- iv) A safeguard shall
 - (a) in the case of a safeguard which is designed to be attached, be securely attached to all the required anchors, and the anchors and the means of attachment thereto shall be suitable and of sufficient strength and stability for the purpose of safely supporting the foreseeable loading in arresting any fall and during any subsequent rescue;
 - (b) in the case of an airbag, landing mat or similar safeguard, be stable; and
 - (c) in the case of a safeguard, which distorts in arresting a fall, afford sufficient clearance.
- v) Suitable and sufficient steps shall be taken to ensure, so far as practicable, that in the event of a fall by any person the safeguard does not itself cause injury to that person.

18.19 Requirements for personal fall protection systems



- i) A personal fall protection system shall be used only if
 - (a) a risk assessment has demonstrated that
 - (i) the work can so far as is reasonably practicable be performed safely while using that system; and
 - (ii) the use of other safer work equipment is not reasonably practicable; and
 - (b) the user and a sufficient number of available persons have received adequate training specific to the operations envisaged, including rescue procedures.
- ii) A personal fall protection system shall
 - (a) be suitable and of sufficient strength for the purposes for which it is being used having regard to the work being carried out and any foreseeable loading;
 - (b) where necessary, fit the user;
 - (c) be correctly fitted;
 - (d) be designed to minimise injury to the user and, where necessary, be adjusted to prevent the user falling or slipping from it, should a fall occur; and
 - (e) be so designed, installed and used as to prevent unplanned or uncontrolled movement of the user.
- iii) A personal fall protection system designed for use with an anchor shall be securely attached to at least one anchor, and each anchor and the means of attachment thereto shall be suitable and of sufficient strength and stability for the purpose of supporting any foreseeable loading.
- iv) Suitable and sufficient steps shall be taken to prevent any person falling or slipping from a personal fall protection system.

18.20 Requirements for Ladders

- 1) Every contractor shall ensure that a ladder is used for work at height only if a risk assessment has demonstrated that the use of more suitable work equipment is not justified because of the low risk and
 - i) The short duration of use; or
 - ii) Existing features on site, which he cannot alter.
- 2) Only metal ladders shall be allowed. Bamboo ladders are prohibited.
- 3) Any surface upon which a ladder rests shall be stable, firm, of sufficient strength and of suitable composition safely to support the ladder so that its rungs or steps remain horizontal, and any loading intended to be placed on it.
- 4) A ladder shall be so positioned as to ensure its stability during use
- 5) A suspended ladder shall be attached in a secure manner and so that, with the exception of a flexible ladder, it cannot be displaced and swinging is prevented.
- 6) A portable ladder shall be prevented from slipping during use by -
 - i) securing the stiles at or near their upper or lower ends;
 - ii) an effective anti-slip or other effective stability device; or
 - iii) any other arrangement of equivalent effectiveness.
- 7) A ladder used for access shall be long enough to protrude sufficiently above the place of landing to which it provides access, unless other measures have been taken to ensure a firm handhold.
- 8) No interlocking or extension ladder shall be used unless its sections are prevented from moving relative to each other while in use.
- 9) A mobile ladder shall be prevented from moving before it is stepped on.



- 10) Where a ladder or run of ladders raises a vertical distance of 9 metres or more above its base, there shall, where reasonably practicable, be provided at suitable intervals sufficient safe landing areas or rest platforms.
- 11) Every ladder shall be used in such a way that
 - (a) a secure handhold and secure support are always available to the user; and
 - (b) the user can maintain a safe handhold when carrying a load unless, in the case of a step ladder, the maintenance of a handhold is not practicable when a load is carried, and a risk assessment has demonstrated that the use of a stepladder is justified because of
 - (i) the low risk; and
 - (ii) the short duration of use.

19.0 Overhead protection

All contractors shall provide overhead protections as per Rule 41 of BOCWR

- i) Overhead protection should be erected along the periphery of every building which is under construction and the building height shall be 15m or above after construction.
- ii) Overhead protection shall be minimum 2m wide and the outer edge shall be 150mm higher than the inner edge and an angle not more than 20° to its horizontal sloping into the building.
- iii) Overhead protection shall not be erected more than a height of 5m from the base of the building.
- iv) Areas of inadvertent hazard of falling of material shall be guarded or barricaded or roped-off thereby by the contractor.

20.0 Slipping, Tripping, Cutting, Drowning and Falling Hazards

As per Rule 42 of BOCWR,

- i) All places should be free from dust, debris or similar materials.
- ii) Sharp projections or any protruding nails or similar objects shall be suitably guarded or shall even be avoided to make the place safe to work.
- iii) Contractor shall not allow workmen to work or use platforms, scaffolds/passageways or any walkways, which has water, or oil or similar substances spilt and has a slipping hazard, unless it is cleaned off or covered or sanded or saw dusted or make it safe with any suitable material.
- iv) When workers are exposed to areas where fall into water is possible, the contractor shall provide suitable and adequate equipment for saving the workers from drowning and rescuing from such hazard. If the Employer considers, the contractor shall provide well-equipped boat or launch, manned with trained personnel at the work place.
- v) Open side or opening where worker, equipment, vehicle or lifting appliance may fall at a building or outside shall be guarded suitably except in places of free access by reasons of nature of work.
- vi) Suitable safety net shall be provided at places of material / man falling is possible in accordance with national standards.

21.0 Lifting Appliances and Gear

- 21.1 (a) Lifting appliances means a crane, hoist machinery, derrick, winch, gin pole, sheer legs, jack, hoist drum, slewing machinery, slewing bearing fasteners, luffing machinery sheaves, pulley blocks, hooks or other equipment used for lifting materials, objects or building workers and



lifting gears means ropes, chain slings, shackles, hooks, lifting lugs, wire ropes, lifting eyebolts and eyenuts and other accessories of a lifting appliance.

(b) Use of “Tractor Transmission Type “Pick and Carry Hydra crane

“Tractor Transmission Type “Pick and Carry Hydra crane – 1st Generation model is prohibited at JMRC works. Contractor shall mobilize ‘Truck Transmission Type’ pick and hydra crane – 2nd Generation model only

- 21.2 No machine shall be selected to do any lifting on a specific job until its size and characteristics are considered against:
- i) the weights, dimensions and lift radii of the heaviest and largest loads
 - ii) the maximum lift height, the maximum lift radius and the weight of the loads that must be handled at each
 - iii) the number and frequency of lifts to be made
 - iv) how long the crane will be required on site
 - v) the type of lifting to be done (for example, is precision placement of loads important?
 - vi) the type of carrier required (this depends on ground conditions and machine capacity In its operating quadrants: capacity is normally greatest over the rear, less over the side, and non-existent over the front
 - vii) whether loads will have to be walked or carried
 - viii) whether loads will have to be suspended for lengthy periods
 - ix) the site conditions, including the ground where the machine will be set up, access roads and ramps it must travel, space for erection and any obstacles that might impede access or operation
- 21.3 The contractor shall ensure that a valid certificate of fitness issued as per clause **21.5** is available for all lifting appliances including synchronised mobile jacks, pre-stressing hydraulic jacks, jacks fitted with launching girders etc. and Employers approval before inducting to the site. **Only after obtaining the approval from the Employer any lifting appliances and gear shall be used.**
- 21.4 **The laminated photocopies of fitness certificate issued by competent person, the Employers’ approval letter, the operators’ photo, manufacturer’s load chart and competency certificate shall always be either kept in the operator cabin or pasted on the visible surface of the lifting appliances.**
- 21.5 **All lifting appliances and loose gears shall be clearly marked for its safe working load and identification by stamping or other suitable means.**
- 21.6 The contractor shall also maintain a register containing a system of identification of all tools and tackles, its date of purchase, safe working load, competent person date of examination etc.
- 21.7 Test and periodical examination of lifting appliances and gears
- 21.7.1 All lifting appliances including all parts and gears thereof, whether fixed or movable shall be thoroughly tested and examined by a competent person once at least in every six months or after it has undergone any alterations or repairs liable to affect its strength or stability. Within the validity, if the lifting appliances are shifted to a new site, re-examination by the same competent person for ensuring its safety shall also be done.



- 21.7.2 Contractors can utilise the services of any competent person as defined in Factories Act, 1948 and approved by Chief Inspector of Factories with the permission of the Employer.
- 21.7.3 All alarms and signals like automatic safe load indicators (SLI), boom angle indicators, boom extension indicators, over lift boom alarm, swing alarm, hydraulic safety valves, mechanical radius indicators, load moment indicators etc. shall be periodically examined and maintained always in working condition
- 21.8 Automatic safe load indicators
- 21.8.1 **As stipulated in Rule 100 of RBOCW Rules, every lifting appliances and gears like cranes, hydras etc, if so constructed that the safe working load may be varied by raising or lowering of the jib or otherwise shall be attached with an automatic indicator of safe working loads approved by Bureau of Indian standards/ International certifying bodies which gives a warning to the operator and arrests further movements of the lifting parts.**
- 21.9 Qualification of operator of lifting appliances and of signaller etc
- 21.9.1 The contractor shall not employ any person to drive or operate a lifting machine like crane, hydra etc whether driven by mechanical power or otherwise or to give signals to work as a operator of a riggers or derricks unless he
- i) is above twenty-one years of age and possesses a valid heavy transport vehicle driving licence as per Motor Vehicle Act and Rules.
 - ii) is absolutely competent and reliable
 - iii) possesses the knowledge of the inherent risks involved in the operation of lifting appliances by undergoing a formal training at any institution of national importance acceptable to Employer
 - iv) is medically examined periodically as specified in schedule VII of BOCW Rules.
- 21.10 General requirements of appliances
- 21.10.1 Out-of level
- 21.10.1.1 One of the most severe effects of being out-of fit level is that side loads develop in the boom. Because of side loads all mobile cranes lose capacity rapidly as the degree of out-of-level increases and therefore
- 21.10.2 Boom
- i) The boom is one of the more critical elements of the crane and must be in perfect condition at all time. No boom section with a bent lattice member shall be allowed
 - ii) All welds shall be crack and corrosion free
 - iii) No member of the boom shall be bent
 - iv) All telescopic boom shall be free from cracks, rust, flaking or cracked paint, bulges, greases or varnishes
- 21.10.3 The sweep area (work area) of the construction machinery shall be always free from obstructions.



21.10.4 All hydraulic piping and fittings shall be maintained leak proof.

21.10.5 The operator cab shall possess good and safe:

- i) structure, windows and windshield wipers
- ii) Drivers chair and foot rest
- iii) Control handles
- iv) Cab instrumentation
- v) Telecommunication
- vi) Cab out fitting
- vii) wind indicator with an adjustable set point shall be in a position representative for the wind on the crane. The indicator shall give continuous information regarding constant speeds and gusts.

21.11 Mandatory rigging requirements

21.11.1 Rigging shall be done under experienced and qualified rigger only.

21.11.2 The primary requirement in rigging shall be to assess the weight of load before attempting any lift.

21.11.3 All hooks shall be fitted with Master Rings having certificate of fitness from the competent person, so that the hooks are subjected to balanced vertical loading only.

21.11.4 Only four legged slings shall be allowed which includes master link (ring), intermediate master link (ring) if necessary, chain / wire rope sling, sling hook or other terminal fitting.

21.11.5 Hand spliced slings up to 32mm diameter shall not be used at site for any lifting purpose.

21.11.6 No load shall be slewed over public areas without stopping the pedestrians and road traffic first.

21.11.7 Requirements of outriggers

- i) All outriggers shall be fully extended and all tyres are clear of the ground
- ii) Heavy duty blocking having large bearing area shall be necessary to prevent sinking of floats

21.11.8 All loads shall have tag-lines attached in order to ensure that the load can be controlled at all times.

21.11.9 No close working to any live overhead power line is permitted without the operation of a strict Permit to Work.

21.11.10 Minimum lighting is to be ensured at all lifting operations.

21.12 Failure to do any of the above shall attract penalty from the Employer as per relevant clause



22.0 Launching Operation

22.1 As launching operation is one of the riskiest job, the contractor shall take utmost precaution at all stages like; planning, establishing casing yard, casting segments, transporting segments, fabrication and erection of launching girders, launching of segments, pre-stressing, auto launching of girders and dismantling of launching girders.

22.2 The contractor shall prepare a comprehensive Method Statement for the launching operation, adhering to the SHE conditions laid down in conditions of contract on SHE and project SHE manual. Particular reference shall be made to the provisions on working at height. As the entire process of launching has to be undertaken at an elevated level the safety of workers and the girder is paramount important. The following general guidelines shall be adhered throughout the launching operation.

- i) Necessary 'working platforms' and fall protection anchorage arrangement shall be provided in the launching girder itself.
- ii) Provisions for mounting light fittings shall also be made available in the launching girder.
- iii) The casting yard shall be established ensuring the provision given in clause **38.0**
- iv) The workmen engaged in fabrication of reinforcement, concreting the segment shall be provided with necessary PPEs including compulsory hand protection gloves.
- v) Casting and curing of segment shall be undertaken under the direct supervision of the responsible engineer of the contractor.
- vi) Trucks with valid registration, licence, safe worthiness certificate, Employer's approval certificate, and pollution under check certificate shall only be used for transport of segments
- vii) Drivers engaged for driving these trucks, shall be trained once in 6 months on defensive driving at any Government authorized Institute or Maruti Institute of Driver Training and Research at Wazirabad Road, Adjoining Loni Road Flyover, Delhi-110094.
- viii) Drivers shall also have undergone proper medical examination as per relevant clause mentioned under 'Medical Facilities'.
- ix) The segments shall rigidly secured to the truck with necessary wooden wedges and necessary red indicators/safety tapes provided so that the vehicle is clearly seen by other road users both in day / night time.
- x) Every launching girder shall have a responsible engineer on duty all the time.
- xi) All the time from erection to dismantling the area between the two piers wherein launching is in progress shall always be barricaded.
- xii) Unloading of segments from trucks, lifting of segments, shifting of segments, gluing shall be done under the direct supervision of the approved engineer of the contractor.
- xiii) Auto launching shall be done only after approval from the Employer. After every auto launching the stability of launching girder shall be ensured.
- xiv) The vertical deflection of launching girder shall be monitored at all critical stages like with/without loads and after every auto launching.
- xv) A register containing all important operational details from erection to dismantling of launching girders shall be maintained and made available to Employer whenever called for.
- xvi) Test certificate for all lifting gears including Macalloy bars shall be maintained at a location closer to the launching girder itself so that it can be referred during all inspections.
- xvii) Adequate lighting at all time shall be ensured in the entire area of operation.
- xviii) Access to drinking water & toilet shall be ensured to all workmen engaged for launching process.



- xix) Proper access ladders/stairways shall be maintained for safe ascending / descending of workmen / engineers.

22.3 Non-adherence to any of the clauses mentioned above shall be viewed seriously by the Employer and penalty levied as per relevant clause.

23.0 Construction machinery

23.1 Construction machineries may include dumpers and dump trucks, lift trucks and telescopic handlers piling rigs, vibro hammers, rail welding equipments, mobile elevating work platforms, cranes, tipper lorries, lorry loaders, skip wagons, 360° excavators, 180° backhoe loaders, crawler tractors, scrapers, graders, loading shovels, trenchers, side booms, pavers, planers, chippers, road rollers, locomotives, tankers and bowsers, trailers, hydraulic and mechanical breakers etc.

23.2 Safe worthiness certificate

23.2.1 Every construction equipment shall be in sound mechanical working condition and certified by either competent person under Factories Act or manufacturers' warranty in case of brand new equipments or authorized persons / firms approved by Employer before induction to any site.

23.2.2 Every such certificate shall have the date of purchase, main overhauling undertaken in the past, any accident to the equipment, visual examination details, critical components safety check, list of safety devices and its working condition, manufacturer's maintenance checklist, past projects wherein the equipments were used etc as its minimum content.

23.3 Reverse Horns

23.3.1 All Vehicles shall be fitted with audible reverse alarms and maintained in good working condition. Reversing shall be done only when there is adequate rear view visibility or under the directions of a banksman.

23.4 General operating procedures

- i) Drivers entering site shall be instructed to follow the safe system of work adopted on site. These shall be verbal instructions or, preferably, written instructions showing the relevant site rules, the site layout, delivery areas, speed limits, etc.
- ii) No passengers shall be carried, unless specific seating has been provided in accordance with the manufacturers recommendations.
- iii) Working on gradients beyond any equipments capability shall not be allowed.
- iv) Prevention of dumper and dump truck accidents should be managed by providing wheel stops at a sufficient distance from the edges of excavations, spoil heaps, pits, etc.
- v) The manufacturer's recommended bucket size must not be exceeded in excavators.
- vi) If excavators operating on a gradient which cannot be avoided, it must be ensured that the working cycle is slowed down, that the bucket is not extended too far in the downhill direction, and that travel is undertaken with extreme caution. A large excavator must never be permitted to travel in a confined area, or around people, without a banksman to guide the driver, who should have the excavator attachment close in to the machine, with the bucket just clear of the ground. On wheeled excavators, it is essential that the tyres are in good condition and correctly inflated. If stabilizing devices are fitted, they should be employed when the machine is excavating.



- vii) When the front shovel of the 180⁰ backhoe loaders is being employed, the backhoe attachment shall be in its “travel” position, with the safety locking device in place.
- viii) When operating the backhoe in poor ground conditions, the stabilisers tend to sink into the surface of the ground, reducing stability. Therefore frequent checks shall be made for the stability of the machine. The loading shovel should always be lowered to the ground to stabilise the machine when the backhoe is employed.
- ix) The netting operation of the skip wagons should be carried out prior to lifting the skip to reduce the risks of working on the rear platform
- x) If a tractor dozer is employed on clearing scrub or felling trees, it shall be provided with adequate driver protection.
- xi) When two or more scrapers are working on the same job, a minimum distance of at least 25m shall be kept between them.
- xii) In case of hydraulic breakers, hydraulic rams and hoses shall be in good working condition

23.5 All wood working machines shall be fitted with suitable guards and devices such as top guard, riving knife, push stick, guards for drive belts and chains, and emergency stop switch easily accessible by the operator.

23.6 Penalty

23.6.1 If any of the above clauses are not adhered, penalty shall be imposed as per relevant clause depending upon the gravity of the unsafe act and or condition.

24.0 Machine and general area guarding

24.1 The contractor shall ensure at the construction site all motors, cogwheels, chains and friction gearing, flywheels, shafting, dangerous and moving parts of machinery are securely fenced or legged. The fencing of dangerous part of machinery is not removed while such machinery is in motion or in use.

25.0 Manual lifting and carrying of excessive weight

25.1 The contractor shall ensure at his construction site of a building or other construction work that no building worker lifts by hand or carries overhead or over his back or shoulders any material, article, tool or appliances exceeding in weight as said below as per Rule 38 of BOCWR, Unless aided by another building worker or device.

Person	Maximum weight in kg.
Adult man	55
Adult woman	30

25.2 No building worker aided by other building worker shall lift or carry weight higher than or exceeding the sum of total of maximum limits set out for each building worker separately as mentioned in the table above.

26.0 Site Electricity

26.1 Competency of Electrical personnel:



- 26.1.1 The contractor shall employ qualified and competent electrical personnel as specified in general instruction **JMRC/SHE/GI/001**.
- 26.2 Assessment of power
- 26.2.1 The contractor shall assess the size and location of the electrical loads and the manner in which they vary with time during the currency of the contract.
- 26.2.2 The contractor shall elaborate as to how the total supply is to be obtained / generated. The details of the source of electricity, earthing requirement, substation / panel boards, distribution system shall be prepared and necessary approval from Employer obtained before proceeding of the execution of the job.
- 26.2.3 **The main contractor shall take consideration, the requirements of the sub / petty contractors' electric power supply and arrive at the capacity of main source of power supply from diesel generators.**
- 26.2.4 **As the sub / petty contractors' small capacity generators create more noise and safety hazard, no small capacity diesel generators shall be allowed for whatsoever the type of job to be executed under this contract.**
- 26.2.5 **If any unsafe noise making small capacity diesel generators are found used by sub / petty contractors the main contractor shall only be penalised.**
- 26.3 **Work on site**
- 26.3.1 **The contractor shall also submit electrical single line diagram, schematic diagram and the details of the equipment for all temporary electrical installation and these diagrams together with the temporary electrical equipment shall be submitted to the Employer's for necessary approval. Failure to do so shall invite penalty as per relevant clause.**
- 26.4 Strength and capability of electrical equipment
- 26.4.1 No electrical equipment shall be put into use where its strength and capability may be exceeded in such a way as may give rise to danger.
- 26.5 Adverse or hazardous environments
- 26.5.1 Electrical equipment which may reasonably foreseeably be exposed to-
- (a) mechanical damage;
 - (b) the effects of the weather, natural hazards, temperature or pressure;
 - (c) the effects of wet, dirty, dusty or corrosive conditions; or
 - (d) any flammable or explosive substance, including dusts, vapours or gases, shall be of such construction or as necessary protected as to prevent, so far as is reasonably practicable, danger arising from such exposure.
- 26.6 Distribution system:
- 26.6.1 The contractor shall provide distribution system for control and distribution of electricity from a main AC supply of 50Hz for typical appliances,



- i) Fixed plant – 400V 3 phase
 - ii) Movable plant fed via trailing cable over 3.75 kW – 400 3 phase
 - iii) Installation in site buildings – 230V single phase
 - iv) Fixed flood lighting – 230V single phase
 - v) Portable and hand tools – 115V single phase
 - vi) Site lighting - 115V single phase
 - vii) Portable hand lamps – 115V single phase
- 26.7 Electrical protection circuits
- 26.7.1 Precautions shall be taken, either by earthing or by other suitable means, to prevent danger arising when any conductor (other than a circuit conductor) which may reasonably foreseeable become charged as a result of either the use of a system, or a fault in a system, becomes so charged. A conductor shall be regarded as earthed when conductors of sufficient strength and current-carrying capability to discharge electrical energy to earth connect it to the general mass of earth.
- If a circuit conductor is connected to earth or to any other reference point, nothing which might reasonably be expected to give rise to danger by breaking the electrical continuity or introducing high impedance shall be placed in that conductor unless suitable precautions are taken to prevent that danger.
- 26.7.2 Appropriate electrical protection shall be provided for all circuits, against over load, short circuit and earth fault current.
- 26.7.3 The contractor shall provide sufficient ELCBs (maintain sensitivity 30 mA) / RCCBs for all the equipments (including Potable equipments), electrical switchboards, distribution panels etc. to prevent electrical shocks to the workers.
- 26.7.4 All protection devices shall be capable of interrupting the circuit without damage to any equipments and circuits in case of any fault may occur.
- 26.7.5 Rating of fuses and circuit breakers used for the protection of circuits should be coordinate with equipment power ratings.
- 26.7.6 Protection against lightning shall be ensured to all equipment kept in open at sites.
- 26.8 Cables:
- 26.8.1 Cables shall be selected after full consideration of the condition to which they shall be exposed and the duties for which they are required. Supply cable up to 3.3 kV shall be in accordance with BS 6346.
- 26.8.2 For supplies to mobile or transportable equipment where operating of the equipment subjects the cable to flexing, the cable shall conform to any of these codes BS 6007 / BS 6500 / BS 7375.
- 26.8.3 Flexible cords with a conductor cross sectional area smaller than 1.5 mm² shall not be used and insulated flexible cable shall conform to BS 6500 and BS 7375.
- 26.8.4 Where low voltage cables are to be used, reference shall be made to BS 7375. The following standards shall also be referred to particularly for under ground cables BS 6346 and BS 6708



- 26.8.5 Cables buried directly in the ground shall be of a type incorporating armour or metal sheath or both. Such cables shall be marked by cable covers or a suitable marking tape and be buried at a sufficient depth to avoid their being damaged by any disturbance of the ground. Cable routes shall be marked on the plans kept in the site electrical register.
- 26.8.6 Cabling passing under the walk way and across way for transport and mobile equipment shall be laid in ducts at a minimum depth of 0.6 meters.
- 26.8.7 Cables that need to cross open areas, or where span of 3m or more are involved, a catenary wire on poles or other supports shall be provided for convenient means of suspension. Minimum height shall be 6 m above ground.
- 26.8.8 Cables carrying a voltage to earth in excess of 65V other than supply for welding process shall have metal armour or sheath, which has been effectively earthed and monitored by the contractor. In case of flexible and trailing cables such earthed metal sheath and/or armour should be in addition to the earth core in the cable and shall not be used as the protective conductor.
- 26.8.9 Armoured cables having an over-sheath of polyvinyl chloride (PVC) or an oil resisting and flame retardant compound shall be used whenever there is a risk of mechanical damage occurring
- 26.9 **Plugs, socket-outlets and couplers:**
- 26.9.1 **The contractor shall ensure plugs, socket-outlets, and couplers available in the construction site as “splash proof” type. The minimum degree of Ingress Protection should be of IP44 in accordance with BS EN 60529.**
- 26.9.2 Only plugs and fittings of the weatherproof type shall be used and they should be colour coded in accordance with the Internationally recognised standards for example as detailed as follows:
- (a) 110 volts : Yellow.
 - (b) 240 volts : Blue.
 - (c) 415 volts : Red.
- 26.10 Connections
- 26.10.1 **Every joint and connection in a system shall be mechanically and electrically suitable for use to prevent danger. Proper cable connectors as per national/international standards shall only be used to connect cables.**
- 26.10.2 **No loose connections or tapped joints shall be allowed any where in the work site, office area, stores and other areas. Penalty as per relevant clause shall be put in case of observation of any tapped joints.**
- 26.11 Portable and hand-held equipments:
- 26.11.1 The contractor shall ensure the use of double insulated or all-insulated portable electrical hand equipment may be used without earthing (i.e. two core cables), but they shall still be used only on 110V because of the risk of damage to trailing leads.



26.12 Other equipments:

- 26.12.1 All equipment shall have the provision for major switch/cut-off switch in the equipment itself.
- 26.12.2 All non-current carrying metal parts of electrical equipment shall be earthed through insulated cable
- 26.12.3 Isolate exposed high-voltage (over 415 Volts) equipment, such as transformer banks, open switches, and similar equipment with exposed energized parts and prevent unauthorised access.
- 26.12.4 Approved perimeter markings shall be used to isolate restricted areas from designated work areas and entryways and shall be erected before work begins and maintained for entire duration of work. Approved perimeter marking shall be installed with either red barrier tape printed with the words "DANGER—HIGH VOLTAGE" or a barrier of yellow or orange synthetic rope, approximately 1 to 1.5 meter above the floor or work surface.

26.13 Work on or near live conductors

- 26.13.1 No person shall be engaged in any work activity on or so near any live conductor (other than one suitably covered with insulating material so as to prevent danger) that danger may arise unless-
 - a) it is unreasonable in all the circumstances for it to be dead; and
 - b) it is reasonable in all the circumstances for him to be at work on or near it while it is live; and
 - c) suitable precautions (including where necessary the provision of suitable protective equipment) are taken to prevent injury.

26.14 Inspection and Maintenance

- 26.14.1 All electrical equipment should be permanently numbered and a record kept of the date of issue, date of last inspection and recommended inspection period.
- 26.14.2 Fixed installations shall be inspected at least at three monthly intervals; routine maintenance being carried out in accordance with equipment manufactures recommendations.

27.0 Lighting:

- 27.1 The contractor shall provide sufficient site lighting, of the right type and at the right place for it to be properly effective. Lighting ought not to introduce the risk of electric shock. Therefore, 230V supplies should be used for those fittings, which are robustly installed, and well out of reach e.g. flood lighting or high-pressure discharge lamps.

27.2 Selection of Luminaries:

The contractor shall select the luminaries as per the area requirement indicated below:

Type of Lighting	Area of Requirement	Luminaries
Area Lighting	Workmen and vehicles to move about in safely.	i) Shovel type: non-symmetrical ii) Symmetrical or non-symmetrical tungsten halogen



Beam flood lighting	Concentrated light over an area from a relatively great distance.	<ul style="list-style-type: none"> i) Portable flood light (Conical beam) ii) Wide angle flood (fan shaped beam) iii) Medium or narrow angle flood (Conical beam)
Dispersive lighting	Lighting for indoor	<ul style="list-style-type: none"> i) Dispersive (Mercury florescent) ii) Cargo cluster iii) Florescent trough
Walkway lighting	Lighting for stairways, ladder ways, corridors, scaffold access routs, etc.	<ul style="list-style-type: none"> i) Well glass unit ii) Bulkhead unit (tungsten filament) iii) Bulk head unit (Florescent)
Local lighting	Lighting on sites and fittings are generally accessible to operatives	<ul style="list-style-type: none"> i) PAR (Parabolic Aluminised Reflector) lamp cluster ii) Festoons (with or without shades) iii) Adjustable florescent work lamp iv) Portable flood lamp (mounted on own cable drum)

27.3 The contractor shall ensure that luminaries should always be placed so that no person is required to work in their own shadow and so that the local light for one person is not a source of glare for the others. Strongly made clamps should be available for attaching luminaries to poles and other convenient supports.

27.4 Luminaries should be robust, resistant to corrosion and rain proof especially at the point of the cable entry.

27.5 The correct type of lamp for each luminaries should always be used and when lamps need to be replaced if shall be in accordance with the supply voltage.

27.6 Lamp holders not fitted with a lamp should be capped off.

27.7 The contractor shall take every effort to illuminate the work site as per the Employer's requirement illustrated in general instruction **JMRC/SHE/GI/0011**.

28.0 Hand Tools and Power Tools

28.1 General

28.1.1 The contractor is wholly responsible for the safe condition of tools and equipment used by his employees and that of his sub-contractors.

28.1.2 Use of short / damaged hand tools shall be avoided and the contractor shall ensure all his hand tools used at his worksite are safe to work with or stored and shall also train his employees (including his sub-contractors) for proper use thereby.



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- 28.1.3 All hand tools and power tools shall be duly inspected before use for safe operation.
- 28.1.4 All hand tools and power tools shall have sufficient grip and the design specification on par with national/international standards on anthropometrics.
- 28.2 Hand tools
- 28.2.1 Hand tools shall include saws, chisels, axes and hatches, hammers, hand planes, screw drivers, crow bars, nail pullers.
- 28.2.2 The contractor shall ensure that,
- i) For crosscutting of hardwood, saws with larger teeth points (no. of points per inch) shall be preferred to avoid the saw jumping out of the job.
 - ii) Mushroom headed chisels shall not be used in the worksite where the fragments of the head may cause injury.
 - iii) Unless hatchet has a striking face, it shall be used as a hammer.
 - iv) Only knives of retractable blades shall be used in the worksite.
 - v) No screwdrivers shall be used for scraping, chiselling or punching holes.
 - vi) A pilot hole shall always be driven before driving a screw.
 - vii) Wherever necessary, usage of proper PPEs shall be used by his employees.
- 28.3 Power tools
- 28.3.1 Power tools include drills, planes, routers, saws, jackhammers, grinders, sprayers, chipping hammers, air nozzles and drills.
- 28.3.2 The contractor shall ensure that
- i) Electric tools are properly grounded or / and double insulated.
 - ii) GFCIs/ RCCBs shall be used with all portable electric tool operated especially outdoors or in wet condition.
 - iii) Before making any adjustments or changing attachments, his workers shall disconnect the tool from the power source.
 - iv) When operating in confined spaces or for prolonged periods, hearing protection shall be required. The same shall also apply to working with equipments, which gives out more noise as mentioned in clause **43.0** of this contract document.
 - v) Tool is held firmly and the material is properly secured before turning on the tool.
 - vi) All drills shall have suitable attachments respective of the operations and powerful for ease of operation.
 - vii) When any work / operation need to be performed repeatedly or continuously, tools specifically designed for that work shall be used. The same is applicable to detachable tool bit also.
 - viii) Size of the drill shall be determined by the maximum opening of the chuck in case of drill bit.
 - ix) Attachments such as speed reducing screwdrivers and buffers shall be provided to prevent fatigue and undue muscle strain to his workers.
 - x) Stock should be clamped or otherwise secured firmly to prevent it from moving.
 - xi) Workers shall never stand on the top of the ladder to drill holes in walls / ceilings, which can be hazardous, instead standing on the fourth or fifth rung shall be recommended.



- xii) Electric plane shall not be operated with loose clothing or long scarf or open jacket.
- xiii) Safety guards used on right angle head or vertical portable grinders must cover a minimum of 180° of the wheel and the spindle / wheel specifications shall be checked.
- xiv) All power tools / hand tools shall have guards at their nip points.
- xv) Low profile safety chain shall be used in case of wood working machines and the saw shall run at high rpm when cutting and also correct chain tension shall be ensured to avoid "kickback".
- xvi) Leather aprons and gloves shall be used as an additional personal protection auxiliary to withstand kickback.
- xvii) Push sticks shall be provided and properly used to hold the job down on the table while the heels moves the stock forward and thus preventing kickbacks.
- xviii) Air pressure is set at a suitable level for air actuated tool or equipment being used. Before changing or adjusting pneumatic tools, air pressure shall be turned off.
- xix) Only trained employees shall use explosive actuated tools and the tool shall also be unloaded when not in use.
- xx) Usage of such explosive actuated tools shall be avoided in case of places where explosive/flammable vapours or gases may be present.
- xxi) Explosive actuated tools and their explosives shall be stored separately and be taken out and loaded only before the time of immediate use.
- xxii) Misfired cartridges of explosive actuated tools must be placed in a container of water and be removed safely from the project.
- xxiii) No worker shall point any power operated / hand tool to any other person especially during loading / unloading.

29.0 Welding, Gouging and Cutting

- 29.1 Gas cylinders in use shall be kept upright on a custom-built stand or trolley fitted with a bracket to accommodate the hoses and equipment or otherwise secured. The metal cap shall be kept in place to protect the valve when the cylinder is not connected for use.
- 29.2 Hose clamp or clip shall be used to connect hoses firmly in both sides of cylinders and torches.
- 29.3 All gas cylinders shall be fixed with pressure regulator and dial gauges
- 29.4 Non-return valve and Flashback arrester shall be fixed at both end of cylinder and torch.
- 29.5 Domestic LPG cylinders shall not be used for Gas welding and Cutting purpose.
- 29.6 DCP or CO₂ type Fire Extinguisher not less than 5 kg shall be fixed at or near to welding process zone in an easily accessible location. Fire Extinguisher should confirm to IS 2190: 1992.
- 29.7 Use firewatchers if there is a possibility of ignition unobserved by the operator (e.g. on the other side of bulkheads).
- 29.8 Oxygen cylinders and flammable gas cylinders shall be stored separately, at least 6.6 meters (20 feet) apart or separated by a fire proof, 1.6 meters (5 feet) high partition. Flammable substances shall not be stored within 50 feet of cylinder storage areas.



- 29.9 Transformer used for electrical arc welding shall be fixed with Ammeter and Voltmeter and also fixed with separate main power switch.
- 29.10 Welding grounds and returns should be securely attached to the work by cable lugs, by clamps in the case of stranded conductors, or by bolts for strip conductors. The ground cable will not be attached to equipment or existing installations or apparatus.
- 29.11 Use a low voltage open circuit relay device if welding with alternating current in constricted or damp places.
- 29.12 Take precautions against the risk of increased fume hazards when welding with chrome containing fluxed consumables or high current metal inert gas (MIG) or tungsten inert gas (TIG) processes.
- 29.13 Avoid being in contact with water or wet floors when welding. Use duckboards or rubber protection.
- 29.14 All electrical installations shall meet the IS: 5571: 1997 and NFPA 70 for gas cylinder storage area and other hazardous areas.
- 29.15 The current for Electric arc welding shall not exceed 300 A on a hand welding operation.

30.0 Dangerous and harmful environment

As per BOCWR Rule 40,

- i) When internal combustion engines are to be used into a confined space or excavation or tunnel or any other workplace where neither natural or artificial ventilation system is inadequate to keep carbon monoxide below 50ppm, exposure of building workers shall be avoided unless suitable measures are taken and provided by the contractor.
- ii) No worker shall be allowed into any confined space or tank or trench or excavation wherein there is given off any dust, fumes / vapours or other impurities which is likely to be injurious or offensive, explosive or poisonous or noxious or gaseous material or other harmful articles unless steps are carried out by the contractor and certified by the responsible person to be safe.

31.0 Fire prevention, protection and fighting system

- 31.1 **The contractor shall ensure that construction site is provided with fire extinguishing equipment sufficient to extinguish any probable fire at construction site. An adequate water supply is provided at ample pressure as per national standard.**
- 31.2 Recharging of fire extinguishers and their proper maintenance should be ensured and as a minimum should meet Indian National Standards
- 31.3 All drivers of vehicles, foreman, supervisors and managers shall be trained on operating the fire extinguishers and fire fighting equipment.
- 31.4 The contractor shall also give consideration to the provision of adequate fire fighting arrangements within the underground and tunnelling operations including the provision of Fire Service compatible hose connections and emergency lighting



- 31.5 As per the RBOCW Rules 2009, Rule 106(a)(vii), all lifting appliances' driver cabin should be provided with a suitable portable fire extinguisher.
- 31.6 Combustible scrap and other construction debris should be disposed off site on a regular basis. If scrap is to be burnt on site, the burning site should be specified and located at a distance no less than 12 metres from any construction work or any other combustible material.
- 31.7 Every fire, including those extinguished by contractor personnel, shall be reported to the Employer representatives.
- 31.8 Emergency plans and Fire Evacuation plans shall be prepared and issued . Mock drills should be held on a regular basis to ensure the effectiveness of the arrangements and as a part of the programme, the Telephone Number of the local fire brigade should be prominently displayed near each telephone on site.

32.0 Corrosive substances

- 32.1 As per BOCWR Rule 44, corrosive substances including alkalis and acids shall be stored and used by a person dealing with such substances at a building / construction site in a manner that it does not endanger the building worker and suitable PPE shall be provided by the contractor to the worker during such handling and work. In case of spillage of such substances on building worker, the contractor shall take immediate remedial measures.

33.0 Demolition

- 33.1 The Contractor shall ensure that
- i) all demolition works be carried out in a controlled manner under the management of experienced and competent supervision.
 - ii) the concerned department of the Government or local authority be informed and permission obtained wherever required. Media shall also be informed regarding this concern.
 - iii) **all glass or similar materials or articles in exterior openings are removed before commencing any demolition work and all water, steam, electric, gas and other similar supply lines are put-off and such lines so located or capped with substantial coverings so as to protect it from damage and to afford safety to the building workers and public.**
 - iv) examine the walls of all structures adjacent to the structure to be demolished to determine thickness, method of support to such adjacent structures
 - v) no demolishing work be performed if the adjacent structure seems to be unsafe unless and until remedial measures like sheet piling, shoring, bracing or similar means be ensured for safety and stability for adjacent structure from collapsing.
 - vi) debris / bricks and other materials or articles shall be removed by means of
 - a) chutes
 - b) buckets or hoists
 - c) through openings through floors or
 - d) any other safe means
 - vii) no person other than building workers or other persons essential to the operation of demolition work shall be permitted to enter a zone of demolition and the area be provided with substantial barricades.



34.0 Excavation and Tunnelling:

34.1 Excavation

34.1.1 The contractor shall ensure

- i) where any construction building worker engaged in excavation is exposed to hazard of falling or sliding material or article from any bank or side of such excavation which is more than one 1.5 m above his footing, such worker is protected by adequate piling and bracing against such bank or side.
- ii) where banks of an excavation are undercut, adequate shoring is provided to support the material or article overhanging such bank.
- iii) excavated material is not stored at least 0.65 m from the edge of an open excavation or trench and banks of such excavation or trench are stripped of loose rocks and the banks of such excavation or trench are stripped of loose rocks and other materials which may slide, roll or fall upon a construction building worker working below such bank
- iv) metal ladders and staircases or ramps are provided, as the case may be, for safe access to and egress from excavation where, the depth of such excavation exceeds 1.5 m and such ladders, staircases or ramps comply with the IS 3696 Part 1&2 and other relevant national standards.
- v) trench and excavation is protected against falling of a person by suitable measures if the depth of such trench or excavation exceeds 1.5 m and such protection is an improved protection in accordance with the design and drawing of a professional engineer, where such depth exceeds 4m.

34.2 Tunnelling

34.2.1 The contractor shall inform in writing to the Director General within 30 days, prior to the commencement of any tunnelling work.

34.2.2 The contractor shall appoint a responsible person for safe operation for tunnelling work as per Rule 121 & 125 of BOCWR.

34.2.3 The contractor shall ensure

- i) every compressed air system in a tunnel is provided with emergency power supply for maintained continued supply of compressed air as per Rule 155 of BOCWR
- ii) watertight bulkhead doors are installed at the entrance of a tunnel to prevent flooding.
- iii) reliable and effective means of communication such as telephone or walkie-talkie are provided and maintained for arranging better effective communication at an excavation or tunnelling work as per Rule 136 of BOCWR.
- iv) all portable electrical hand tools and inspection lamp used in under ground and confined space at an excavation or tunnelling work is operated at a voltage not exceeding 24V.
- v) only flame proof equipment of appropriate type as per IS:5571:2000 and or other relevant national standard is used inside the tunnel



- vi) petrol or LPG of any other flammable substances are not used, stored inside the tunnel except with prior approval from Employer, and also no oxy-acetylene gas is used in a compressed air environment in excavation or tunnelling
- vii) adequate number of water outlets provided for fire fighting purpose, an audible fire alarm and adequate number and types of fire extinguishers are provided and maintained.
- viii) temperature in any working chamber in an excavation or tunnelling work where workers employed does not exceed 29°C as per Rule 165 of BOCWR.
- ix) all working areas in a free air tunnel are provided with ventilation system as approved by the Director General and the fresh air supplied in such tunnel is not less than 6 m³/min for each worker employed in tunnel as per Rule 153 of BOCWR.

34.3 Warning signs and notices:

34.3.1 The contractor shall ensure that

- i) suitable warning signs or notices, required for the safety of building workers carrying out the work of an excavation or tunnelling, shall be displayed or erected at conspicuous places in Hindi and in a language understood by majority of such building workers at such building such excavation or tunnelling work
- ii) such warning signs and notices with regard to compressed air working shall include
 - a) the danger involved in such compressed air work
 - b) fire and explosion hazard
 - c) the emergency procedures for rescue from such danger or hazards.

35.0 Work Permit system

35.1 The Contractor shall develop a Work Permit system, which is a formal written system used to control certain types of work that are potentially hazardous. A work permit is a document, which specifies the work to be done, and the precautions to be taken. Work Permits form an essential part of safe systems of work for many construction activities. They allow work to start only after safe procedures have been defined and they provide a clear record that all foreseeable hazards have been considered. Permits to Work are usually required in high-risk areas as identified by the Risk Assessments.

35.2 A permit is needed when construction work can only be carried out if normal safeguards are dropped or when new hazards are introduced by the work. Examples of high-risk activities include but are not limited to:

- i) Entry into confined spaces
- ii) Work in close proximity to overhead power lines and telecommunication cables.
- iii) Hot work.
- iv) To dig—where underground services may be located.
- v) Work with heavy moving machinery.
- vi) Working on electrical equipment
- vii) Work with radioactive isotopes.
- viii) Heavy lifting operations and lifting operations closer to live power line

35.3 The permit-to-work system should be fully documented, laying down:

- i) How the system works;



- ii) The jobs it is to be used for;
- iii) The responsibilities and training of those involved; and
- iv) How to check its operation;

35.4 A Work Permit authorisation form shall be completed with the maximum duration period not exceeding 12 hours.

35.5 A copy of each Permit To Work shall be displayed, during its validity, in a conspicuous location in close proximity to the actual works location to which it applies.

36.0 Traffic Management

36.1 The basic objective of the following guidelines is to lay down procedures to be adopted by contractor to ensure the safe and efficient movement of traffic and also to ensure the safety of workmen at construction sites.

36.2 All construction workers should be provided with high visibility jackets with reflective tapes as most of viaduct /tunnelling and station works or either above or under right-of-way. The conspicuity of workmen at all times shall be increased so as to protect from speeding vehicular traffic.

36.3 The guiding principles to be adopted for safety in construction zone are to

- i) Warn the road user clearly and sufficiently in advance.
- ii) Provide safe and clearly marked lanes for guiding road users.
- iii) Provide safe and clearly marked buffer and work zones
- iv) Provide adequate measures that control driver behaviour through construction zones.

36.4 Legal permission

36.4.1 In all cases, the contractor shall employ proper precautions. Wherever operations undertaken are likely to interfere with public traffic, specific traffic management plans shall be drawn up and implemented by the contractor in consultation with the approval of local police authorities and/or the concerned metropolitan/civil authorities as the case may be.

36.4.2 Such traffic management plans shall include provision for traffic diversion and selection of alternative routes for transport of equipment. If necessary, the contractor shall carry out road widening before commencement of works to accommodate the extra load

36.5 The primary traffic control devices used in work zones shall include signs, delineators, barricades, cones, pylons, pavement markings and flashing lights.

36.6 The road construction and maintenance signs which fall into the same three major categories as do other traffic signs, that are Regulatory Signs, Warning Signs and Direction (or guidelines) Signs shall only be used. The IRC: 67 (Code of Practice for Road Signs) provide a list of traffic signs. The size, colours and placement of sign shall confirm to IRC: 67.

36.7 Regulatory signs



- 36.7.1 Regulatory signs impose legal restriction on all traffic. It is essential, therefore, that they are used only after consulting the local police and traffic authorities.
- 36.8 Warning signs
- 36.8.1 Warning signs in the traffic control zone shall be utilised to warn the drivers of specific hazards that may be encountered.
- 36.8.2 The contractor shall place detour signage at strategic locations and install appropriate warning signs. In order to minimize disruption of access to residences and business, the contractor shall maintain at least one entrance to a property where multiple entrances exist.
- 36.8.3 A warning sign as given in general instruction **JMRC/SHE/GI/012** shall be installed at all secondary road which merges with the primary road where the construction work is in progress at sufficient distance before it merges with the primary road so as to alert the road users regarding the 'Metro Work in Progress'.
- 36.8.4 Materials hanging over / protruded from the chassis / body of any vehicle especially during material handling shall be indicated by red indicator (red light/flag) to indicate the caution to the road users.
- 36.9 Delineators
- The delineators are the elements of a total system of traffic control and have two distinct purposes:
- i) To delineate and guide the driver to and along a safe path
 - ii) As a taper to move traffic from one lane to another.
- 36.9.1 These channelising devices such as cones, traffic cylinders, tapes and drums shall be placed in or adjacent to the roadway to control the flow of traffic. These should normally be retro-reflectors complying to IRC: 79 - Recommended Practice for Road Delineators.
- 36.9.2 Traffic cones and cylinders
- Traffic cones of 500mm, 750mm and 1000mm high and 300mm to 500mm in diameter or in square shape at base and are often made of plastic or rubber and normally have retro-reflectorised red and white band shall be used wherever required.
- 36.9.3 Drums
- Drums about 800mm to 1000mm high and 300mm in diameter can be used either as channelising or warning devices. These are highly visible, give the appearance of being formidable objects and therefore command the respect of drivers.
- 36.9.4 Barricades
- 36.9.4.1 Full height fence, barriers, barricades etc. shall be erected around the site in order to prevent the working area from the risk of accidents due to speedy vehicular movement. Same the way barricades protect the road users from the danger due to construction equipment and other temporary structures.



36.9.4.2 The structure dimension of the barricade, material and composition, its colour scheme, JMRC logo and other details shall be in accordance with specifications laid down in tender document.

36.9.4.3 All barricades shall be erected as per the design requirements of the Employer, numbered, painted and maintained in good condition and also Barricade in-charge maintains a barricade register in site.

36.9.4.4 **All barricades shall be conspicuously seen in the dark/night time by the road users so that no vehicle hits the barricade. Conspicuity shall be ensured by affixing retro reflective stripes of required size and shape at appropriate angle at the bottom and middle portion of the barricade at a minimum gap of 1000mm. In addition minimum one red light or red light blinker should be placed at the top of each barricade.**

36.9.5 The contractor shall ensure that all his construction vehicles plying on public roads (like dump trucks, trailers, etc.) have proper license to ply on public roads from the State Transport Authority. Drivers holding proper valid license as per the requirements of Motor Vehicles Act shall drive these vehicles

36.9.6 The contractor shall not undertake loading and unloading at carriageways obstructing the free flow of vehicular traffic and encroachment of existing roads by the contractor applying the excuse of work execution.

36.9.7 **Tow away vehicle**

36.9.7.1 **The contractor shall make arrangements keeping tow away van / manpower to tow away any breakdown vehicle in the traffic flow without losing any time at his cost.**

36.9.8 **Cleaning of roads**

36.9.8.1 **The contractor shall ensure the cleanliness of roads and footpaths by deploying proper manpower for the same. The contractor shall have to ensure proper brooming, cleaning washing of roads and footpaths on all the time throughout the entire stretch till the currency of the contract including disposal of sweepage.**

37.0 Work to adjacent railways

37.1 Whenever work is to be conducted in close proximity to the live railways then the following measures shall need to be addressed:

- (a) The rules provided for in the Railway's manual shall be followed.
- (b) No persons are allowed to encroach onto the railway unless specific authority has been given by the owner.
- (c) Adequate protection in accordance with the railway owner's requirements shall be followed. (Provision of Block Inspectors, Flagmen and Lookouts)
- (d) All persons shall wear high visibility clothing at all times.
- (e) Any induction training requirements of the railways shall be strictly observed

38.0 Batching Plant / Casting Yard

- i) The batching plant / casting yard shall be effectively planned for smooth flow of unloading and stacking the aggregates reinforcements and cement, batching plant,



transport of concrete, casting the segment, stacking the segment and loading the segments to the trucks. As far as possible the conflicts should be avoided.

- ii) The batching plant / casting yard shall be barricaded and made as a compulsory PPE zone
- iii) If in case of material unloading area is not maintainable as PPE zone, the same shall be segregated properly and made as a non-PPE zone with appropriate barrications.
- iv) Electrical system shall also be suitably planned so that location of diesel generator, if any, location of DBs, routing of cables and positioning of area lighting poles/masts does not infringe on any other utility and pose danger.
- v) Drainage shall be effectively provided and waste water shall be disposed after proper treatment
- vi) Time office, canteen, drinking water, toilet and rest place shall be suitably located for the easy access to workers. All the facilities shall be properly cleaned and maintained during the entire period of operation.
- vii) Manual handling of cement shall be avoided to a larger extent. Whenever it is absolutely necessary the workmen shall be given full body protection, hand protection and respiratory protection as a basic measure of ensuring better health.
- viii) The PPEs provided to cement handling workmen shall conform to international standards.
- ix) Access roads and internal circulation roads shall be well laid and maintained properly at all time.
- x) Non-adherence to any of the above provision shall be penalised as per relevant penalty clause.

39.0 Personal Protective Equipments (PPEs)

39.1 The contractor shall provide required PPEs to workmen to protect against safety and / or health hazards. Primarily PPEs are required for the following protection

- i) Head Protection (Safety helmets)
- ii) Foot Protection (Safety footwear, Gumboot, etc)
- iii) Body Protection (High visibility clothing (waistcoat/jacket), Apron, etc)
- iv) Personal fall protection (Full body harness, Rope-grap fall arrester, etc)
- v) Eye Protection (Goggles, Welders glasses, etc)
- vi) Hand Protection (Gloves, Finger coats, etc)
- vii) Respiratory Protection. (Nose mask, SCBAs, etc)
- viii) Hearing Protection (Ear plugs, Ear muffs, etc)

39.2 **The PPEs and safety appliances provided by the contractor shall be of the standard as prescribed by Bureau of Indian Standards (BIS). If materials conforming to BIS standards are not available, the contractor as approved by the Employer shall procure PPE and safety appliances.**

39.3 **All construction workers should be provided with high visibility jackets with reflective tapes confirming to the requirement specified under BS EN 471: 1994 as most of viaduct /tunnelling and station works are executed either above or under right-of-way. The conspicuity of workmen at all times shall be increased so as to protect them from speeding vehicular traffic.**

39.4 The contractor shall provide **safety helmet, safety shoe and high visibility clothing** for all employees including workmen, traffic marshal and other employees who are engaged for any work under this contract as per the following requirement.



All employees of the Contractor including workmen	Traffic marshals
<ul style="list-style-type: none"> i) Hard hat with company Logo ii) Safety boots iii) Hi-visibility waistcoat covering upper body and meeting the following requirements as per BS EN 471:1994: <ul style="list-style-type: none"> a) Background in fluorescent orange-red in colour b) Two vertical green strips of 5cm wide on front side, covering the torso at least 500 cm² c) Two diagonal strips of 5 cm wide on back in an 'X' pattern covering at least 570cm² d) Horizontal strips not less than 5cm wide running around the bottom of the vertical strip in front and 'X' pattern at back. e) The bottom strip shall be at a distance of 5cm from the bottom of the vest. f) Strips must be retro reflective and fluorescent g) Waistcoat shall have a side adjustable fit and a side and front tear-away feature on vests made of nylon. 	<ul style="list-style-type: none"> i) Hard hat with reflective tape ii) Safety boots iii) Hi-visibility jacket covering upper body and meeting the following requirements as per BS EN 471:1994 : <ul style="list-style-type: none"> a) Background in fluorescent orange-red in colour b) Jackets with full-length sleeves with two bands of retro reflective material, which shall be placed at the same height on the garment as those of the torso. The upper band shall encircle the upper part of the sleeves between the elbow and the shoulder; the bottom of the lower band shall not be less than 5cm from the bottom of the sleeve. c) Two vertical green strips of 5cm wide on front side, covering the torso at least 500 cm² d) Two diagonal strips of 5 cm wide on back in an 'X' pattern covering at least 570cm² e) Horizontal strips not less than 5cm wide running around the bottom of the vertical strip in front and 'X' pattern at back. f) The bottom strip shall be at a distance of 5cm from the bottom of the vest. g) Strips must be retro reflective and fluorescent.

39.4.1 Colour coding for helmets

Safety Helmet Colour Code (Every Helmet should have the LOGO* affixed /painted)	Person to use
White	JMRC staffs
Grey	All Designers, Architect, Consultants, etc.
Violet	Main Contractors (Engineers / Supervisors)
Blue	All Sub-contractors (Engineers / Supervisors)
Red	Electricians (Both Contractor and Sub-contractor)
Green	Safety Professionals (Both Contractor and Sub-contractor)
Orange	Security Guards / Traffic marshals
Yellow	All workmen



White (with "VISITOR" sticker)	Visitors
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Note: LOGO*

1. Logo shall have its outer dimension 2"X2" and shall be conspicuous
2. Logo shall be either painted or affixed
3. No words shall come either on Top / Bottom of Logo

Logo of the corresponding main contracting company for their employees and sub-contracting company for their employees shall only be used.

- 39.5 In addition to the above any other PPE required for any specific jobs like, welding and cutting, working at height, tunnelling etc shall also be provided to all workmen and also ensure that all workmen use the PPEs properly while on the job.
- 39.6 The contractor shall not pay any cash amount in lieu of PPE to the workers/sub-contractors and expect them to buy and use during work.
- 39.7 The contractor shall at all time maintain a minimum of 10% spare PPEs and safety appliances and properly record and show to the Employer during the inspections. Failing to do so shall invite appropriate penalty as per the provisions of the contract.
- 39.8 It is always the duty of the contractor to provide required PPEs for all visitors. Towards this required quantity of PPEs shall be kept always at the security post.

40.0 Visitors to site

- 40.1 No visitor is allowed to enter the site without the permission of the Employer. All authorised visitors should report at the site office. Contractor shall provide visitor's helmet (White helmet with visitor sticker) and other PPEs like Safety Shoe, reflective jacket, respiratory protection etc. as per requirement of the site.
- 40.2 All Visitors shall be accompanied at all times by a responsible member of the site personnel.
- 40.3 The contractor shall be fully responsible for all visitors' safety and health within the site..



**PART – III : OCCUPATIONAL HEALTH
AND WELFARE**



41.0 Physical fitness of workmen

41.1 The contractor shall ensure that his employees/workmen subject themselves to such medical examination as required under the law or under the contract provision and keep a record of the same.

41.2 The contractor shall not permit any employee/workmen to enter the work area under the influence of alcohol or any drugs.

42.0 Medical Facilities

42.1 Medical Examination

42.1.1 The contractor shall arrange a medical examination of all his employees including his sub-contractor employees employed as drivers, operators of lifting appliances and transport equipment before employing, after illness or injury, if it appears that the illness or injury might have affected his fitness and, thereafter, once in every two years up to the age of 40 and once in a year, thereafter.

- i) The Contractor shall maintain the confidential records of medical examination or the physician authorized by the Employer.
- ii) No building or other construction worker is charged for the medical examination and the cost of such examination is borne by contractor employing such building worker.
- iii) The medical examination shall include: -
 - a) Full medical and occupational history.
 - b) Clinical examination with particular reference to
 - i) General Physique;
 - ii) Vision: - Total visual performance using standard orthorator like Titmus Vision Tester should be estimated and suitability for placement ascertained in accordance with the prescribed job standards.
 - iii) Hearing: - Persons with normal must be able to hear a forced whisper at twenty-four feet. Persons using hearing aids must be able to hear a warning shout under noisy working conditions.
 - iv) Breathing: - Peak flow rate using standard peak flow meter and the average peak flow rate determined out of these readings of the test performed. The results recorded at pre-placement medical examination could be used as a standard for the same individual at the same altitude for reference during subsequent examination.
 - v) Upper Limbs: - Adequate arm function and grip
 - vi) Spine: - Adequately flexible for the job concerned.
 - vii) Lower Limbs: - Adequate leg and foot concerned.
 - viii) General: - Mental alertness and stability with good eye, hand and foot coordination.
 - c) Any other tests which the examining doctor considers necessary

42.1.2. If the contractor fails to get the medical examination conducted as mentioned above, the employer will have the right to get the same conducted by through an agency with intimation to the contractor and deduct the cost and overhead charges.



42.2 Occupational Health Centre

42.2.1 The contractor shall ensure at a construction site an occupational health centre, mobile or static is provided and maintained in good order. Services and facilities as per the scale lay down in Schedule X of BOCWR. A construction medical officer appointed in an occupational health centre possesses the qualification as laid down in Schedule XI of BOCWR.

42.3 Ambulance van and room

42.3.1 The contractor shall ensure at a construction site of a building or other construction work that an ambulance van and room are provided at such construction site or an arrangement is made with a nearby hospital for providing such ambulance van for transportation of serious cases of accident or sickness of workers to hospital promptly and such ambulance van and room are maintained in good repair and is equipped with standard facilities specified in Schedule IV and Schedule V of BOCWR.

42.4 First-aid boxes

42.4.1 The contractor shall ensure at a construction site one First-aid box for 100 workers provided and maintained for providing First-aid to the building workers. Every First-aid box is distinctly marked "First-aid" and is equipped with the articles specified in Schedule III of BOCWR.

42.5 HIV/ AIDS prevention and control

42.5.1 The contractor shall adopt the Employer's Policy on "HIV / AIDS Prevention and Control for Workmen Engaged by Contractors" and the copy of the policy is given in **Appendix No.: 4**.

42.5.2 The Employer will engage a professional agency for implementing the guidelines laid down in the policy and communicate to the contractor.

42.5.3 The Contractor shall extend necessary support to the appointed agency by deputing the workmen to attend the awareness creation programmes.

42.5.4 The contractor shall also extend necessary organizational support to the appointed agency for the effective implementation of the Employers' workplace policy on HIV/AIDS for workmen of the Contractors.

42.5.5 As laid down in the policy the contractor shall identify peer educators (1 for every 100 workers) and refer them for professional training to the Employers' appointed agency for the purpose.

42.5.6 **The peer educators on completion of the training shall serve as the focal point for any information, education and awareness campaign among the workmen throughout the contract period.**

42.5.7 The peer educators will be paid a monthly honorarium as fixed by the Employer for rendering his services in addition to his regular duty.

42.5.8 The total number of peer educators (1 for 100 workers) shall always be maintained by the contractor.



42.5.9 **In case if these peer educators leave the contractor by creating vacancy, then the contractor at his own expense train the new replacement peer educator from the Employers' appointed agency for the purpose.**

42.5.10 It is suggested to the contractor that due care should be taken to select the peer educators from among the group of workmen so that they remain with the contractor throughout the contract period.

42.6 Prevention of mosquito breeding

42.6.1 Measures shall be taken to prevent breeding at site. The measures to be taken shall include:

- i) Empty cans, oil drums, packing and other receptacles, which may retain water shall be deposited at a central collection point and shall be removed from the site regularly.
- ii) Still waters shall be treated at least once every week with oil in order to prevent mosquito breeding.
- iii) Contractor's equipment and other items on the site, which may retain water, shall be stored, covered or treated in such a manner that water could not be retained.
- iv) Water storage tanks shall be provided.

42.6.2 Posters in both Hindi and English, which draw attention to the dangers of permitting mosquito breeding, shall be displayed prominently on the site.

42.6.3 **The contractor at periodic interval shall arrange to prevent mosquito breeding by fumigation / spraying of insecticides. Most effective insecticides shall include SOLFAC WP 10 or Baytex, The Ideal Larvicide etc.**

42.7 Alcohol and drugs

42.7.1 The contractor shall ensure at all times that no employee is working under the influence of alcohol / drugs which are punishable under Govt. regulations.

42.7.2 Smoking at public worksites by any employee is also prohibited as per Govt. regulations.

43.0 Noise

43.1 The Contractor shall consider noise as an environmental constraint in his design, planning and execution of the Works and provide demonstrable evidence of the same on Employer's request. The Contractor shall, at his own expense, take all appropriate measures to ensure that work carried out by the Contractor and by his sub-Contractors, whether on or off the Site, will not cause any unnecessary or excessive noise which may disturb the occupants of any nearby dwellings, schools, hospitals, or premises with similar sensitivity to noise.

43.1.1 Without prejudice to the generality of the foregoing, noise level reduction measures shall include the following:

- i) The Contractor shall ensure that all powered mechanical equipment used in the Works shall be effectively sound reduced using the most modern techniques available including but not limited to silencers and mufflers.
- ii) The Contractor shall construct acoustic screens or enclosures around any parts of the Works from which excessive noise may be generated.



- 43.1.2 The Contractor shall ensure that noise generated by work carried out by the Contractor and his sub-Contractors during daytime and night time shall not exceed the maximum permissible noise limits, whether continuously or intermittently, as given in the project SHE Manual. The same may be varied from time to time by and at the sole discretion of the Employer. In the event of a breach of this requirement, the Contractor shall immediately re-deploy or adjust the relevant equipment or take other appropriate measures to reduce the noise levels and thereafter maintain them at levels which do not exceed the said limits. Such measures may include without limitation the temporary or permanent cessation of use of certain items of equipment.
- 43.1.3 The noise monitoring requirements including monitoring locations are given in the project SHE Manual.
- 43.2 Control Requirements
- 43.2.1 Construction material should be operated and transported in such a manner as not to create unnecessary noise as outlined below:
- i) Perform Work within the procedures outlined herein and comply with applicable codes, regulations, and standards established by the Central and State Government and their agencies.
 - ii) Keep noise to the lowest reasonably practicable level. Appropriate measures will be taken to ensure that construction works will not cause any unnecessary or excessive noise, which may disturb the occupants of any nearby dwellings, schools, hospitals, or premises with similar sensitivity to noise. Use equipment with effective noise-suppression devices and employ other noise control measures as to protect the public.
 - iii) Schedule and conduct operations in a manner that will minimize, to the greatest extent feasible, the disturbance to the public in areas adjacent to the construction activities and to occupants of buildings in the vicinity of the construction activities.
 - iv) The Contractor shall submit to the Employer a Noise Monitoring and Control Plan (NMCP) under contract specific Site Environmental Plan. It shall include full and comprehensive details of all powered mechanical equipment, which he proposes to use during daytime and night time, and of his proposed working methods and noise level reduction measures. The NMCP shall include detailed noise calculations and vibration levels to demonstrate the anticipated noise generation and vibrations by the Contractor.
 - v) The NMCP prepared by the Contractor shall guide the implementation of construction activity. The NMCP will be reviewed on a regular basis and updated as necessary to assure that current construction activities are addressed. It may appear as a regular agenda item in project coordination meetings, if noise is an issue at any location in the contract.
- 43.3 Occupational Noise
- i) Protection against the effects of occupational noise exposure should be provided when the sound levels exceeds the threshold values as provided in Project SHE Manual.
 - ii) When employees are subjected to sound levels exceeding those listed in the Table, feasible administrative or engineering controls should be utilized as given in this document and JMRC's Project SHE Manual.



- iii) If such controls fail to reduce sound levels within the levels of the table, personal protective equipment shall be provided and used to reduce sound levels within the levels of the table.
- iv) When the daily noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect should be considered, rather than the individual effect of each. Exposure to different levels for various periods of time shall be computed according to the formula and sample computation as given in project SHE Manual.

43.4 Vibration Level

- 43.4.1 In locations where the alignment is close to historical / heritage structures, the contractor shall prepare a monitoring scheme prior to construction at such locations. This scheme for monitoring vibration level at such historical / heritage sites shall be submitted to Employer for his approval. This scheme shall include:
- i) Monitoring requirements for vibrations at regular intervals throughout the construction period.
 - ii) Pre-construction structural integrity inspections of historic and sensitive structures in project activity.
 - iii) Information dissemination about the construction method, probable effects, quality control measures and precautions to be used.
 - iv) The vibration level limits at work sites adjacent to the alignment shall conform to the permitted values of peak p velocity as given in article project SHE Manual.

44.0 Ventilation and illumination

44.1 Ventilation

- 44.1.1 The contractor shall ensure at a construction site of a building or other construction work that all working areas in a free tunnel are provided with ventilation system as approved by the DG/CIIBC and the fresh air supply in such tunnel is not less than 6m³/min for each building worker employed underground in such tunnel and the free air flow movement inside such tunnel is not less than 9m/min.

- 44.1.2 The oxygen level shall not be less than 19.5% in the working environment.

44.2 Illumination

- 44.2.1 The contractor shall take every effort to illuminate the work site as per the Employer's requirement illustrated in general instruction **JMRC/SHE/GI/0011**.
- 44.2.2 **The contractor shall conduct a monthly illumination monitoring by lux meter for all the locations and the report shall be sent to the Employer within 7th of the next month and the same shall be reviewed during the monthly SHE committee meeting.**

45.0 Radiation

- 45.1 The use of radioactive substances and radiating apparatus shall comply with the Govt. regulatory requirements and all subsidiary legislation



- 45.2 Operations involving ionising radiation shall only be carried out after having been reviewed without objection by the Employer's representative and shall be carried out in accordance with a method statement.
- 45.3 each area containing irradiated apparatus shall have warning notices and barriers, as required by the Regulations, conspicuously posted at or near the area.
- 45.4 Radioactive substances will be stored, used or disposed shall be strictly in accordance with the Govt. Enactments.
- 45.5 The contractor shall ensure that all site personnel and members of the public are not exposed to radiation.
- 46.0 **Welfare measures for workers**
- 46.1 Latrine and Urinal Accommodation
- 46.1.1 **The contractor shall provide one latrine seat for every 20 workers up to 100 workers and thereafter one for every additional 50 workers. In addition one urinal accommodation shall be provided for every 100 workers.**
- 46.1.2 When women are employed, separate latrine and urinals accommodation shall be provided on the same scale as mentioned above.
- 46.1.3 Latrine and urinals shall be provided as per Section 33 of BOCWA and maintained as per Rule 243 of BOCWR and shall also comply with the requirements of public health authorities
- 46.1.4 Moving sites
- 46.1.4.1 In case of works like track laying, the zone of work is constantly moving at elevated level or at underground level. In such cases mobile toilets with proper facility to drain the sullage shall be provided at reasonably accessible distance.
- 46.1.5 **In case if the contractor fail to provide required number of urinals and latrines or fail to maintain it as per the requirements of Public Health laws, the Employer shall have the right to provide/maintain through renowned external agencies like "Sulabh" at the cost of the contractor.**
- 46.2 **Canteen:**
- 46.2.1 **In every workplace wherein not less than 250 workers are ordinarily employed the contractor shall provide an adequate canteen conforming to Section 37 of BOCWA, Rule 244 of BOCWR and as stipulated in Rule 247 of BOCWR the charges for food stuff shall be based on 'no profit no loss' basis. The price list of all items shall be conspicuously displayed in such canteen.**
- 46.3 **Serving of tea and snacks at the workplace:**
- 46.3.1 **As per Rule 246 of BOCWR, at a building or other construction work where a workplace is situated at a distance of more than 200 m from the canteen provided under Rule 244(1) of BOCWR, the contractor employing building works shall make suitable arrangement for serving tea and light refreshment to such building works at such place.**



46.4 **Drinking water**

46.4.1 **As per Section 32 of BOCWA the contractor shall make in every worksite, effective arrangements to provide sufficient supply of wholesome drinking water with minimum quantity of 5 litres per workman per day. Quality of the drinking water shall conform to the requirements of national standards on Public Health.**

46.4.2 While locating these drinking water facility due care shall be taken so that these are easily accessible within a distance of 200m from the place of work for all workers at all location of work sites.

46.4.3 All such points shall be legible marked "Drinking Water" in a language understood by a majority of the workmen employed in such place and such point shall be situated within six metres of any washing places, urinals or latrines.

46.5 **Labour Accommodation**

46.5.1 **The contractor shall provide free of charges as near as possible, temporary living accommodation to all workers conforming to provisions of Section 34 of BOCWA. These accommodations shall have cooking place, bathing, washing and lavatory facilities.**

46.6 **Creches**

46.6.1 In every workplace where in more than 50 female workers are ordinarily employed, there shall be provided and maintained a suitable room for use of children under age of 6 yrs, conforming to the provisions of Section 35 of BOCWA.



PART – IV : ENVIRONMENTAL MANAGEMENT



47.0 Air Quality

- 47.1 The Contractor shall take all necessary precautions to minimise fugitive dust emissions from operations involving excavation, grading, and clearing of land and disposal of waste. He shall not allow emissions of fugitive dust from any transport, handling, construction or storage activity to remain visible in atmosphere beyond the property line of emission source for any prolonged period of time without notification to the Employer.
- 47.2 The Contractor shall use construction equipment designed and equipped to minimise or control air pollution. He shall maintain evidence of such design and equipment and make these available for inspection by Employer.
- 47.3 If after commencement of construction activity, Employer believes that the Contractor's equipment or methods of working are causing unacceptable air pollution impacts then these shall be inspected and remedial proposals shall be drawn up by the Contractor, submitted for review to the Employer and implemented.
- 47.4 In developing these remedial measures, the Contractor shall inspect and review all dust sources that may be contributing to air pollution. Remedial measures include use of additional/ alternative equipment by the Contractor or maintenance/modification of existing equipment of the Contractor.
In the event that approved remedial measures are not being implemented and serious impacts persist, the Employer may direct the Contractor to suspend work until the measures are implemented, as required under the Contract.
- 47.5 Contractor's transport vehicles and other equipment shall conform to emission standards fixed by Statutory Agencies of Government of India or the State Government from time to time. The Contractor shall carry out periodical checks and undertake remedial measures including replacement, if required, so as to operate within permissible norms.
- 47.6 The Contractor shall establish and maintain records of routine maintenance program for internal combustion engine powered vehicles and equipment used on this project. He shall keep records available for inspection by Employer.
- 47.7 The Contractor shall cover loads of dust generating materials like debris and soil being transported from construction sites. All trucks carrying loose material should be covered and loaded with sufficient free- board to avoid spills through the tail board or side boards.
- 47.8 The Contractor shall promptly transport all excavation disposal materials of whatever kind so as not to delay work on the project. Stockpiling of materials will only be allowed at sites designated by the Employer. The Contractor shall place excavation materials in the dumping/disposal areas designated in the plans as given in the specifications.
- 47.9 The temporary dumping areas shall be maintained by the Contractor at all times until the excavate is re-utilised for backfilling or as directed by Employer. Dust control activities shall continue even during any work stoppage.
- 47.10 The Contractor shall place material in a manner that will minimize dust production. Material shall be minimized each day and wetted, to minimize dust production. During dry weather, dust control methods must be used daily especially on windy, dry days to prevent any dust from blowing across the site perimeter.



- 47.11 The Contractor shall water down construction sites as required to suppress dust, during handling of excavation soil or debris or during demolition. The Contractor will make water sprinklers, water supply and water delivering equipment available at any time that it is required for dust control use. Dust screens will be used, as feasible when additional dust control measures are needed specially where the work is near sensitive receptors.
- 47.12 The Contractor shall provide a wash pit or a wheel washing and/or vehicle cleaning facility at the exits from work sites such as construction depots and batching plants. At such facility, high-pressure water jets will be directed at the wheels of vehicles to remove all spoil and dirt.
- 47.13 The Contractor shall design and implement his blasting techniques so as to minimise dust, noise, vibration generation and prevention fly rock.
- 47.14 Blasting technique should be consistent not only with nature and quantity of rock to be blasted but also the location of blasting.
- 47.15 The contractor shall give preference to explosives with better environmental characteristics.
- 47.16 The Contractor shall protect structures, utilities, pavements roads and other facilities from disfiguration and damage as a result of his activities. Where this is not possible, the contractor shall restore the structures, utilities, pavements, roads and other facilities to their original or better, failing which the rectification/restoration work shall be carried out at the risk and cost of the contractor.
- 47.17 The Contractor shall submit to the Employer an Air Monitoring and Control Plan (AMCP) under contract specific Site Environmental Plan to guide construction activity insofar as it relates to monitoring, controlling and mitigating air pollution.

48.0 Water Quality

- 48.1 The Contractor shall comply with the Indian Government legislation and other State regulations in existence in Jaipur insofar as they relate to water pollution control and monitoring. A drainage system should be constructed at the commencement of the Works, to drain off all surface water from the work site into suitable drain outlet.
- 48.2 The Contractor shall provide adequate precautions to ensure that no spoil or debris of any kind is pushed, washed, falls or deposited on land adjacent to the site perimeter including public roads or existing stream courses and drains within or adjacent to the site. In the event of any spoil or debris from construction works being deposited or any silt washed down to any area, then all such spoil, debris or material and silt shall be immediately removed and the affected land and areas restored to their natural state by the Contractor to the satisfaction of the Employer.
- 48.3 Due to lowering of potable water supplies in Jaipur and subsequent contamination of ground water, the Contractor is not allowed to discharge water from the site without the approval of the Employer. The Contractor must comply with the requirements of the Central Ground Water Board for discharge of water arising from dewatering. Any water obtained from dewatering systems installed in the works must be either re-used for construction purposes and this water may subsequently be discharged to the drainage system or, if not re-used, recharged to the ground water at suitable aquifer levels. The Contractor must submit his proposals for approval of Employer, on his proposed locations of dewatering of excavation and collection of water for either construction re-use or recharge directly to



aquifers. The Contractor's recharge proposals must be sufficient for recharging of the quantity of water remaining after deduction of water re-used for construction. During dewatering, the contractor shall monitor ground water levels from wells to ensure that draw down levels do not exceed allowable limits. The Contractor will not be permitted to directly discharge, to the drainage system, unused ground water obtaining from the excavation without obtaining approval of Employer or the Agency controlling the system.

- 48.4 The Contractor shall ensure that earth, bentonite, chemicals and concrete agitator washings etc. are not deposited in the watercourses but are suitably collected and residue disposed off in a manner approved by local authorities.
- 48.5 All water and waste products (surface runoff and wastewater) arising on the site shall be collected and removed from the site via a suitable and properly designed temporary drainage system and disposed off at a location and in a manner that will cause neither pollution nor nuisance.
- 48.6 Any mud slurry from drilling, tunnelling, diaphragm wall construction or grouting etc. shall not be discharged into the drainage system unless treatment is carried out that will remove silt, mud particles, bentonite etc. The Contractor shall provide treatment facilities as necessary to prevent the discharge of contaminated ground water.
- 48.7 The Contractor shall discharge wastewater arising out of site office, canteen or toilet facilities constructed by him into sewers after obtaining prior approval of agency controlling the system. A wastewater drainage system shall be provided to drain wastewater into the sewerage system.
- 48.8 The bentonite mixing, treatment and handling system shall be established by the contractor giving due regard to its environmental impacts. The disposal of redundant bentonite shall be carefully considered whether in bulk or liquid form. The disposal location will be advised and agreed with the relevant authorities.
- 48.9 The Contractor shall take measures to prevent discharge of oil and grease during spillage from reaching drainage system or any water body. Oil removal / interceptors shall be provided to treat oil waste from workshop areas etc.
- 48.10 The Contractor shall apply to the appropriate authority for installing bore wells for water supply at site.

49.0 Archaeological and Historical Preservation

- 49.1 The contractor shall seek to accommodate archaeological and historical preservation concerns that may arise due to the construction of the project especially in close vicinity of such areas where such monuments may be located.
- 49.2 The contractor shall consult the Archaeological Survey of India (ASI). Other competent authorities and other parties, on the advise of the Employer, to identify and assess construction effects and seek ways to avoid, minimize or mitigate adverse effects on such monuments.
- 49.3 Adverse effects may include reasonably foreseeable effects caused by the construction that may occur later in time, be farther removed in distance or those that alter, howsoever temporarily, the significance of the structure.



50.0 Landscape and Greenery

- 50.1 As far as is reasonably practicable, the Contractor shall maintain ecological balance by preventing deforestation and defacing of natural landscape. In respect of ecological balance, the Contractor shall observe the following instructions.
- 50.2 The Contractor shall, so conduct his construction operations, as to prevent any avoidable destruction, scarring or defacing of natural surrounding in the vicinity of work.
- 50.3 Where destruction, scarring, damage or defacing may occur as a result of operations relating to Permanent or Temporary works, the same shall be repaired, replanted or otherwise corrected at Contractor's expense. All work areas shall be smoothened and graded in a manner to conform to natural appearance of the landscape as directed by the Employer.
- 50.4 A suggested list of trees/shrubs suitable for planting and landscaping is found in Employer's Project SHE Manual.

51.0 Felling of Trees

- 51.1 The contractor shall identify the number and type of trees that are required to be felled as a result of construction of works and facilities related to Jaipur Metro Project and inform the Employer.
- 51.2 All trees and shrubbery, which are not specifically required to be cleared or removed for construction purposes, shall be preserved and shall be protected from any damage that may be caused by Contractor's construction operations and equipment. The contractor shall not fell, remove or dispose of any tree or forest produce in any land handed over to him for the construction of works and facilities related to Jaipur Metro except with the previous permission obtained from the Forest Department.
- 51.3 The Employer shall arrange permission from the forest department for trees to be felled or transplanted. The Employer will permit the removal of trees or shrubs only after prior approval.
- 51.4 Special care shall be exercised where trees or shrubs are exposed to injuries by construction equipment, blasting, excavating, dumping, chemical damage or other operation and the Contractor shall adequately protect such trees by used of protective barriers or other methods approved by the Employer. Trees shall not be used for anchorage.

52.0 Fly Ash

- 52.1 The Employer may require the contractor to use fly ash as a percentage substitution of cement, in concrete for certain structures and works.
- 52.2 In all such uses of Fly Ash, the contractor shall maintain a detailed record of usage of Fly Ash. The contractor shall also collect related details and provide to the Employer.
- 52.3 The reporting details on consumption of Fly Ash are found in Employer's SHE Manual.



53.0 Waste

- 53.1 The contractor is required to develop, institute and maintain a Waste Management Programme (WMP) during the construction of the project for his works, which may include: -
- i) Identification of disposal sites.
 - ii) Identification of quantities to be excavated and disposed off.
 - iii) Identification of split between waste and inert material
 - iv) Identification of amounts intended to be stored temporarily on site location of such storage.
 - v) Identification of intended transport means and route.
 - vi) Obtaining permission, where required, for disposal.
- 53.2 Such a mechanism is intended to ensure that the designation of areas for the segregation and temporary storage of reusable and recyclable materials are incorporate into the WMP. The WMP should be prepared and submitted to the Engineer for approval.
- 53.3 The Contractor shall handle waste in a manner that ensures they are held securely without loss or leakage thus minimizing potential for pollution. The Contractor shall maintain and clean waste storage areas regularly.
- 53.4 The Contractor shall remove waste in a timely manner and disposed off at landfill sites after obtaining approval of Jaipur Municipal Corporation for its disposal.
- 53.5 Burning of wastes is prohibited. The Contractor shall not burn debris or vegetation or construction waste on the site but remove it in accordance with **50.1** above.
- 53.6 The Contractor shall make arrangement to dispose of metal scrap and other saleable waste to authorized dealer and make available to the Employer on request, records of such sales.

54.0 Hazardous Waste Management

- 54.1 If encountered or generated as a result of Contractor's activity, then waste classified as hazardous under the "Hazardous Wastes (Management & Handling) Rules, 1989, amendments 2000, 2003" shall be disposed off in a manner in compliance with the procedure given in the rules under the aforesaid act.
- 54.2 Chemicals classified as hazardous chemicals under "Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 of Environment (Protection) Act, 1986 shall be disposed off in a manner in compliance with the procedure given in the rules under the aforesaid act.
- 54.3 The contractor shall identify the nature and quantity of hazardous waste generated as a result of his activities and shall file a 'Request for Authorisation' with Rajasthan State Pollution Control Board along with a map showing the location of storage area.
- 54.4 Outside the storage area, the contractor shall place a 'display board', which will display quantity and nature of hazardous waste, on date. Hazardous Waste needs to be stored in a secure place



- 54.5 It shall be the responsibility of the contractor to ensure that hazardous wastes are stored, based on the composition, in a manner suitable for handling, storage and transport. The labelling and packaging is required to be easily visible and be able to withstand physical conditions and climatic factors.
- 54.6 The contractor shall approach only Authorised Recyclers of Hazardous Waste for disposal of Hazardous Waste, under intimation to the Employer.
- 54.7 Submittal of all environment related documents and records pertaining to monitoring and trend analysis on key parameters such as but not limited to consumption/efficient use of resources such as energy, water, material such as cement, fly ash, iron and steel, recycle/reuse of waste etc that shall have demonstrated continual improvement in the implementation of Environmental management System. Failure to do so the employer shall impose appropriate penalty as indicated under penalty clause.

55.0 Energy Management

- 55.1 The contractor shall use and maintain equipment so as to conserve energy and shall be able to produce demonstrable evidence of the same upon Employer's request.
- 55.2 Measures to conserve energy include but not limited to the following:
- i) Use of energy efficient motors and pumps
 - ii) Use of energy efficient lighting, which uses energy efficient luminaries
 - iii) Adequate and uniform illumination level at construction sites suitable for the task
 - iv) Proper size and length of cables and wires to match the rating of equipment
 - v) Use of energy efficient air conditioners
- 55.3 The contractor shall design site offices maximum daylight and minimum heat gain. The rooms shall be well insulated to enhance the efficiency of air conditioners and the use of solar films on windows may be used where feasible.



PART – V : PENALTY AND AWARDS



56.0 Charges to be recovered from contractor for unsafe act or condition

56.1 JMRC has built an image of safety conscious organisation meticulously over a period of three years. Any reportable accident (fatality / injury) results in loss of life and/or property damage. These accidents not only result in loss of life but also damage the reputation of JMRC. Most of the accidents are avoidable and caused preliminary due to contractors' negligence. Hence JMRC shall recover the cost of damages from the contractors for every reportable incident (fatality / injury).

56.2 In addition every JMRC work site is exposed to public scrutiny as the work is executed just on the right-of-way. Any unsafe act / unsafe condition observed by public further damages our reputation. Because of the non-voluntary compliance of contractors to the condition of contract on SHE and project SHE manual, JMRC has been forced to establish safety-enforcing organisation. The cost of established such organisation is to be recovered from contractors for all observed safety violations at sites.

56.3 The following table indicates the Safety, Health and Environment violation (unsafe act / unsafe condition) and charges to be recovered from contractors.

SL. NO.	TOPIC	UNSAFE ACT/UNSAFE CONDITION	DEDUCTIBLE AMOUNT
1.	SHE Policy & Plan	i) SHE policy a) non-compliance of clause 4.1 b) Inadequate coverage, not signed c) Not displayed at prominent locations	Rs.5,000 per single violation, compounded to a maximum of Rs.25,000 at any single instance.
		ii) SHE plan: a) Not as per Employers' content and coverage b) Delay in submission c) Not updated as per employer's instruction as per clause 4.4 d) Copies not provided to all required supervisors / engineers	Rs.1,00,000 per single violation, compounded to a maximum of Rs.2,00,000 at any single instance.
2.	SHE Organisation	i) Not complying to the minimum manpower requirements as mentioned in General Instruction JMRC/SHE/001 ii) Not filling up the vacancies created due to SHE personnel leaving the contractor within 14 days. iii) SHE organisation not provided with required Audio-visual and other equipments as per General Instruction JMRC/SHE/012 iv) Employing through outsourcing	i) Rs.1,00,000 per month for first month and Rs.2,00,000 for subsequent months ii) Rs.50,000 per month for first month and Rs.1,00,000 for subsequent months For items iii), iv), v) and vi) Rs.50,000 for first violation and Rs.1,00,000 for subsequent violations



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		<p>agencies and SHE personal are not in the payroll of the main contractor</p> <p>v) Disobedience / Improper conduct of any SHE personnel.</p> <p>vi) Chief SHE Manager not reporting directly to CPM of contractor.</p>	
3.	SHE committee	<p>i) Failed to formulate or conduct SHE Committee meeting for any month</p> <p>ii) Contractor and Sub-contractor representatives not attending SHE Committee meetings</p> <p>iii) Failed to conduct Site inspection before conducting SHE Committee meeting</p> <p>iv) Failed to send SHE Committee Meeting minutes or Agenda to Employer in time</p> <p>v) Non-adherence of clause 7.7.1</p> <p>vi) Non-adherence of clause 7.9</p>	<p>i) Rs.1,00,000 for the first violation and Rs.5,00,000 for the subsequent violations</p> <p>ii) Rs.5,000 to the contractor of the member who had not attended the meeting for first violation and Rs.25,000 for subsequent violations.</p> <p>For item iii), iv), v) and vi) Rs.25,000 for first violation and Rs.50,000 for subsequent violations</p>
4.	ID card	<p>i) Non-adherence of clause 8.1, 8.2 and 8.3</p>	<p>Rs.1,00,000 for first violation and Rs.2,00,000 for subsequent violations</p>
5.	SHE Training	<p>i) Not complying to the requirements as mentioned in conditions of contract on SHE and project SHE manual with regard to:</p> <p>a) Induction training not given</p> <p>b) Supervisor/engineer/manager training not conducted as per clause 9.6</p> <p>c) Refresher training as per clause 9.7 and 9.11 not conducted</p> <p>d) Tool-box talk not conducted as per clause 9.8</p> <p>e) Skill development training not conducted as clause 9.9</p> <p>f) Daily Safety Oath not conducted as per clause 9.10</p> <p>g) Top management behaviour based SHE training conducted</p>	<p>For item 1 a) to g) Rs.50,000 for first violation on and Rs.1,00,000 for subsequent violations</p>
6.	SHE Inspection	<p>i) Not complying to the requirements as mentioned in conditions of contract on SHE and project SHE manual as per clause 10.0</p> <p>ii) Non compliance of clause 10.3.6</p>	<p>Rs.50,000 for first violation and Rs.1,00,000 for subsequent violations</p>
7.	SHE audit	<p>Internal Audit: MARS</p> <p>i) Not conducted as per SHE Plan</p> <p>ii) Report not sent to Employer</p> <p>iii) Action not taken for any month</p>	<p>For item i) to iii) Rs.50,000 for first violation and Rs.1,00,000 for subsequent violations.</p>



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		<p>External Audit</p> <p>iv) Not conducted as per SHE Plan</p> <p>v) Report not sent to employer</p> <p>vi) Action not taken for any quarter</p>	<p>For item iv) to vi)</p> <p>Rs.1,00,000 for first violation and Rs.2,00,000 for subsequent violations.</p>
8.	SHE Communication	<p>i) Important days to be observed for SHE awareness as furnished by employer not observed</p> <p>ii) Posters as furnished by Employer not printed and displayed</p>	<p>i) Rs.10,000 for first violation and Rs.50,000 for subsequent violations</p> <p>ii) 2,00,000 per contract</p>
9.	SHE Submittals	<p>i) Non compliance of clause 13.1</p> <p>ii) Non compliance of clause 13.2</p> <p>iii) Non compliance of clause 13.3</p>	<p>For item i)</p> <p>Rs.50,000 for first violation and Rs.1,00,000 for subsequent violations</p> <p>For item ii) and iii)</p> <p>Rs.1,00,000 for first violation and Rs.2,00,000 for subsequent violations</p>
10.	Injury and Incidence reporting	<p>i) Fatal accidents</p> <p>ii) Injury accident</p> <p>iii) Abnormal delay in reporting accidents or wilful suppression of information about any accidents / dangerous occurrence as per clause 14.1.4</p> <p>iv) Delay in informing about any accidents / dangerous incidents.</p> <p>v) Non-compliance of the clause 14.4</p>	<p>i. Rs.5,00,000 for first fatality and Rs.10,00,000 for every subsequent fatality.</p> <p>ii. Rs.1,00,000 for first grievously injured person and Rs.2,00,000 for every subsequent grievously injured person (Grievous Injury as defined by Workmen Compensation Act)</p> <p>iii. Rs.1,00,000 for first violation and Rs.2,00,000 for subsequent violations</p> <p>For items iv) and v)</p> <p>Rs.50,000 for first violation and Rs.1,00,000 for subsequent violations</p>
11.	Emergency preparedness Plan	Non-compliance of the clause 15.1,15.2, 15.3, 15.4, 15.5 and 15.6	Rs.1,00,000 for non-compliance of any of the clauses
12.	Housekeeping	<p>i) Housekeeping maintenance register not properly maintained up to date</p> <p>ii) Surrounding areas of drinking water tanks / taps not hygienically cleaned / maintained</p> <p>iii) Office, stores, toilet / urinals not properly cleaned and maintained.</p> <p>iv) Required dustbins at appropriate places not provided / not cleaned.</p> <p>v) Stairways, gangways, passageways blocked.</p>	Rs.10,000 per single violation Compounded to a maximum of Rs.1,00,000 at any single instance



		<ul style="list-style-type: none"> vi) Lumber with protruding nails left as such vii) Openings unprotected viii) Excavated earth not removed within a reasonable time. ix) Truck carrying excavated earth not covered / tyres not cleaned. x) Vehicles / equipments parked / placed on roads obstructing free flow of traffic xi) Unused surplus cables / steel scraps lying scattered xii) Wooden scraps, empty wooden cable drums lying scattered xiii) Water stagnation leading to mosquito breeding 	
13.	Working at Height / Ladders and Scaffolds	<ul style="list-style-type: none"> i) Not using or anchoring Safety Belt ii) Not using Safety Net iii) Absence of life line or anchorage point to anchor safety belt iv) Non-compliance of clause 18.17 v) Using Bamboo ladders vi) Painting of ladders vii) Improper usage (less than 1m extension above landing point, not maintaining 1:4 ratio) viii) Aluminium ladders without base rubber bush ix) Usage of broken / weak ladders x) Usage of re-bar welded ladders xi) Improper guardrail, toe board, barriers and other means of collective protection xii) Improper working platform xiii) Working at unprotected fragile surface xiv) Working at unprotected edges 	Rs.10,000 per single violation Compounded to a maximum of Rs.1,00,000 at any single instance
14.	Lifting appliances and gear	<ul style="list-style-type: none"> i) Non availability of fitness certificate as per clause 21.3 ii) Documents not displayed on the machine or not available with the operator as per clause 21.4 iii) Maximum Safe Working Load not written on the machine as per clause 21.5 iv) Non-compliance of 21.6 v) Non-compliance of 21.7 vi) Automatic safe load indicator not provided or not in working condition as per clause 21.8 vii) Age of the operator less than 21 years or without any licence and non-compliance of other item as per clause 21.9 	Rs.50,000 per single violation Compounded to a maximum of Rs.5,00,000 at any single instance



		<ul style="list-style-type: none"> viii) Non-compliance of 21.10 ix) Non-compliance of any of the items mentioned regarding rigging requirements as per clause 21.11 x) Failure to submit method statement in case of all critical lifting xi) Person riding on crane. xii) Creating more noise and smoke xiii) Absence of portable fire extinguisher in driver cabin xiv) Fail to guard hoist platform xv) No fencing of hoist rope movement area xvi) Hoist platform not in the horizontal position 	
15.	Launching operation	Non-adherence of any of the provisions mentioned in clause 22.2	Rs. 50,000 for first violation and Rs.1,00,000 for subsequent violations .
16.	Site Electrical safety	<ul style="list-style-type: none"> i) Non-compliance of clause 26.1.1 ii) Non-compliance of clause 26.2.4, 26.2.5 iii) Non-compliance of clause 26.3.1 iv) Non-compliance of clause 26.7, 26.8 and 26.9.1 v) Non-compliance of clause 26.10 and 26.13 vi) Non-compliance of clause 28.3.2 vii) Exposed electric lines (fermentative damage) and circuits in the workplace. viii) Inserting of bare wires into the socket ix) Improper grounding for the electrical appliances x) Electrical cables running on the ground xi) Non-compliance clause 27.0 	Rs.10,000 per single violation Compounded to a maximum of Rs.1,00,000 at any single instance
17.	Hand tools and Power tools	<ul style="list-style-type: none"> i) Non-compliance of clause 28.0 	Rs.10,000 per single violation Compounded to a maximum of Rs.1,00,000 at any single instance
18.	Gas Cutting	<ul style="list-style-type: none"> ii) Wrong colour coding of cylinder. iii) Cylinders not stored in upright position. iv) Flash back arrester, non-return valve and regulator not present or not in working condition. v) Fail to put cylinders in a cylinder trolley. vi) Damaged hose. vii) Using domestic LPG cylinders viii) Fail to store cylinder 6.6m away from fire prone materials ix) Fail to use hose clamps x) Fire extinguisher not placed in the vicinity during operation 	Rs.10,000 per single violation Compounded to a maximum of Rs.50,000 at any single instance



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19.	Welding	<ul style="list-style-type: none"> i) Voltmeter and Ammeter not working ii) Improper grounding and return path. iii) Damaged welding cable iv) Bare openings in the cable. v) Non-availability of separate switch in the transformer vi) Non-availability of main switch control to switch off power to the welding unit. vii) Usage of reinforcement rod as return conductor viii) Damaged holder ix) Fire extinguisher not placed in the vicinity during operation 	Rs.10,000 per single violation Compounded to a maximum of Rs.50,000 at any single instance
20.	Fire precaution	<ul style="list-style-type: none"> i) Smoking and open flames in fire prone area ii) Using more than 24V portable electrical appliances in the fire prone area iii) Not proper ventilation in cylinder storage area. iv) Absence of fire extinguishers v) Fire extinguishers not refilled once in a year. vi) Fire extinguisher placed in a not easily accessible location 	Rs.5,000 per single violation Compounded to a maximum of Rs.25,000 at any single instance.
21.	Excavation, Tunnelling and confined space	<ul style="list-style-type: none"> i) Non-compliance of clause 34.1.1 ii) Non-compliance of clause 34.2.3 iii) Non-compliance of clause 34.3 	For any item from i) and ii) Rs.10,000 per single violation Compounded to a maximum of Rs.50,000 at any single instance. For item iii) Rs.10,000 per first violation and Rs.50,000 for subsequent violations
22.	Work permit system	<ul style="list-style-type: none"> i) Non-compliance of clause 35.2 ii) Non-compliance of clause 21.11.9 	For item i) and ii) Rs.50,000 per first violation and Rs.1,00,000 for subsequent violations
23.	Traffic Management	<ul style="list-style-type: none"> i) Non-compliance of clause 36.4.1 ii) Non-compliance of clause 36.8.3 iii) Non-compliance of clause 36.9.2 iv) Non-compliance of clause 36.9.3 v) Non-compliance of clause 36.9.7 vi) Non-compliance of clause 36.9.8 	Rs.1,00,000 per first violation and Rs.2,00,000 for subsequent violations



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		a) Barricades i) Not Cleaned ii) Not in alignment iii) Not numbered iv) Not painted v) Red lights / reflectors not working vi) Damages not repaired vii) Not secured properly viii) Barricade inspector not employed ix) Protruding parts / portions repaired x) Barricades maintaining register not properly maintained up to date	Rs.25,000 per single violation Compounded to a maximum of Rs.1,00,000 at any single instance
		b) Contractor Vehicles i) Over loading of vehicles ii) Unfit drivers or operators iii) Unlicensed vehicles iv) Absence of traffic marshals v) Absence of reversing alarm vi) Absence of fog light (at winter) vii) Power / hand brakes not in working condition.	Rs.25,000 per single violation Compounded to a maximum of Rs.1,00,000 at any single instance
		c) Splashing of Bentonite on roads / non-cleaning of tyres of dumpers and transit mixers i) Mishandling of bentonite like splashing of bentonite outside specified width of barricading ii) Non-cleaning of tyres of dumpers and transit mixers before leaving the site and thereby creating a traffic safety hazard to road users.	For item i) and ii) a) Rs.1,00,000 on first observation. b) Rs. 2,00,000 on second observation c) Rs. 3,00,000 on third and subsequent observations
24.	Batching plant / Casting yard	Non-adherence of any of the provisions mentioned in clause 38.0.	Rs. 10,000 for single violation compounded to a maximum of Rs.1,00,000 at any single instant.
25.	PPE	i) Not having ii) Not wearing (or) using and kept it elsewhere iii) Using damaged one iv) Using wrong type v) Using wrong colour helmet or helmet without logo vi) Using for other operation (e.g. Using safety helmet for storing materials or carrying water from one place to other) vii) Not conforming to BIS standard	From item i) to vi). Rs.200 per single violation For item vii) Rs.10,000 for first violation and Rs.50,000 for subsequent violations For item viii) Rs.50,000 for first violation and Rs.1,00,000 for subsequent violations



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		viii) Non-compliance of clause 39.6, 39.7 and 39.8	
26.	Occupational Health	i) Fail to conduct Medical examination to workers ii) Absence of ambulance van & room iii) Workers not having ID card iv) Inadequate number of toilets v) Toilets not cleaned properly vi) Absence of water facilities for toilets and washing places vii) Toilet placed more than 500m from the work site viii) Absence of drinking water ix) Absence of first-aid person in work site. x) Absence or inadequacy of first-aid box. xi) Misuse of first-aid box. xii) First-aid box not satisfy the minimum Indian standard. xiii) Smoking inside the construction site xiv) Drink and drive or work xv) Excessive noise and vibration xvi) Canteen not provided xvii) Food stuff not served on no loss no profit basis xviii) Creche not provided xix) Accommodation not provided as per BOCWA xx) Fumigation / insecticides not sprayed to prevent Mosquito breeding xxi) Non-compliance of clause 44.1 and 44.2	Rs.10,000 per single violation Compounded to a maximum of Rs.1,00,000 at any single instance
27.	Labour Welfare measures	i) Non adherence of Labour welfare provisions of BOCWA ii) Fail to register establishment and display the registration certificate at workplace iii) Absence of workers register and records iv) Absence of muster roll and wages register v) Fail to display an abstract of BOCWA and BOCWR	Rs.10,000 per single violation Compounded to a maximum of Rs.50,000 at any single instance
28.	Environmental Management	i) Tyre wash facility not provided ii) Spillage from vehicles not arrest iii) Air monitoring not practiced iv) Noise monitoring not practiced v) The values of air monitoring and noise monitoring not with in acceptable limits vi) Dust control measures at sites not	Rs.10,000 per single violation Compounded to a maximum of Rs.50,000 at any single instance



		practiced vii) Improper disposal of debris / residues	
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56.4 **Without limiting to the unsafe acts and or conditions mentioned above in clause 56.3 the Employer shall have the right to deduct charges for any other unsafe act and or condition depending upon the gravity of the situation on a case-to-case basis. The charges shall be in comparison with that of the similar offence indicated in clause 56.3.**

57.0 Stoppage of work

57.1 The Employer shall have the right to stop the work at his sole discretion, if in his opinion the work is being carried out in such a way that it may cause accidents and endanger the safety of the persons and / or property, and / or equipments. In such cases, the contractor shall be informed in writing about the nature of hazards and possible injury / accident.

57.2 The contractor shall not proceed with the work until he has complied with each direction to the satisfaction of Employer

57.3 The Contractor shall not be entitled for any damages / compensation for stoppage of work, due to safety reasons and the period of such stoppage of work shall not be taken as an extension of time for Completion of the Facilities and will not be the ground for waiver of levy of liquidated damages.

58.0 Awards

The following categories will be considered for awards as per the scheme in practice of Employer

- i) For every safe million man hour working without any reportable incidents
- ii) Zero fatality contracts
- iii) 100% adherence to voluntary reporting of all accidents throughout the currency of contract
- iv) Safest project team of the year.
- v) Best SHE team of the year.
- vi) Safest Contractor of the year.



APPENDIX



	JAIPUR METRO RAIL CORPORATION LTD.
APPENDIX NO.: 1	

Memorandum of Understanding between Jaipur Metro Rail Corporation (JMRC) and the Contractor for safe execution of contract work

This Memorandum of Understanding is made and executed by and between Jaipur Metro Rail Corporation Ltd. (JMRC), a Company registered under the Companies Act 1956 and having its registered office at Khanij Bhawan, Udyog Bhawan Premises, Tilak Nagar, C-Scheme, Jaipur-302005 or their authorized representative(s), hereinafter referred to as "EMPLOYER" (which expression shall wherever the context so requires or admits be deemed to mean and include its successors in business and assigns) of the one party
AND

M/s _____ having its registered office at _____ hereinafter referred to as the "CONTRACTOR" (which expression shall wherever the context so requires or admits be deemed to mean and include its successors in business and assigns) of the other party

WITNESSETH THAT

WHEREAS the EMPLOYER gives highest importance to the occupational safety, health and environment during execution of work, seeks cooperation from the CONTRACTOR in this endeavour.

Thus, this Memorandum of Understanding is for promoting the safety, health and environment aspects required to be followed at workplace/site and will be applicable to any site job to be done by the CONTRACTOR
AND

WHEREAS the CONTRACTOR has read all the terms and conditions of the EMPLOYER and whereas the CONTRACTOR has studied the following documents:

- (a) Tender Documents, including Notice Inviting Tender, General Conditions, Special Conditions,
- (b) Conditions of Contract on Safety, Health and Environment and Project Safety, Health and Environment Manual.
- (c) Building and Other Construction Workers (Regulations of Employment and Conditions of Service) Act 1996, Central Rules 1998 and subsequent Rajasthan Government Rules 2009, Building and Other Construction Workers Welfare Cess Act 1996 and Rules 1998 and Rajasthan Building and Other Construction Workers' Welfare Board Rules and
- (d) Indian Electricity Act 2003 and Rules 1956.
- (e) Corresponding International / Bureau of Indian Standard Codes.

The amendments to any of the above rules and any other rules & regulations or procedures, circulars, notices & advices laid down by the EMPLOYER from time to time.

Now it is hereby AGREED AND DECLARED by and between the EMPLOYER and the CONTRACTOR as follows:

Clause - I The CONTRACTOR shall abide by the terms and conditions stipulated in Condition of Contract on Safety, Health & Environment and Project Safety, Health



Safety, Health and Environment (SHE) Manual

& Environment Manual.

- Clause - II The CONTRACTOR shall undertake full responsibility for safe execution of job at work place/site and safety of his personnel and adjoining road users during work.
- Clause - III Without giving any prior notice, the EMPLOYER shall from time to time be entitled to add/or amend any or all terms and conditions with a view to improving safety and occupational health of personnel and safety of work, with immediate effect and the same shall be binding on the CONTRACTOR. The contractor agrees to implement all such amendments, which shall be laid down by the EMPLOYER.
- Clause - IV Besides following the guidelines, safety rules and regulations, safety codes given in various safety procedures/documents mentioned above, the CONTRACTOR shall also prepare detailed method statement which includes job safety analysis wherever there are complicated and hazardous/high risk working involved and get it approved from Employer before execution of work.
- Clause - V Any negligence or violation in implementing any of the provision of the conditions of contract on Safety, Health & Environment and JMRC project Safety, Health & Environment Manual shall be viewed seriously and the contractor is liable to compensate the employer for the loss of reputation. The cost of damage shall be fixed on case-to-case basis.

In witness thereof the Parties hereto by representatives duly authorised have executed this Memorandum of Understanding on _____ day of _____ 20____.

Signed on
For and on behalf of JMRC

Signed on
For and on behalf of (Contractor)

Signature:
Name:
Title:

Signature:
Name:
Title:



	JAIPUR METRO RAIL CORPORATION LTD.
APPENDIX NO.: 2	

Safety, Welfare and Occupational Health requirements as per BOCW Act 1996 and Rules 1998 and Rajasthan BOCW Rules 2009.

(This list has been prepared in chronological order with primary importance to Section of Act and secondary importance to Rules)

- S -** Refers relevant Sections in BOCWA
R - Refers relevant Rules in BOCWR
C - Refers relevant Chapter No. in BOCWR

Sl. No.	1. Items	Relevant Sections / Rules in BOCWA and BOCWR and RBOCWR
2.	Registration of establishment	S – 7, R – 23 to 27
3.	Display of registration certification at workplace	R – 26 (5)
4.	Hours of work	S – 28 R – 234 to 237
5.	Register of overtime	S – 28; S – 29 R – 241(1) Form XXII
6.	Weekly rest and payment at rest	R – 235
7.	Night shift	R – 236
8.	Maintenance of workers registers and records	S – 30 R – 238
9.	Notice of commencement and completion	S – 46 R – 239
10.	Register of persons employed as building workers	R – 240
11.	Muster roll and wages register	R – 241(1) (a); Form XVI and XVII
12.	Payment of wages	R – 248
13.	Display of notice of wages regarding	R – 249
14.	Register of damage or loss	R – 241(1)(a); Form XIX, XX, XXI
15.	Issue of wages book	R – 241(2)(a); Form XXIII
16.	Service certificate for each workers	R – 241(2)(b); Form XXIV
17.	Display an abstract of BOCWA and BOCWR	R – 241(5)
18.	Annual return	R – 242; Form XXV
19.	Drinking water	S – 32
20.	Latrines and Urinals	S – 33 R - 243
21.	Accommodation	S – 34
22.	Creches	S – 35
23.	First-aid boxes	S – 36 R – 231 and Schedule III
24.	Canteens	S – 37 R – 244
25.	Food stuff and other items served in the canteens	R – 245
26.	Supply of tea and snacks in work place	R – 246
27.	Food charges on no loss no profit basis	R - 247
28.	Delhi BOCW welfare Board Rules	R – 250 to 296



29.	Safety committee	S – 38 R – 208
30.	Safety officer	S – 38 R – 209 and Schedule VII
31.	Reporting of accidents and dangerous occurrences	S – 39, R – 210
32.	Procedure for inquiry in to the causes of accidents	R – 211
33.	Responsibility of employer	S - 44 R – 5
34.	Responsibility of Architects, Project engineer and Designers	R – 6
35.	Responsibility of workmen	R – 8
36.	Responsibility for payment of wages and compensation	S – 45
37.	Penalties and Procedures	S – 47; S – 55
38.	Excessive noise, vibration etc	R – 34
39.	Fire Protection	R – 35
40.	Emergency action plan	R – 36
41.	Fencing of motors	R – 37
42.	Lifting of carrying of excessive weight	R – 38
43.	Health, Safety and Environmental Policy	R – 39
44.	Dangerous and Harmful Environment	R – 40
45.	Overhead protection	R – 41
46.	Slipping, Tripping, Cutting, Drowning and Falling Hazards	R – 42
47.	Dust, Gases, Fumes, etc	R – 43
48.	Corrosive substance	R – 49
49.	Eye Protection	R – 45
50.	Head Protection and other protection apparel	R – 46; R – 54
51.	Electrical Hazards	R – 47
52.	Vehicular traffic	R – 48
53.	Stability of structure	R – 49
54.	Illumination	R – 50; R – 124
55.	Stacking of materials	R – 51
56.	Disposal of debris	R – 52
57.	Numbering and marking of floors	R – 53
58.	Lifting appliances and gears	C – VII; R – 55 to 81
59.	Runways and Ramps	C – VIII; R – 82 to 85
60.	Working on or adjacent to water	C – IX; R – 86 & 87
61.	Transport and earthmoving equipments	C – X; R – 88 to 95
62.	Concrete work	C – XI; R – 96 to 107
63.	Demolition	C – XII; R – 108 to 118
64.	Excavation and Tunnelling works	C – XIII; R – 119 to 168
65.	Ventilation	R – 153
66.	Construction, repair and maintenance of step roof	C – XIV; R – 169 to 171
67.	Ladders and Step ladders	C – XV; R – 172 to 174
68.	Catch platform and hoardings, chutes, safety belts and nets	C – XVI; R – 175 to 180
69.	Structural frame and formworks	C – XVII; R – 181 to 185
70.	Stacking and unstacking	C – XVIII; R – 186 & 187
71.	Scaffold	C – XIX; R – 188 to 205
72.	Cofferdams and Caissons	C – XX; R – 206 to 211
73.	Explosives	C – XXI; R – 212 & 213
74.	Piling	C – XXII; R – 214 to 222
75.	Medical Examination for building and other construction worker, Crane operator an Transport vehicle drivers	R – 81; R – 223(a)(iii) and Schedule XII



Safety, Health and Environment (SHE) Manual

76.	Medical examination for occupational health hazards	R – 233(a)(iv)
77.	Charging of workers for Medical Examination	R – 223(b)
78.	Occupational health centres and Medical officers	R – 225 and Schedule X & XI
79.	Ambulance van & room	R – 226 & 227 and Schedule IV & V
80.	Stretchers	R – 228
81.	Occupational health service for building workers	R – 229
82.	Medical examination for occupational health hazards	R – 223(a)(iv)
83.	Emergency care services and emergency treatment	R – 232
84.	Panel of experts and agencies	Central Rule 250 Rajasthan Rule 277
85.	Power of inspectors	Central rule 251 Rajasthan rule 278



	JAIPUR METRO RAIL CORPORATION LTD.
APPENDIX NO.: 3	


CONTENT OF SHE PLAN	
Contract No	
Contractor Name	
Project Name	

1	Project Highlights <ul style="list-style-type: none">i. Title of the contentii. Contractor Numberiii. Brief scope of workiv. Location map/ key planv. Period of the project
2	SHE Policy
3	Site Organisation Chart Chart indicating reporting of SHE personnel
4	Roles & Responsibility Individual responsibility of the <ul style="list-style-type: none">i. Project Managerii. Construction Manageriii. Construction Supervisorsiv. SHE Committee Membersv. SHE Inchargevi. Site Engineersvii. First Line Supervisorsviii. Sub-contractors
5	SHE Committee <ul style="list-style-type: none">i. Details - Chairman, Members, Secretary and Employer's representative,ii. Procedures for effective conduct of meeting
6	SHE Training
7	Subcontractor Evaluation, Selection and Control
8	SHE Inspection
9	SHE Audit
10	Accident Investigation And Reporting Procedures



11	Occupational Health Measures
12	Labour Welfare Measures
13	Risk assessment and mitigation procedures
14	Safe Work Procedures <ul style="list-style-type: none"> i. Work at Height ii. Structural Steel Erection iii. Launching of segments iv. Floor, Wall Openings and Stairways v. Welding, Cutting and Bracing vi. Lifting appliances vii. Work Permit Systems viii. Electrical Equipments ix. Mechanical Equipments x. Excavation xi. Fire Prevention xii. Hazardous Chemicals and Solvents xiii. Ionising Radiation xiv. Lighting xv. Abrasive Blasting
15	Work Permit System
16	List of standard job specific PPEs to be used in the site
17	Maintenance of Regime for construction Equipment and Machinery
18	Traffic management
19	Housekeeping
20	Environmental Management
21	Emergency Management
22	Visitors and Security arrangement



	JAIPUR METRO RAIL CORPORATION LTD.
APPENDIX NO.: 4	

WORKPLACE POLICY ON HIV/AIDS PREVENTION & CONTROL FOR WORKMEN ENGAGED BY CONTRACTORS

“Being mobile in and of itself is not a risk factor for HIV infection. It is the situations encountered and the behaviours possibly engaged in during mobility or migration that increase vulnerability and risk regarding HIV / AIDS.”

UNAIDS, Technical update on ‘Population, Mobility and AIDS’, February 2001, p.5

Jaipur Metro Rail Corporation (JMRC) recognizes HIV / AIDS as a developmental challenge and realizes the need to respond to it by implementing regular HIV / AIDS prevention programmes and creating a non-discriminatory work environment for HIV infected workmen engaged by contractors. For the purpose of making conscientious, sensitive and compassionate decision in addressing the realities of HIV / AIDS, JMRC has established these guidelines based on ILO code of practice on HIV / AIDS.

- ▶ Creating awareness through professional agency using IEC (Information, Education and Communication) package specially designed for migrant workers.
- ▶ Institutional capacity building by training the project implementation team, Safety, Health & Environment (SHE) Managers, establishing linkages for efficient diagnosis and treatment of the affected workers, effective monitoring of implementation and documentation for further learning.
- ▶ Establishing peer educators by selecting them in consultation with contractors and training them through professional agencies so that they become focal point for any information, education and awareness campaigns among the workmen throughout the contract period.
- ▶ Promotion of social marketing of condoms through Rajasthan State Aids Control Society (RSACS).



Safety, Health and Environment (SHE) Manual

	JAIPUR METRO RAIL CORPORATION LTD.
General Instruction : JMRC/SHE/GI/001	

MINIMUM MANPOWER REQUIREMENTS OF SHE ORGANIZATION BASED ON CONTRACT VALUE

	1	2	3	4	5	6
Awarded Contract value (in Cr.)	Chief SHE Manager	Senior SHE Manager	Junior SHE Manager	Safety Steward	Senior SHE (Electrical) Engineer	Junior SHE (Electrical) Engineer
Upto 2	-	-	1	Refer Note 1	-	1
Upto 10	-	1	Refer Note 1		1	Refer Note 2
Upto 25	1	Refer Note 1			1	
Upto 100	1				1	
Upto 250	1				1	
More than 250	1				1	

	7	8	9	10	11	12	13
Awarded Contract value (in Cr.)	*Junior SHE (Fire) Manager / **Senior SHE (Fire) Manager	Occupational Health officer with Necessary Nursing Assistants (Refer Note3)	Environmental Manager	Senior SHE (Traffic) Engineer (Refer Note4)	Barricade Maintenance Squad (Refer Note4)	House Keeping Squad	Labour Welfare Officer
Upto 2	-	-	-	-	Refer Note 5	Refer Note 6	-
Upto 10	-	1 (PT)	1	1			1
Upto 25	1*	1 (PT)	1	1			1
Upto 100	1*	1 (FT)	1	1			1
Upto 250	1**	2(FT)	1	1			1 with support staff
More than 250	2**	2(FT)	1 with support staff	1			1 with support staff

Note 1: Adequate, qualified and trained SHE Professionals with required support staff to be deployed at each worksite at each shift.

Note 2: Adequate, qualified and trained Electrical Engineers / supervisors to be deployed at each worksite at each shift.



Safety, Health and Environment (SHE) Manual

Note 3: (PT) means Part-Time and (FT) means Full-time.

Note 4: Senior SHE (Traffic) Engineer Post and Barricade Manager (including the staff) Posts are applicable to contracts where the work has to be executed either below or over the right-of-way like Viaduct, Tunnel Contracts wherein erection and maintenance of barricades are paramount important.

Note 5: One Barricade Manager supported by required supervisors and workmen

Note 6: One Housekeeping Manager supported by required supervisors and workmen



	JAIPUR METRO RAIL CORPORATION LTD.
General Instruction : JMRC/SHE/GI/002	

MINIMUM QUALIFICATION AND EXPERIENCE FOR (SHE) SAFETY, ELECTRICAL, ENVIRONMENTAL, TRAFFIC ENGG. AND OCCUPATIONAL HEALTH PROFESSIONALS

Sl. No	Designation	Qualification	Experience (in years)
1	Chief SHE Manager	<p>The Chief SHE Manager shall have qualified in any of the following degree/diploma:</p> <ul style="list-style-type: none"> i) Post Graduate Diploma in Industrial Safety & Environmental Management (PGDISEM) from National Institute of Industrial Engineering, Mumbai ii) M.E. in Industrial Safety from NIT, Trichy, Tamil Nadu iii) M.E. in Industrial Safety from Mepco Schlenk Engineering College, Sivakasi, Tamil Nadu iv) B.E. in Fire and Safety Engg. From Cochin University of Science and Engg. Cochin, Kerala v) B.E. with advanced Safety Management Diploma from CLI / RLI Mumbai / Chennai / Kolkata and Kanpur. vi) B.E / B.Arch., with one year Full Time advanced Safety diploma from NICMAR, Hyderabad. vii) B.E/B.Tech with any other equivalent State and Central Govt. recognized full time Degree / Diploma in Safety. viii) International qualifications like CSP (Certified Safety Professional), NEBOSH, MIOSH, MSISO etc. 	2 {for all category except (iv) and 5yrs for category (iv)}
2	Senior SHE Manager (Refer Note 3)	<p>As stated in Sl. No:1 and in addition the following categories:</p> <ul style="list-style-type: none"> i) B.Sc.(Physics/Chemistry/Maths) with one year Full Time advanced Safety diploma from NICMAR, Hyderabad ii) B.Sc. / Diploma in Engg. with advanced Safety Management Diploma from CLI / RLI / Mumbai / Chennai / Kolkata and Kanpur. iii) B.Sc. (Physics/Chemistry/Maths) with One year Full Time diploma in Safety Engineering offered by West Bengal State Technical Education Departments and similar courses by other states. iv) Any Graduate or diploma holder with 7 years of work experience in full fledged SHE department of any Public Sector / Leading Private Sector / MNC / with prior approval of employer on a case to case basis 	2 {for category (i), (ii) and (iii) only}
3	Junior SHE Manager (Refer Note 3)	<ul style="list-style-type: none"> i) Degree in Science / Diploma in Engineering with Govt. recognized safety diplomas from Correspondence 	2 (for category (i) only)



Safety, Health and Environment (SHE) Manual

		course of NICMAR, Annamalai University, National and State Productivity Councils, Other State Technical Education Boards etc. ii) Any Graduate or diploma holder with 5 years of work experience in full fledged SHE department of any Public Sector / Leading Private Sector / MNC / with prior approval of employer on a case to case basis	
4	Safety Steward (Refer Note 3)	Any basic qualification with any SHE related certificate courses.	2
5	Senior SHE (Electrical) Manager	Degree in Electrical Engineering + Govt. recognized Electrical Licence holder	2
6	Junior SHE (Electrical) Manager	Diploma in Electrical Engineering + Govt. recognized Electrical Licence holder	1
7	Senior SHE (Fire) Manager	i) B.E. (Fire) from National Fire Service College, Nagpur ii) B.E (Fire & Safety) from Cochin University iii) Graduate with any Govt. recognized diploma in Fire Safety with 5 years of experience	2 (for category (i) and (ii) only)
8	Junior SHE (Fire) Manager	Any Diploma holder with any Govt. recognized diploma in Industrial Fire Safety.	1
9	Occupational Health Officer	MBBS with Govt. recognized degree/diploma in Industrial/ occupational health	1
10	Environment Manager	Govt. recognized PG Degree / PG Diploma / Degree in Environmental Engineering / Science	2
11	Senior SHE (Traffic) Engineer	Govt. recognized PG Degree / Degree / Diploma in Traffic/Transportation Engineering or Planning	1
12.	House Keeping Squad -Manager	Any Diploma in Engineering	1
13	Barricade Manager	Any Diploma in Engineering	1
14	Labour Welfare Officer	Any Degree with Govt. Recognized Degree / Diploma / P G Diploma in Labour Welfare related fields like Law, Personnel / Industrial Relations etc.	2

Note 1: In some extraordinary cases where the candidate had earlier worked in JMRC Projects they can be considered for the following posts:

- i) Senior SHE Manager
- ii) Junior SHE Manager
- iii) Safety Steward

depending upon the qualification and no. of years of experience on a case to case basis even if they do not possess the prescribed qualification as listed above.

Note 2: In all other cases other than listed under note 3 (i), (ii) and (iii) irrespective their earlier experience with JMRC projects the candidates shall qualify as specified above.



	JAIPUR METRO RAIL CORPORATION LTD.
General Instruction : JMRC/SHE/GI/003	

MINIMUM REQUIREMENTS OF SHE MONITORING AND AUDIO-VISUAL EQUIPMENTS

- For the purpose of minimum requirements of Audio-visual and Other equipment the contracts are categorized into the following groups:

Contract Value (Initial awarded value of contract)	Group
Upto 25 Cr	A
Upto 100 Cr	B
Upto 250 Cr	C
More than 250 Cr	D

- Every contractor falling into the above groups shall provide the following minimum required audio visual aids for conducting weekly review, monthly safety committee and other post review meeting of all fatal and major incidences effectively. These audio-visual equipments are a must for conducting periodical in-house safety presentations in the training programmes.
- In addition to the above portable hand held digital sound level meter (SLM) and portable hand held digital lux meter are also to be provided.

Sl.No	SHE monitoring and Audio-Visual Equipment details	SHE monitoring and Audio-Visual equipment required for			
		Group A Contract	Group B Contract	Group C Contract	Group D Contract
1.	Portable hand held Digital Sound Level Meter (SLM)	1	1	1	1
2.	Portable hand held Digital Lux Meter	1	1	1	1
3.	Laptop Computer with standard configuration including multi media facilities	1	1	1	1
4.	Colour Printer	1	1	1	1
5.	Computer projector with screen	-	1	1	1
6.	Overhead projector	1			
7.	35mm Camera (For taking accident investigation photos in which case the images can not be easily altered)	1	1	1	1



Safety, Health and Environment (SHE) Manual

8.	Digital camera with flash of minimum 4 mega pixel and video facility	1	1	1	2
9.	Digital still camera with flash of minimum 4 mega pixel	1	2	4	6
10.	Portable loudspeaker (for tool-box talk and emergency purpose)	1	1	2	6
11.	Communication facility like mobile phone, walky-talky etc	For all supervisors and managers/engineers working in Safety, Health & Environment			
12.	Accident investigation Kit containing the following:	1	1	1	2
a)	Chalk piece for marking				
b)	Measuring tape for measuring <ul style="list-style-type: none"> Flexible tape – 2m length Metal Foot long scale and Metal tape – 30m 				
c)	Equipment tags				
d)	Multipurpose Flash light				
e)	Barrier tape of 20m length				
f)	Accident investigation Forms and checklists				
g)	Enough Paper for witness recording and other noting				
h)	Emergency Phone Numbers list				



	JAIPUR METRO RAIL CORPORATION LTD.
General Instruction: JMRC/SHE/GI/004	

Training of Contractor's Employees/Staff/Worker's

Contractor shall provide a training/workshop on safety, health & environment (SHE) to all its workers/staff/employees/subcontractors of at least 2 weeks (96 hrs) at the time of induction. Before posting of any his worker's/staff/employees/subcontractors, the contractor shall give a certificate that the said person had undergone the requisite SHE training. Non compliance of the above will invoke penalties as per the condition of contract on SHE, of Tender Document.

The training shall cover following aspects:-

1. Hazard Identification Procedure

Hazards on site:

- Falls
- Earthing work
- Electricity
- Machinery
- Handling materials
- Transport
- Site housekeeping
- Fire

2. Personal Protective Equipment

- What is available?
- How to obtain it?
- Correct use and care.

3. Health

- Site welfare facilities
- Potential health hazards
- First Aid/CPR


4. Duties of the contractor

- Brief outline of the responsibilities of the Contractor by law
- Details of Contractor's accident prevention policy
- JMRC's SHE manual
- Building and other Constructions Welfare Law

5. Employee's Duties

- Brief outline of responsibilities of employee under law
- Explanation of how new employees fit into the Contractor's plan for accident prevention. (induction and orientation).



	JAIPUR METRO RAIL CORPORATION LTD.
General Instruction : JMRC/SHE/GI/005	

ID Card Format

(85 mm x 55mm)

Front side of ID Card:

Name & Address of Main/Sub Contractor	
LOGO of Main/Sub Contractor Company	Location Jaipur Metro Rail Project
Name: Designation: Blood Group: Valid from: Valid up to:	Photo
Contractor's Authorised Signatory with seal	

Backside of ID Card:

Employee Address: _____ _____ _____
<div>1. This card is the property of "XX" (Main / Sub / Labour Contractor) and must be returned on demand and on transfer / cancellation of employment. 2 A charge will be levied for replacement of the card due to loss or theft 3 If found please return to</div>
Main contractors' Address



	JAIPUR METRO RAIL CORPORATION LTD.
General Instruction : JMRC/SHE/GI/006	

SHE Training details for Managers and Supervisors

1. The Law and Safety	2. Policy and Administration
Statutory requirement Appropriate regulations Duties of employer and employee	Effect of incentive on accident prevention Human relations Consultation Safety Officer: duties, aims, objectives
3. Safety and the Supervisor	4. Principles of Accident Prevention
Safety and efficient production go together Accidents affect morale and public relations	Attitudes of management, supervision and operations Methods of achieving safe operations Accident and injury causes
5. Site Inspection	6. Human Behavior
The role of management Hazard Identification Procedure Records results Follow-up procedures Feedback	Motivating agencies Individual behavior Environmental effects Techniques of persuasion
7. Site housekeeping	8. Health
Site organization Relationship of site housekeeping to accident occurrence Site access Equipment storage Material stacking Materials handling	Medical examination Hazard to health on site Sanitation and welfare Protective clothing First Aid/CPR
9. Personal Protective Equipment	10. Electricity
Eye, face, hands, feet and legs Respiratory protective equipment Protection against ionizing radiation	Appreciation of electrical hazards Power tools Arc welding Low voltage system Lighting and power system on sites ELCB, RRCB, Grounding/Ground fault circuit interrupters (GFCIs)
11. Oxygen and Acetylene Equipment	12. Equipment
Cylinder storage and maintenance Condition and maintenance of valves, regulators, and gauges Condition and maintenance of hoses and fittings Pressures	Accidents related to moving parts of machinery Appreciation of principles of guarding Importance of regular maintenance



3. Transportation	14. Excavations
Transport to and from site Hazard connected with site transport Competent drivers Dumpers Tipping trucks Movement near excavations	Method of shoring Precautions while shoring Precautions at edge of excavations Removal of shoring Sheet steel piling
15. Working platforms, Ladders, and Scaffolding	16. Cranes and other Lifting Machines
Hazards connected with the use of ladders Maintenance and inspection Type of scaffold Overloading Work on roofs Fragile material Openings in walls and floors Use of safety belts and nets	Licensing, certification and training required for operation of cranes Slings methods Signaling Access to crane(s) Maintenance and examination Ground conditions Hazards and accident prevention methods connected with the use of different types of cranes/heavy equipment Crane Lift Plan for all lifts
17. Lifting Tackle	18. Fire Prevention and Control
Slings - single and multi-legged Safe working loads (SWLs) Safety hooks and eyebolts Cause of failure Maintenance and examination	Principle causes determining fire Understanding fire chemistry Fire fighting equipment Fire fighting training
19. Communications	
Effective methods of communication (particular interest to non-English speaking workers) Method and preparation of reports Safety committees Safety meeting	




SHE Training Matrix

SHE/ Page 108 of 122



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DAYS TO BE OBSERVED FOR CREATING SHE AWARENESS

	JAIPUR METRO RAIL CORPORATION LTD.
General Instruction : JMRC/SHE/GI/008	

1 st Monday to Sunday of January	Road Safety Week (Subjected to confirmation from Ministry of Road Transport, Govt. of India every year.)
16 th February	Kyoto Protocol Day
March	Red Cross Month
May 1 to 7	Emergency Preparedness Week
4 th March	National Safety Day
7 th April	World Health Day
14 th April	Fire Safety Day
April 18 to 22	Earth Week
20 th April	Earth Day
20 th April	Noise Awareness Day
28 th April	ILO World Day for Safety and Health at Work Day
5 th June	World Environmental Day
12 th June	World Day against Child Labours
9 th July	Occupational Health Day
17 th October	World Trauma Day
1 st December	World AIDS Day



	JAIPUR METRO RAIL CORPORATION LTD.
General Instruction : JMRC/SHE/GI/009	

Minimum Requirements of SHE Communication Posters / Signage / Video

- For the purpose of Minimum requirements of SHE Communication Posters / Signages / Video the contracts are categorized into the following groups:

Contract Value (Initial awarded value of contract)	Group
Upto 25 Cr	A
Upto 100 Cr	B
Upto 250 Cr	C
More than 250 Cr	D

- Every contractor falling into the above groups shall prepare a SHE Communication Plan as a part of site specific SHE Plan and shall include the following minimum requirement of Posters / Signages / Video as applicable. In case readymade posters are available in any of the category from National Safety Council, Loss Prevention Association of India or any other safety related organisations they may procure the same and display it. In case the same is not available then the contractors' shall make necessary arrangements to get the posters designed and printed on their own.

All the above are to be detailed in the Site SHE Plan and get an approval from the Employer before displaying the posters.

Table No.: 1 - Minimum No. of Posters

Sl.No	SHE Poster Title	Minimum No. of concepts in each title	No. of Posters / Signage / Video			
			Group A Contract	Group B Contract	Group C Contract	Group D Contract
1.	Safety Culture	5	Each 10	Each 50	Each 75	Each 100
2.	Daily Safety Oath	1 English & 1 Hindi	Each 100	Each 200	Each 500	Each 1000
3.	Mandatory PPE Usage					
a)	Signages to display the messages like PPE ZONE, NO PPE ZONE, HARD HAT AREA etc.	2 types of sizes made up of metal sheet to be mounted at different locations	Each 25	Each 50	Each 75	Each 200
b)	Helmet	5	Each 25	Each 50	Each 75	Each 200



Safety, Health and Environment (SHE) Manual

c)	Shoe	5	Each 25	Each 50	Each 75	Each 200
d)	Goggles & Ear Protection	5	Each 25	Each 50	Each 75	Each 200
e)	Full Body Harness	5	Each 25	Each 50	Each 75	Each 200
f)	Hi-Vi Jacket	5	Each 25	Each 50	Each 75	Each 200
4.	Emergency Management Plan	5	Each 25	Each 50	Each 75	Each 200
5.	Working at Heights	10	Each 25	Each 50	Each 75	Each 200
a)	Ladder, Stairway, Scaffold - Signages to display the messages like SAFE, UNSAFE, FIT FOR USE, AVOID USE etc.	5 types of sizes made up of metal sheet to be mounted at different locations	Each 25	Each 50	Each 75	Each 200
6.	Site Electricity	5	Each 25	Each 50	Each 75	Each 200
7.	Crane Safety	5	Each 25	Each 50	Each 75	Each 200
8.	Slings	5	Each 25	Each 50	Each 75	Each 200
9.	Rigging Procedures	5	Each 25	Each 50	Each 75	Each 200
10.	Excavation	5	Each 25	Each 50	Each 75	Each 200
11.	Occupational Health (Mosquito Control, HIV/AIDS awareness, Dust Control, Noise Control, No Smoking/Spitting, etc.)	10	Each 25	Each 50	Each 75	Each 200
12.	First – Aid	3	Each 25	Each 50	Each 75	Each 200
13.	Labour Welfare Measures (Payment of Minimum Wages, Avoidance of Child labour, Signing in the Muster Roll, In case of accidents-what to do? etc	5	Each 25	Each 50	Each 75	Each 200
14.	Importance of “Safety Handbook”	1	25	50	75	200
15.	Traffic Safety (Speed limit, safe crossing and working within barricaded area etc.)	5	Each 25	Each 50	Each 75	Each 200
16.	Environmental Monitoring (Spillage of Muck, hazardous material, Improper drainage, water spray for dust containment etc.)	5	Each 25	Each 50	Each 75	Each 200
17.	Video in Hindi on PPE usage – 15 minutes duration	1	-	-	-	1



Safety, Health and Environment (SHE) Manual

Note 1: Items mentioned under 17 is **video**. Items under 3 (a) and 5 (a) are **metal signage boards** and all other items are **posters**.

Table No.: 2 – Size of Posters / Signages

Sl.No	Item	Size
1.	Posters – Standard	17"x22" –135 GSM 4 Colour Printing
2.	Posters – Special (Wherever required)	17"x22" card laminated FA Poster
3.	Posters - Mega size (Wherever required)	32"x40" Flex FA Poster
4.	First-Aid Booklet	6"x4"
5.	Safety Handbook	6"x4"
6.	Signages	Small : 12"x6" Big : 24"x12"
7.	Road Traffic Sign Boards	Strictly as per Indian Road Congress (IRC) specifications

Table No.: 3 – Safety Signage Colour (as per IS 9457)

Sl.No	Type of signage	Colour
1	Mandatory	Blue
2	Danger	Yellow
3	Prohibitory	Red
4	Safe conditions	Green



	JAIPUR METRO RAIL CORPORATION LTD.
General Instruction : JMRC/SHE/GI/010	

Experts / Agencies for SHE Services

Sl. No.	Organisation	Services
1.	Bureau Veritas India Pvt. Ltd., B-21 & 22, First Floor, Sector-16, NOIDA-201 301 (U.P.) Phone: 0120 – 2515055, Fax: 0120 - 2515248 E-mail: enp.delhi@in.bureauveritas.com	<ul style="list-style-type: none">• External SHE Audit• SHE Management / Technical Training
2.	Central Labour Institute Post box no: 17851 N.S.Monkikar Marg Sion , Mumbai- 400 022 Tel.: 022- 4092203, Fax: 022 – 4071986 E-mail: cli@dgfasli.nic.in	<ul style="list-style-type: none">• SHE Management / Technical Training
3.	Construction Industry Development Council 801, 8 th Floor, Hemkunt Chambers, 89, Nehru Place,, New Delhi – 110 019	<ul style="list-style-type: none">• SHE Management / Technical Training
4.	Delhi Productivity Council 1E/10, Swami Ramtirath Nagar New Delhi – 110 055 Tel.: 23522835	<ul style="list-style-type: none">• SHE Management / Technical Training
5.	Det Norske Veritas AS, 203, Savitri Sadan 1, 11 Preet Vihar Community Centre, New Delhi-110 092 Phone: 011-2253 1502/2253/1503, 2242 7688/2253 1278 Fax: 011-2253 0247 Website: www.dnv.com	<ul style="list-style-type: none">• External SHE Audit• SHE Management / Technical Training
6.	Dr. A. V. Baliga Memorial trust Link House Bagadur Shah Zafar Marg Press Area, New Delhi – 110 002 Phone: 011 – 23311119	<ul style="list-style-type: none">• HIV / AIDS awareness



7.	DuPont Safety Resources, E.I. DuPont India Private Limited, Arihant Nitco Park 6 th Floor, 90, Dr. Radhakrishnan Salai, Mylapore, Chennai-600 004 Phone: 044-2847 2800, 2847 3752 Fax: 044-2847 3800 Mobile: 9381201040 Website: in.dupont.com	<ul style="list-style-type: none"> • SHE Management Training
8.	EQMS INDIA PVT. LTD. E-49, 1 st Floor, Dazzle House, Jawahar Park, Main Vikas Marg, Laxmi Nagar, Delhi-110 092 Phone: 91-11-220 17639/2204 4754 Fax: 91-91 2201 5150 E-mail: eqms@eqmsindia.org Website: www.eqmsindia.com	<ul style="list-style-type: none"> • ISO Certification • SHE Management / Technical Training
9.	Green Cross Consultants 59, 7 th Cross, 1 st Floor, Jai Bharath Nagar, Bangalore-560 033 Phone: 080-2549 6782 E-mail: etgrangan@yahoo.com	<ul style="list-style-type: none"> • SHE Management / Technical Training
10.	HSRTC, PENTASAFE, 201, 2 nd Floor, Town Centre, Andheri Kurla Road, Marol, Andheri (East), Mumbai-400 059 Phone: 022-2850 2210/20/50 Fax: 022-2850 2260 E-mail: training@penta-safe.com Website: www.penta-safe.com	<ul style="list-style-type: none"> • SHE Practical Field Training for Height Safety
11.	Institute of Driving Training & Research, Wazirabad Road, Adjoining Loni Road flyover. New Delhi – 110 094 Phone: 011 – 22813474, 22815833 Fax: 011 - 22811131	<ul style="list-style-type: none"> • SHE Technical Training for Vehicle Drivers.
12.	Institute for Research, Development & Training of Construction Trades & Management, An Educational Institute, Society and Trust, 1 st Floor, UVCE Alumni Association Building, K.R. Circle, Bangalore-560 001 Phone: 080-22294291/22243257 Fax: 080-22243257 E-mail: ubrco@vsnl.com Website: www.instructindia.org	<ul style="list-style-type: none"> • SHE Technical /Field Training



13.	International Engineering Company K – 10, South Extension, Part – 2, New Delhi – 110 049 Phone: 011 – 26254761, 26258130 Mobile: 9312260130 E-mail: ashok@intenco.net	<ul style="list-style-type: none"> • Crane and Lifting appliances and Gears Certification • SHE Practical Field Training for Crane Safety
14.	L & T Eutectic 32, Sivaji Marg New Delhi – 110 015 Phone: 011 - 51419538, 51419539 Fax: 011 - 51419600 Website: www.Inteutecticwelding.com	<ul style="list-style-type: none"> • SHE Practical Field Training for Welding Safety
15.	Loss Prevention Association of India Ltd. Warden House, Sir P.M. Road, Mumbai – 400 001 Website: www.lpaidia.org	<ul style="list-style-type: none"> • SHE Management / Technical Training
16.	MFA Crucial Moments Healthcare Pvt. Ltd., 42, Okhla Industrial Estate, Phase – II New Delhi – 110 020 Phone: 011 – 55624000 Fax: 011 – 55624010 E-mail: contact@crucialmoments.net	<ul style="list-style-type: none"> • First-aid Training
17.	Modicare Foundation 4 Community Centre, New Friends Colony, New Delhi – 110 065 Phone: 011 – 5167235059 Fax: 011 – 26915469 E-mail: nivedita@modi.com , nivedita@gmail.com Website: www.modicarefoundation.org	<ul style="list-style-type: none"> • HIV / AIDS awareness
18.	National Safety Council HQ and Institute Building 98A, Sector 15, industrial Area C.B.D Belapur, Navi Mumbai – 400614 Phone: 27579924	<ul style="list-style-type: none"> • SHE Management / Technical Training
19.	NICMAR (National Institute of Construction Management and Research) 910,9 th Floor, Hemkunt Chambers, 89, Nehru Place, New Delhi – 110 019 Phone: 011 – 51618415, 51618417, 51618418 Fax: 011 – 51618416	<ul style="list-style-type: none"> • SHE Management / Technical Training



20.	<p>Quality Growth Services Pvt. Ltd. H-13, Kirti Nagar, New Delhi – 110 015 Fax: 011 – 25431737 / 25438598 / 25918332 E-mail: qgs@qgspl.com Website: www.qgspl.com</p>	<ul style="list-style-type: none"> • ISO Certification
21.	<p>Safety Engineers Association / Safety Educational Trust – India 2/257, First Floor, Dr. Ambedkar Nagar, Manapakkam, Chennai – 600 116 Phone: 044 – 22523461 E-mail: safetrustindia@rediffmail.com</p>	<ul style="list-style-type: none"> • SHE Management / Technical Training
22.	<p>SHE Management Consultancy & Support Services, 145 A, Pocket-VI, (DDA Flats), Kondli Gharoli, Mayur Vihar-II, Delhi-110 096 Fax: 011-2262 5015 Mobile: 9811153873 E-mail: r_k_p@vsnl.net</p>	<ul style="list-style-type: none"> • SHE Management / Technical Training
23.	<p>St. Johns' Ambulance Red Cross Road New Delhi – 110 001</p>	<ul style="list-style-type: none"> • First-aid Training
24.	<p>Vexil Business Process Services Pvt. Ltd. 208, A/4, Savitri Nagar, New Delhi – 110 017 Mobile: 9350232714, 98102832201, 9350232716 E-mail: info@vexilbps.com Website: www.vexilbps.com</p>	<ul style="list-style-type: none"> • Emergency Preparedness Mock drill • SHE Management / Technical Training
25.	<p>Welding Research Institute Bharat Heavy Electricals Ltd. (BHEL) Trichirappalli, Tamil Nadu – 620 014 Phone: 0431 – 2577029, 2577283 Fax: 0431 – 2520770 E-mail: wri@bheltry.co.in</p>	<ul style="list-style-type: none"> • SHE Practical Field Training for Welding Safety
26.	<p>Dr Cris Research Centre for Occupational Health & Safety 306, Guru Arjuna Dev Bhawan Ranjit Nagar Complex, New Delhi-08 Ph: 9810040406 Fax: 011-25702929 Email: team@drcri.com www.drcri.com</p>	<ul style="list-style-type: none"> • Ambulance • Communication Material • First Aid Training • HIV/AIDS Awareness • ID Card • Medical Facilities • SHE training




	JAIPUR METRO RAIL CORPORATION LTD.
General Instruction: JMRC/SHE/GI/011	

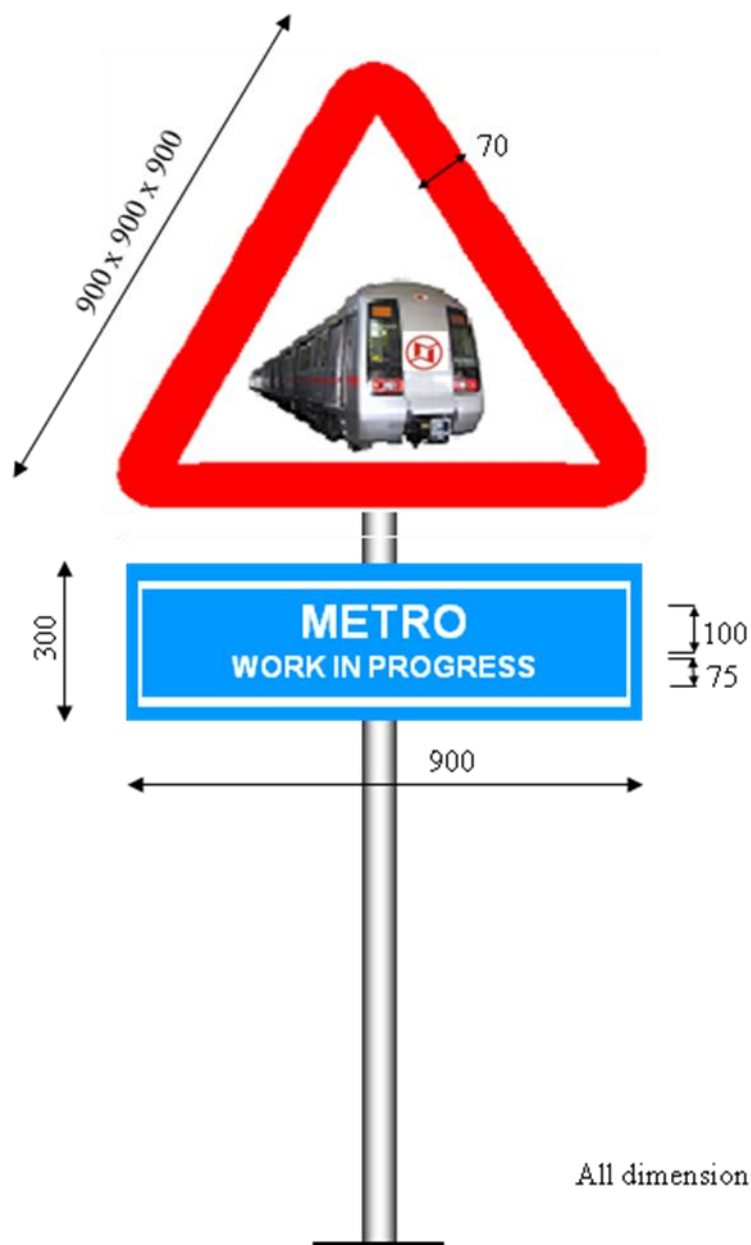
Minimum Lighting Requirements

S.N.	A. Facility or Function	Luminance – lx (lm/ft ²)
B. 1.	Administrative areas (offices, drafting and meeting rooms, etc.)	540 (50)
C. 2.	D. Construction areas <ul style="list-style-type: none"> - general indoor - general outdoor - tunnel and general underground work areas (minimum 110 lux required at tunnel and shaft heading during drilling, mucking and scaling) 	55 (5) 33 (3) 55 (5)
E. 3.	F. Access ways <ul style="list-style-type: none"> - exit ways, walkways, ladders, stairs 	110 (10)
4.	G. Maintenance / Operating areas / shops <ul style="list-style-type: none"> - vehicle maintenance shop - carpentry shop - outdoors field maintenance area - refueling area, outdoors - shops, fine details work - shops, medium detail work - welding shop 	325 (30) 110 (10) 55 (5) 55 (5) 540 (50) 325 (30) 325 (30)
5.	Mechanical/electrical equipment rooms	110 (10)
6.	Hoists, Elevators, freight and passenger	215 (20)
7.	H. Warehouses and storage rooms/area <ul style="list-style-type: none"> - indoor stockroom, active/bulk storage - indoor rack storage - outdoor storage 	110 (10) 270 (25) 33 (3)
8.	Health Centers and First aid stations and infirmaries	325 (30)
9.	Toilets, wash and dressing rooms	110 (10)
10.	Work areas – general (not listed above)	325 (30)
11.	Parking areas	33 (3)
12.	Visitor areas	215 (20)
13.	Laboratories	540 (50)



	JAIPUR METRO RAIL CORPORATION LTD.
General Instruction: JMRC/SHE/GI/012	

SIGNAGE





	JAIPUR METRO RAIL CORPORATION LTD.
FORM No. : SF/001	

FORMATION OF SITE SHE COMMITTEE	
Contract No	
Contractor Name	
Contract Title	

<u>CIRCULAR</u>	
<u>Committee</u> The following SHE Committee is constituted with immediate effect: Chairman: Members: 1) 2) 3) 4) 5) Secretary:	
<u>Periodicity</u> The committee will meet at least once in a month on the day (specify date)	
<u>Agenda</u> Secretary will circulate agenda of the meeting at least two days in advance of the schedule date of the meeting.	
<u>Circulation</u> Gist of the meeting will be minuted in the standard format and circulated to the following under the signature of the secretary 1. Chairman 2. Members 3. JMRC Representatives 5. Others concerned	
Date: CHAIRMAN	Signed By: -----



	JAIPUR METRO RAIL CORPORATION LTD.
FORM No. : SF/002	

MINUTES OF SHE COMMITTEE MEETING			
Contract No.			
Contractor Name			
Contract Title			
Meeting No.		Date of Meeting	
Location of Meeting			

MEMBERS PRESENT	INVITEES	MEMBERS ABSENT



Safety, Health and Environment (SHE) Manual

REPORT SENT TO					
No. of Copies	Name / Dept.	No. of Copies	Name / Dept.	No. of Copies	Name / Dept.
Prepared by: _____ Location: _____ Date: _____					

MINUTES OF SHE MEETING				
Item No.	Description of Discussion	Action By	Target	Remarks
1	Complaints received from Clients and corrective and preventive action			
2	Review of MOM of previous meeting			
3	NCR's / Observation from third party			
4	First - Aid cases / Reportable accident cases			
5	Future jobs and specific requirement			
6	Status of implementation of Safety plan			
7	Sub-contractor performance			



Safety, Health and Environment (SHE) Manual

8	Analysis of first-aid cases			
9	Need for any specific system / training / PPE's / resources			
10	Observation of SHE committee during last walk down			

Next SHE Meeting is scheduled on:

Date:	Chief SHE Manager (Signature & Name)
Date:	Project Manager (Signature & Name)



Procurement of Works

JAIPUR METRO RAIL CORPORATION LIMITED

BIDDING DOCUMENT

for

Procurement on International Competitive Bidding Mode

of

ICB No.- JP/JS 21 (Phase-1B)

**DESIGN, MANUFACTURE, SUPPLY, INSTALLATION, TESTING &
COMMISSIONING OF AUTOMATIC FARE COLLECTION SYSTEM
FOR JMRC PHASE 1B**

PART - III CONDITIONS OF CONTRACT AND CONTRACT FORMS

Section 7 – General Conditions of Contractors (GCC)

**3rd Floor, RAJSICO Building, Udhog Bhawan, Tilak Marg,
C- Scheme, Jaipur (Rajasthan) PIN-302005
Country: India**

Section 7 - General Conditions of Contract

These General Conditions of Contract (GCC) are based on the Model Form of International Contract for Process Plant Construction published by the Engineering Advancement Association of Japan (ENAA). The Multilateral Development Banks (MDBs) participating in the procurement harmonization process gratefully acknowledge the contribution of ENAA to the advancement of good contracting practices by its borrowers. The GCC contain general clauses to be applied on all contracts. The GCC in this section, read in conjunction with the Special Conditions of Contract in Section 8 and other documents listed therein, should be a complete document expressing all the rights and obligations of the contracting parties. The General Conditions herein shall not be altered.

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General Conditions of Contract

A. Contract and Interpretation

1. Definitions

1.1 The following words and expressions shall have the meanings hereby assigned them:

“Contract” means the Contract Agreement entered into between the Employer and the Contractor, together with the Contract Documents referred to therein; they shall constitute the Contract, and the term “the Contract” shall in all such documents be construed accordingly.

“Contract Documents” means the documents listed in Article 1.1 (Contract Documents) of the Contract Agreement (including any amendments thereto).

“GCC” means the General Conditions of Contract.

“SCC” means the Special Conditions of Contract.

“day” means calendar day.

“year” means 365 days.

“month” means calendar month.

“Party” means the Employer or the Contractor, as the context requires.

“Employer” means the person named as such in the SCC and includes the legal successors or permitted assigns of the Employer.

“Project Manager” means the person appointed by the Employer in the manner provided in GCC Subclause 17.1 (Project Manager) hereof and named as such in the SCC to perform the duties delegated by the Employer.

“Contractor” means the person(s) named as Contractor in the Contract Agreement, and includes the legal successors or permitted assigns of the Contractor.

“Contractor’s Representative” means any person nominated by the Contractor and approved by the Employer in the manner provided in GCC Subclause 17.2 (Contractor’s Representative and Construction Manager) hereof to perform the duties delegated by the Contractor.

“Construction Manager” means the person appointed by the Contractor’s Representative in the manner provided in GCC Subclause 17.2.4.

“Subcontractor,” including manufacturers, means any person to whom execution of any part of the Facilities, including preparation of any design or supply of any Plant, is sub-contracted directly or indirectly by the Contractor, and includes its legal successors or permitted assigns.

“Dispute Board” means the person or persons named as such in the SCC appointed by agreement between the Employer and the Contractor to make a decision on or to settle any dispute or difference between the Employer and the Contractor referred to him or her by the parties pursuant to GCC Subclause 45.1 (Dispute Board) hereof.

“The Bank” means the financing institution named in the SCC.

“Contract Price” means the sum specified in Article 2.1 (Contract Price) of the Contract Agreement, subject to such additions and adjustments thereto or deductions therefrom, as may be made pursuant to the Contract.

“Facilities” means the Plant to be supplied and installed, as well as all the Installation Services to be carried out by the Contractor under the Contract.

“Plant” means permanent plant, equipment, machinery, apparatus, articles and things of all kinds to be provided and incorporated in the Facilities by the Contractor under the Contract (including the spare parts to be supplied by the Contractor under GCC Subclause 7.3 hereof), but does not include Contractor’s Equipment.

“Installation Services” means all those services ancillary to the supply of the Plant for the Facilities, to be provided by the Contractor under the Contract, such as transportation and provision of marine or other similar insurance, inspection, expediting, site preparation works (including the provision and use of Contractor’s Equipment and the supply of all construction materials required), installation, testing, pre-commissioning, commissioning, operations, maintenance, the provision of operations and maintenance manuals, training, etc. as the case may require.

“Contractor’s Equipment” means all facilities, equipment, machinery, tools, apparatus, appliances, or things of every kind required in or for installation, completion and maintenance of Facilities that are to be provided by the Contractor, but does not include Plant, or other things intended to form or forming part of the Facilities.

“Country of Origin” means the countries and territories eligible under the rules of the Bank as further elaborated in the SCC.

“Site” means the land and other places upon which the Facilities are to be installed, and such other land or places as may be specified in the Contract as forming part of the Site.

“Effective Date” means the date of fulfillment of all conditions stated in Article 3 (Effective Date) of the Contract Agreement, upon which the period until the Time for Completion shall be counted from.

“Time for Completion” means the time within which Completion of the Facilities as a whole (or of a part of the Facilities where a separate Time for Completion of such part has been prescribed) is to be attained, as referred to in GCC Clause 8 and in accordance with the relevant provisions of the Contract.

“Completion” means that the Facilities (or a specific part thereof where specific parts are specified in the Contract) have been completed operationally and structurally and put in a tight and clean condition, that all work in respect of Pre-commissioning of the Facilities or such specific part thereof has been completed, and that the Facilities or specific part thereof are ready for Commissioning as provided in GCC Clause 24 (Completion) hereof.

“Pre-commissioning” means the testing, checking and other requirements specified in the Employer’s Requirements that are to be carried out by the Contractor in preparation for Commissioning as provided in GCC Clause 24 (Completion) hereof.

“Commissioning” means operation of the Facilities or any part thereof by the Contractor following Completion, which operation is to be carried out by the Contractor as provided in GCC Subclause 25.1 (Commissioning) hereof, for the purpose of carrying out Guarantee Test(s).

“Guarantee Test(s)” means the test(s) specified in the Employer’s Requirements to be carried out to ascertain whether the Facilities or a specified part thereof is able to attain the Functional Guarantees specified in the Appendix (Functional Guarantees) to the Contract Agreement in accordance with the provisions of GCC Subclause 25.2 (Guarantee Test) hereof.

“Operational Acceptance” means the acceptance by the Employer of the Facilities (or any part of the Facilities where the Contract provides for acceptance of the Facilities in parts), which certifies the Contractor’s fulfillment of the Contract in respect of Functional Guarantees of the Facilities (or the relevant part thereof) in accordance with the provisions of GCC Clause 28 (Functional Guarantees) hereof and shall include deemed acceptance in accordance with GCC Clause 25 (Commissioning and Operational Acceptance) hereof.

“Defect Liability Period” means the period of validity of the warranties given by the Contractor commencing at Completion of the Facilities or a part thereof, during which the Contractor is responsible for defects with respect to the Facilities (or the relevant part thereof) as provided in GCC Clause 27 (Defect Liability) hereof.

- | | |
|------------------------------|--|
| 2. Contract Documents | 2.1 Subject to Article 1.2 (Order of Precedence) of the Contract Agreement, all documents forming part of the Contract (and all parts thereof) are intended to be correlative, complementary and mutually explanatory. The Contract shall be read as a whole. |
| 3. Interpretation | 3.1 In the Contract, except where the context requires otherwise, <ul style="list-style-type: none"> (a) words indicating one gender include all genders; (b) words indicating the singular also include the plural and words indicating the plural also include the singular; (c) provisions including the word “agree,” “agreed,” or “agreement” require the agreement to be record in writing; |

- (d) the word "tender" is synonymous with "bid," "tenderer" with "Bidder," and "tender documents" with "Bidding Documents;" and
- (e) "written" or "in writing" means handwritten, typewritten, printed or electronically made, and resulting in a permanent record.

The marginal words and other headings shall not be taken into consideration in the interpretation of these Conditions.

3.2 Incoterms

Unless inconsistent with any provision of the Contract, the meaning of any trade term and the rights and obligations of parties thereunder shall be as prescribed by Incoterms.

"Incoterms" means international rules for interpreting trade terms published by the International Chamber of Commerce (latest edition), 38 Cours Albert 1^{er}, 75008 Paris, France.

3.3 Entire Agreement

Subject to GCC Subclause 16.4 hereof, the Contract constitutes the entire agreement between the Employer and Contractor with respect to the subject matter of Contract and supersedes all communications, negotiations, and agreements (whether written or oral) of parties with respect thereto made prior to the date of Contract.

3.4 Amendment

No amendment or other variation of the Contract shall be effective unless it is in writing, is dated, expressly refers to the Contract, and is signed by a duly authorized representative of each party hereto.

3.5 Independent Contractor

The Contractor shall be an independent contractor performing the Contract. The Contract does not create any agency, partnership, joint venture, or other joint relationship between the parties hereto. Subject to the provisions of the Contract, the Contractor shall be solely responsible for the manner in which the Contract is performed. All employees, representatives, or Subcontractors engaged by the Contractor in connection with the performance of the Contract shall be under the complete control of the Contractor and shall not be deemed to be employees of the Employer, and nothing contained in the Contract or in any subcontract awarded by the Contractor shall be construed to create any contractual relationship between any such employees, representatives, or Subcontractors and the Employer.

3.6 Non-Waiver

3.6.1 Subject to GCC Subclause 3.6.2 below, no relaxation, forbearance, delay, or indulgence by either party in enforcing any of the terms and conditions of the Contract or the granting of time by either party to the other shall prejudice, affect, or restrict the rights of that party under the Contract, nor shall any waiver by either party of any breach of Contract operate as waiver of any subsequent or continuing breach of Contract.

3.6.2 Any waiver of a party's rights, powers, or remedies under the

Contract must be in writing, must be dated, and signed by an authorized representative of the party granting such waiver, and must specify the right and the extent to which it is being waived.

3.7 Severability

If any provision or condition of the Contract is prohibited or rendered invalid or unenforceable, such prohibition, invalidity, or unenforceability shall not affect the validity or enforceability of any other provisions and conditions of the Contract.

3.8 Country of Origin

"Origin" means the place where the plant and component parts thereof are mined, grown, produced, or manufactured, and from which the services are provided. Plant components are produced when, through manufacturing, processing, or substantial or major assembling of components, a commercially recognized product results that is substantially in its basic characteristics or in purpose or utility from its components.

4. Communications

4.1 Wherever these Conditions provide for the giving or issuing of approvals, certificates, consents, determinations, notices, requests, and discharges, these communications shall be

- (a) in writing and delivered against receipt; and
- (b) delivered, sent, or transmitted to the address for the recipient's communications as stated in the Contract Agreement.

When a certificate is issued to a Party, the certifier shall send a copy to the other Party. When a notice is issued to a Party, by the other Party or the Project Manager, a copy shall be sent to the Project Manager or the other Party, as the case may be.

5. Law and Language

5.1 The Contract shall be governed by and interpreted in accordance with laws of the country specified in the SCC.

5.2 The ruling language of the Contract shall be that stated in the SCC.

5.3 The language for communications shall be the ruling language unless otherwise stated in the SCC.

6. Fraud and Corruption

6.1 ADB's Anticorruption Policy requires Borrowers (including beneficiaries of ADB-financed activity), as well as Bidders, Suppliers, and Contractors under ADB-financed contracts, observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, ADB

- (a) defines, for the purposes of this provision, the terms set forth below as follows:
 - (i) "corrupt practice" means the offering, giving, receiving, or soliciting, directly or indirectly, anything of value to influence improperly the actions of another party;
 - (ii) "fraudulent practice" means any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party

- to obtain a financial or other benefit or to avoid an obligation;
- (iii) "coercive practice" means impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;
 - (iv) "collusive practice" means an arrangement between two or more parties designed to achieve an improper purpose, including influencing improperly the actions of another party;
 - (v) "obstructive practice" means (a) deliberately destroying, falsifying, altering, or concealing of evidence material to an ADB investigation; (b) making false statements to investigators in order to materially impede an ADB investigation; (c) failing to comply with requests to provide information, documents, or records in connection with an Office of Anticorruption and Integrity (OAI) investigation; (d) threatening, harassing, or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation, or (e) materially impeding ADB's contractual rights of audit or access to information; and
 - (vi) "integrity violation" is any act which violates ADB's Anticorruption Policy, including (i) to (v) above and the following: abuse, conflict of interest, violations of ADB sanctions, retaliation against whistleblowers or witnesses, and other violations of ADB's Anticorruption Policy, including failure to adhere to the highest ethical standard.
- (b) will reject a proposal for award if it determines that the Bidder recommended for award has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices or other integrity violations in competing for the Contract;
 - (c) will cancel the portion of the financing allocated to a contract if it determines at any time that representatives of the Borrower or of a beneficiary of ADB-financing engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices or other integrity violations during the procurement or the execution of that contract, without the Borrower having taken timely and appropriate action satisfactory to ADB to remedy the situation;
 - (d) will impose remedial actions on a firm or an individual, at any time, in accordance with ADB's Anticorruption Policy and Integrity Principles and Guidelines (both as amended from time to time), including declaring ineligible, either indefinitely or for a

stated period of time, to participate¹ in ADB-financed, administered, or supported activities or to benefit from an ADB-financed, administered, or supported contract, financially or otherwise, if it at any time determines that the firm or individual has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices or other integrity violations; and

- (e) will have the right to require suppliers and contractors to permit ADB or its representative to inspect their accounts and records and other documents relating to the bid submission and contract performance and to have them audited by auditors appointed by ADB.

B. Subject Matter of Contract

7. Scope of Facilities

- 7.1 Unless otherwise expressly limited in the Employer's Requirements, the Contractor's obligations cover the provision of all Plant and the performance of all Installation Services required for the design, the manufacture (including procurement, quality assurance, construction, installation, associated civil works, pre-commissioning and delivery) of the Plant and the installation, completion, and commissioning of the Facilities in accordance with the plans, procedures, specifications, drawings, codes, and any other documents as specified in the section Employer's Requirements. Such specifications include, but are not limited to, the provision of supervision and engineering services; the supply of labor, materials, equipment, spare parts (as specified in GCC Subclause 7.3 below) and accessories; Contractor's Equipment; construction utilities and supplies; temporary materials, structures, and facilities; transportation (including, without limitation, unloading and hauling to, from and at the Site); and storage, except for those supplies, works, and services that will be provided or performed by the Employer, as set forth in the Appendix (Scope of Works and Supply by the Employer) to the Contract Agreement.
- 7.2 The Contractor shall, unless specifically excluded in the Contract, perform all such work and/or supply all such items and materials not specifically mentioned in the Contract but that can be reasonably inferred from the Contract as being required for attaining Completion of the Facilities as if such work and/or items and materials were expressly mentioned in the Contract.
- 7.3 In addition to the supply of Mandatory Spare Parts included in the Contract, the Contractor agrees to supply spare parts required for the operation and maintenance of the Facilities for the period specified in the SCC and the provisions, if any, specified in the SCC. However, the identity, specifications, and quantities of such spare parts and the terms and conditions relating to the supply thereof are to be agreed between the Employer and the Contractor, and the price of such spare parts shall be that given in Price Schedule No. 6, which shall be added

¹ Whether as a Contractor, Subcontractor, Consultant, Manufacturer or Supplier, or Service Provider; or in any other capacity (different names are used depending on the particular Bidding Document).

to the Contract Price. The price of such spare parts shall include the purchase price therefore and other costs and expenses (including the Contractor's fees) relating to the supply of spare parts.

8. Time for Commencement and Completion

- 8.1 The Contractor shall commence work on the Facilities within the period specified in the SCC and without prejudice to GCC Subclause 26.2 hereof, the Contractor shall thereafter proceed with the Facilities in accordance with the time schedule specified in the Appendix 4 (Time Schedule) to the Contract Agreement.
- 8.2 The Contractor shall attain Completion of the Facilities or of a part where a separate time for Completion of such part is specified in the Contract, within the time stated in the SCC or within such extended time to which the Contractor shall be entitled under GCC Clause 40 hereof.

9. Contractor's Responsibilities

- 9.1 The Contractor shall design, manufacture, including associated purchases and/or subcontracting, install, and complete the Facilities in accordance with the Contract. When completed, the Facilities should be fit for the purposes for which they are intended as defined in the Contract.
- 9.2 The Contractor confirms that it has entered into this Contract on the basis of a proper examination of the data relating to the Facilities, including any data as to boring tests provided by the Employer, and on the basis of information that the Contractor could have obtained from a visual inspection of the Site if access thereto was available and of other data readily available to it relating to the Facilities as of the date 28 days prior to bid submission. The Contractor acknowledges that any failure to acquaint itself with all such data and information shall not relieve its responsibility for properly estimating the difficulty or cost of successfully performing the Facilities.
- 9.3 The Contractor shall acquire and pay for all permits, approvals, and/or licenses from all local, state, or national government authorities or public service undertakings in the country where the Site is located, which such authorities or undertakings require the Contractor to obtain in its name and which are necessary for the performance of the Contract, including, without limitation, visas for the Contractor's and Subcontractor's personnel and entry permits for all imported Contractor's Equipment. The Contractor shall acquire all other permits, approvals, and/or licenses that are not the responsibility of the Employer under GCC Subclause 10.3 hereof and that are necessary for the performance of the Contract.
- 9.4 The Contractor shall comply with all laws in force in the country where the Facilities are to be implemented. The laws will include all local, state, national, or other laws that affect the performance of the Contract and bind upon the Contractor. The Contractor shall indemnify and hold harmless the Employer from and against any and all liabilities, damages, claims, fines, penalties, and expenses of whatever nature arising or resulting from the violation of such laws by the Contractor or its personnel, including the Subcontractors and their personnel, but without prejudice to GCC Subclause 10.1 hereof.
- 9.5 Any plant and services that will be incorporated in or be required for the Facilities and other supplies shall have their origin as specified under GCC Clause 1 (Country of Origin). Any Subcontractors retained

by the Contractor shall be from a country as specified in GCC Clause 1 (Country of Origin).

9.6 The Contractor shall permit ADB to inspect the Contractor's accounts and records relating to the performance of the Contractor and to have them audited by auditors appointed by ADB, if so required by ADB.

9.7 If the Contractor is a joint venture or consortium of two or more persons, all such persons shall be jointly and severally bound to the Employer for the fulfillment of the provisions of the Contract and shall designate one of such persons to act as a leader with authority to bind the joint venture or consortium. The composition or the constitution of the joint venture or consortium shall not be altered without the prior consent of the Employer.

9.8 Protection of the Environment

(a) The Contractor shall take all reasonable steps to protect the environment (both on and off the Site) and to limit damage and nuisance to people and property resulting from pollution, noise, and other results of his operations.

(b) The Contractor shall ensure that emissions, surface discharges, and effluent from the Contractor's activities shall not exceed the values stated in the Specification or prescribed by applicable Laws.

10. Employer's Responsibilities

10.1 All information and/or data to be supplied by the Employer as described in the Appendix (Scope of Works and Supply by the Employer) to the Contract Agreement shall be deemed to be accurate, except when the Employer expressly states otherwise.

10.2 The Employer shall be responsible for acquiring and providing legal and physical possession of the Site and access thereto, and for providing possession of and access to all other areas reasonably required for the proper execution of the Contract, including all requisite rights of way, as specified in the Appendix (Scope of Works and Supply by the Employer) to the Contract Agreement. The Employer shall give full possession of and accord all rights of access thereto on or before the date(s) specified in that Appendix.

10.3 The Employer shall acquire and pay for all permits, approvals, and/or licenses from all local, state, or national government authorities, or public service undertakings in the country where the Site is located which (a) such authorities or undertakings require the Employer to obtain in the Employer's name, (b) are necessary for the execution of the Contract, including those required for the performance by both the Contractor and the Employer of their respective obligations under the Contract, and (c) are specified in the Appendix (Scope of Works and Supply by the Employer) to the Contract Agreement.

10.4 If requested by the Contractor, the Employer shall use its best endeavors to assist the Contractor in obtaining in a timely and expeditious manner all permits, approvals, and/or licenses necessary

for the execution of the Contract from all local, state, or national government authorities, or public service undertakings that such authorities or undertakings require the Contractor or Subcontractors or the personnel of the Contractor or Subcontractors, as the case may be, to obtain.

- 10.5 Unless otherwise specified in the Contract or agreed upon by the Employer and the Contractor, the Employer shall provide sufficient, properly qualified operating and maintenance personnel; shall supply and make available all raw materials, utilities, lubricants, chemicals, catalysts, other materials and facilities; and shall perform all work and services of whatsoever nature, including those required by the Contractor to properly carry out Pre-commissioning, Commissioning, and Guarantee Tests, all in accordance with the provisions of the Appendix (Scope of Works and Supply by the Employer) to the Contract Agreement at or before the time specified in the program furnished by the Contractor under GCC Subclause 18.2 hereof and in the manner thereupon specified or as otherwise agreed upon by the Employer and the Contractor.
- 10.6 The Employer shall be responsible for the continued operation of the Facilities after Completion, in accordance with GCC Subclause 24.8, and shall be responsible for facilitating the Guarantee Test(s) for the Facilities, in accordance with GCC Subclause 25.2.
- 10.7 All costs and expenses involved in the performance of the obligations under this GCC Clause 10 shall be the responsibility of the Employer, except those incurred by the Contractor with respect to the performance of Guarantee Tests, in accordance with GCC Subclause 25.2.
- 10.8 In the event that the Employer shall be in breach of any of his obligations imposed by the Contract, then the additional cost reasonably incurred by the Contractor in consequence thereof shall be added to the Contract Price.

C. Payment

- | | |
|-----------------------------|--|
| 11. Contract Price | <p>11.1 The Contract Price shall be as specified in Article 2 (Contract Price and Terms of Payment) of the Contract Agreement.</p> <p>11.2 Unless an adjustment clause is provided for in the SCC, the Contract Price shall be a firm lump sum not subject to any alteration, except in the event of a Change in the Facilities or as otherwise provided in the Contract.</p> <p>11.3 Subject to GCC Sub-clauses 9.2, 10.1, and 35 hereof, the Contractor shall be deemed to have satisfied itself as to the correctness and sufficiency of the Contract Price, which shall, except as otherwise provided for in the Contract, cover all its obligations under the Contract.</p> |
| 12. Terms of Payment | <p>12.1 The Contract Price shall be paid as specified in Article 2 (Contract Price and Terms of Payment) of the Contract Agreement and in the Appendix (Terms and Procedures of Payment) to the Contract</p> |

Agreement, which also outlines the procedures to be followed in making application for and processing payments.

- 12.2 No payment made by the Employer herein shall be deemed to constitute acceptance by the Employer of the Facilities or any part(s) thereof.
- 12.3 In the event that the Employer fails to make any payment by its respective due date or within the period set forth in the Contract, the Employer shall pay to the Contractor interest on the amount of such delayed payment at the rate(s) shown in the Appendix (Terms and Procedures of Payment) to the Contract Agreement for the period of delay until payment has been made in full, whether before or after judgment or arbitration award.
- 12.4 The currency or currencies in which payments are made to the Contractor under this Contract shall be specified in the Appendix (Terms and Procedures of Payment) to the Contract Agreement, subject to the general principle that payments will be made in the currency or currencies in which the Contract Price has been stated in the Contractor's bid.

13. Securities

13.1 Issuance of Securities

The Contractor shall provide the securities specified below in favor of the Employer at the times, and in the amount, manner, and form specified below.

13.2 Advance Payment Security

13.2.1 The Contractor shall, within 28 days of the notification of contract award, provide a security in an amount equal to the advance payment calculated in accordance with the Appendix (Terms and Procedures of Payment) to the Contract Agreement, and in the same currency or currencies.

13.2.2 The security shall be in the form provided in the Bidding Documents or in another form acceptable to the Employer. The amount of the security shall be reduced in proportion to the value of the Facilities executed by and paid to the Contractor from time to time, and shall automatically become null and void when the full amount of the advance payment has been recovered by the Employer. The security shall be returned to the Contractor immediately after its expiration.

13.3 Performance Security

13.3.1 The Contractor shall, within 28 days of the notification of contract award, provide a security for the due performance of the Contract in the amount specified in the SCC.

13.3.2 The security shall be denominated in the currency or currencies of the Contract, or in a freely convertible currency acceptable to the Employer, and shall be in one of the forms of bank guarantees provided in the Bidding Documents, as stipulated by the Employer in the SCC, or in another form acceptable to the Employer.

13.3.3 Unless otherwise specified in the SCC, the security shall be reduced by half on the date of the Operational Acceptance. The Security shall become null and void, or shall be reduced

pro rata to the Contract Price of a part of the Facilities for which a separate Time for Completion is provided, 540 days after Completion of the Facilities or 365 days after Operational Acceptance of the Facilities, whichever occurs first; provided, however, that if the Defects Liability Period has been extended on any part of the Facilities pursuant to GCC Subclause 27.8 hereof, the Contractor shall issue an additional security in an amount proportionate to the Contract Price of that part. The security shall be returned to the Contractor immediately after its expiration, provided, however, that if the Contractor, pursuant to GCC Subclause 27.10, is liable for an extended defect liability obligation, the performance security shall be extended for the period and up to the amount specified in the SCC.

14. Taxes and Duties

- 14.1 Except as otherwise specifically provided in the Contract, the Contractor shall bear and pay all taxes, duties, levies, and charges assessed on the Contractor, its Subcontractors, or their employees by all municipal, state, or national government authorities in connection with the Facilities in and outside of the country where the Site is located.
- 14.2 Notwithstanding GCC Subclause 14.1 above, the Employer shall bear and promptly pay all customs and import duties as well as other local taxes like, e.g., a value-added tax (VAT), imposed by the law of the country where the Site is located on the Plant specified in Price Schedule No. 1 and that are to be incorporated into the Facilities.
- 14.3 If any tax exemptions, reductions, allowances, or privileges may be available to the Contractor in the country where the Site is located, the Employer shall use its best endeavors to enable the Contractor to benefit from any such tax savings to the maximum allowable extent.
- 14.4 For the purpose of the Contract, it is agreed that the Contract Price specified in Article 2 (Contract Price and Terms of Payment) of the Contract Agreement is based on the taxes, duties, levies, and charges prevailing at the date 28 days prior to the date of bid submission in the country where the Site is located (hereinafter called "Tax" in this GCC Subclause 14.4). If any rates of Tax are increased or decreased, a new Tax is introduced, an existing Tax is abolished, or any change in interpretation or application of any Tax occurs in the course of the performance of Contract, which was or will be assessed on the Contractor, Subcontractors, or their employees in connection with performance of the Contract, an equitable adjustment of the Contract Price shall be made to fully take into account any such change by addition to the Contract Price or deduction therefrom, as the case may be, in accordance with GCC Clause 36 hereof.

D. Intellectual Property

15. License/Use of Technical Information

- 15.1 For the operation and maintenance of the Plant, the Contractor hereby grants a non-exclusive and nontransferable license (without the right to sublicense) to the Employer under the patents, utility models, or other industrial property rights owned by the Contractor or by a third

party from whom the Contractor has received the right to grant licenses thereunder, and shall also grant to the Employer a nonexclusive and nontransferable right (without the right to sublicense) to use the know-how and other technical information disclosed to the Employer under the Contract. Nothing contained herein shall be construed as transferring ownership of any patent, utility model, trademark, design, copyright, know-how, or other intellectual property right from the Contractor or any third party to the Employer.

- 15.2 The copyright in all drawings, documents, and other materials containing data and information furnished to the Employer by the Contractor herein shall remain vested in the Contractor or, if they are furnished to the Employer directly or through the Contractor by any third party, including suppliers of materials, the copyright in such materials shall remain vested in such third party.

16. Confidential Information

- 16.1 The Employer and the Contractor shall keep confidential and shall not, without the written consent of the other party hereto, divulge to any third party any documents, data or other information furnished directly or indirectly by the other party hereto in connection with the Contract, whether such information has been furnished prior to, during, or following termination of the Contract. Notwithstanding the above, the Contractor may furnish to its Subcontractor(s) such documents, data, and other information it receives from the Employer to the extent required for the Subcontractor(s) to perform its work under the Contract, in which event the Contractor shall obtain from such Subcontractor(s) an undertaking of confidentiality similar to that imposed on the Contractor under this GCC Clause 16.
- 16.2 The Employer shall not use such documents, data, and other information received from the Contractor for any purpose other than the operation and maintenance of the Facilities. Similarly, the Contractor shall not use such documents, data, and other information received from the Employer for any purpose other than the design, procurement of Plant, construction, or such other work and services as are required for the performance of the Contract.
- 16.3 The obligation of a party under GCC Sub-clauses 16.1 and 16.2 above, however, shall not apply to that information, which
- (a) now or hereafter enters the public domain through no fault of that party;
 - (b) can be proven to have been possessed by that party at the time of disclosure and which was not previously obtained, directly or indirectly, from the other party hereto; and
 - (c) otherwise lawfully becomes available to that party from a third party that has no obligation of confidentiality.
- 16.4 The above provisions of this GCC Clause 16 shall not in any way modify any undertaking of confidentiality given by either of the parties hereto prior to the date of the Contract in respect of the Facilities or any part thereof.

- 16.5 The provisions of this GCC Clause 16 shall survive termination, for whatever reason, of the Contract.

E. Execution of the Facilities

17. Representatives 17.1 Project Manager

If the Project Manager is not named in the Contract, then within 14 days of the Effective Date, the Employer shall appoint and notify the Contractor in writing of the name of the Project Manager. The Employer may from time to time appoint some other person as the Project Manager in place of the person previously so appointed, and shall give notice of the name of such other person to the Contractor without delay. No such appointment shall be made at such a time or in such a manner as to impede the progress of work on the Facilities. Such appointment shall only take effect upon receipt of such notice by the Contractor. The Project Manager shall represent and act for the Employer at all times during the performance of the Contract. All notices, instructions, orders, certificates, approvals, and all other communications under the Contract shall be given by the Project Manager, except as herein otherwise provided.

All notices, instructions, information, and other communications given by the Contractor to the Employer under the Contract shall be given to the Project Manager, except as herein otherwise provided.

17.2 Contractor's Representative and Construction Manager

17.2.1 If the Contractor's Representative is not named in the Contract, then within 14 days of the Effective Date, the Contractor shall appoint the Contractor's Representative and shall request the Employer in writing to approve the person so appointed. If the Employer makes no objection to the appointment within 14 days, the Contractor's Representative shall be deemed to have been approved. If the Employer objects to the appointment within 14 days giving the reason therefor, then the Contractor shall appoint a replacement within 14 days of such objection, and the foregoing provisions of this GCC Subclause 17.2.1 shall apply thereto.

17.2.2 The Contractor's Representative shall represent and act for the Contractor at all times during the performance of the Contract and shall give to the Project Manager all the Contractor's notices, instructions, information, and all other communications under the Contract.

All notices, instructions, information, and all other communications given by the Employer or the Project Manager to the Contractor under the Contract shall be given to the Contractor's Representative or, in its absence, its deputy, except as herein otherwise provided.

The Contractor shall not revoke the appointment of the Contractor's Representative without the Employer's prior written consent, which shall not be unreasonably withheld. If the Employer consents thereto, the Contractor shall appoint some other person as the Contractor's Representative, pursuant to the

procedure set out in GCC Subclause 17.2.1.

17.2.3 The Contractor's Representative may, subject to the approval of the Employer which shall not be unreasonably withheld, at any time delegate to any person any of the powers, functions and authorities vested in him or her. Any such delegation may be revoked at any time. Any such delegation or revocation shall be subject to a prior notice signed by the Contractor's Representative, and shall specify the powers, functions, and authorities thereby delegated or revoked. No such delegation or revocation shall take effect unless and until a copy thereof has been delivered to the Employer and the Project Manager.

Any act or exercise by any person of powers, functions and authorities so delegated to him or her in accordance with this GCC Subclause 17.2.3 shall be deemed to be an act or exercise by the Contractor's Representative.

17.2.4 From the commencement of installation of the Facilities at the Site until Completion, the Contractor's Representative shall appoint a suitable person as the Construction Manager. The Construction Manager shall supervise all work done at the Site by the Contractor and shall be present at the Site throughout normal working hours except when on leave, sick, or absent for reasons connected with the proper performance of the Contract. Whenever the Construction Manager is absent from the Site, the Contractor's Representative or the Construction Manager shall appoint a suitable person to act as the Construction Manager's deputy.

17.2.5 The Employer may by notice to the Contractor object to any representative or person employed by the Contractor in the execution of the Contract who, in the reasonable opinion of the Employer, may behave inappropriately, may be incompetent or negligent, or may commit a serious breach of the Site regulations provided under GCC Subclause 22.4. The Employer shall provide evidence of the same, whereupon the Contractor shall remove such person from the Facilities.

17.2.6 If any representative or person employed by the Contractor is removed in accordance with GCC Subclause 17.2.5, the Contractor shall, where required, promptly appoint a replacement.

18. Work Program

18.1 Contractor's Organization

The Contractor shall supply to the Employer and the Project Manager a chart showing the proposed organization to be established by the Contractor for carrying out work on the Facilities within 21 days of the Effective Date. The chart shall include the identities of the key personnel, and the curricula vitae of such key personnel to be employed shall be supplied together with the chart. The Contractor shall promptly inform the Employer and the Project Manager in writing of any revision or alteration of such an organization chart.

18.2 Program of Performance

Within 28 days after the Effective Date, the Contractor shall submit to the Project Manager a detailed program of performance of the Contract, made in a form acceptable to the Project Manager and showing the sequence in which it proposes to design, manufacture,

transport, assemble, install, and pre-commission the Facilities, as well as the date by which the Contractor reasonably requires that the Employer shall have fulfilled its obligations under the Contract so as to enable the Contractor to execute the Contract in accordance with the program and to achieve Completion, Commissioning, and Acceptance of the Facilities in accordance with the Contract. The program so submitted by the Contractor shall accord with the Time Schedule included in the Appendix (Time Schedule) to the Contract Agreement and any other dates and periods specified in the Contract. The Contractor shall update and revise the program as and when appropriate or when required by the Project Manager, but without modification in the Times for Completion given in the SCC and any extension granted in accordance with GCC Clause 40, and shall submit all such revisions to the Project Manager.

18.3 Progress Report

The Contractor shall monitor progress of all the activities specified in the program referred to in GCC Subclause 18.2 above, and supply a progress report to the Project Manager every month.

The progress report shall be in a form acceptable to the Project Manager and shall indicate: (a) percentage completion achieved compared with the planned percentage completion for each activity; and (b) where any activity is behind the program, giving comments and likely consequences and stating the corrective action being taken.

18.4 Progress of Performance

If at any time the Contractor's actual progress falls behind the program referred to in GCC Subclause 18.2, or it becomes apparent that it will so fall behind, the Contractor shall, at the request of the Employer or the Project Manager, prepare and submit to the Project Manager a revised program, taking into account the prevailing circumstances, and shall notify the Project Manager of the steps being taken to expedite progress so as to attain Completion of the Facilities within the Time for Completion under GCC Subclause 8.2, any extension thereof entitled under GCC Subclause 40.1, or any extended period as may otherwise be agreed upon between the Employer and the Contractor.

18.5 Procedures

The Contract shall be executed in accordance with the Contract Documents including the procedures given in the Forms and Procedures of the Employer's Requirements.

The Contractor may execute the Contract in accordance with its own standard project execution plans and procedures to the extent that they do not conflict with the provisions contained in the Contract.

19.Subcontracting

- 19.1 The Appendix 5 (List of Major Items of Plant and Services and List of Approved Subcontractors) to the Contract Agreement specifies major items of plant and services and a list of approved Subcontractors against each item, including manufacturers. Insofar as no Subcontractors are listed against any such item, the Contractor shall prepare a list of Subcontractors for such item for inclusion in such list. The Contractor may from time to time propose any addition to or deletion from any such list. The Contractor shall submit any such list or any modification thereto to the Employer for its approval in sufficient

time so as not to impede the progress of work on the Facilities. Such approval by the Employer for any of the Subcontractors shall not relieve the Contractor from any of its obligations, duties, or responsibilities under the Contract.

- 19.2 The Contractor shall select and employ its Subcontractors for such major items from those listed in the lists referred to in GCC Subclause 19.1.
- 19.3 For items or parts of the Facilities not specified in the Appendix (List of Major Items of Plant and Services and List of Approved Subcontractors for Major Items) to the Contract Agreement, the Contractor may employ such Subcontractors as it may select, at its discretion.
- 19.4 Each subcontract shall include provisions which would entitle the Employer to require the sub-contract to be assigned to the Employer under GCC 19.5 (if and when applicable), or in event of termination by the Employer under GCC 42.2.
- 19.5 If a Sub-contractor's obligations extend beyond the expiry date of the relevant Defects Liability Period and the Project Manager, prior to that date, instructs the Contractor to assign the benefits of such obligations to the Employer, then the Contractor shall do so.

20. Design and Engineering

20.1 Specifications and Drawings

20.1.1 The Contractor shall execute the basic and detailed design and the engineering work in compliance with the provisions of the Contract, or where not so specified, in accordance with good engineering practice.

The Contractor shall be responsible for any discrepancies, errors, or omissions in the specifications, drawings, and other technical documents that it has prepared, whether such specifications, drawings, and other documents have been approved by the Project Manager or not, provided that such discrepancies, errors, or omissions are not because of inaccurate information furnished in writing to the Contractor by or on behalf of the Employer.

20.1.2 The Contractor shall be entitled to disclaim responsibility for any design, data, drawing, specification, or other document, or any modification thereof provided or designated by or on behalf of the Employer, by giving a notice of such disclaimer to the Project Manager.

20.2 Codes and Standards

Wherever references are made in the Contract to codes and standards in accordance with which the Contract shall be executed, the edition or the revised version of such codes and standards current at the date 28 days prior to date of bid submission shall apply unless otherwise specified. During Contract execution, any changes in such codes and standards shall be applied subject to approval by the Employer and shall be treated in accordance with GCC Clause 39.

20.3 Approval/Review of Technical Documents by Project Manager

20.3.1 The Contractor shall prepare or cause its Subcontractors to prepare, and furnish to the Project Manager the documents listed in the Appendix (List of Documents for Approval or Review) to the Contract Agreement for its approval or review as

specified and in accordance with the requirements of GCC Subclause 18.2 (Program of Performance).

Any part of the Facilities covered by or related to the documents to be approved by the Project Manager shall be executed only after the Project Manager's approval thereof.

GCC Subclauses 20.3.2 through 20.3.7 shall apply to those documents requiring the Project Manager's approval, but not to those furnished to the Project Manager for its review only.

20.3.2 Within 14 days after receipt by the Project Manager of any document requiring the Project Manager's approval in accordance with GCC Subclause 20.3.1, the Project Manager shall either return one copy thereof to the Contractor with its approval endorsed thereon or shall notify the Contractor in writing of its disapproval thereof and the reasons therefor and the modifications that the Project Manager proposes.

If the Project Manager fails to take such action within the said 14 days, then the said document shall be deemed to have been approved by the Project Manager.

20.3.3 The Project Manager shall not disapprove any document, except on the grounds that the document does not comply with the Contract or that it is contrary to good engineering practice. If the Project Manager disapproves a document, he shall specify the reasons for his decision.

20.3.4 If the Project Manager disapproves the document, the Contractor shall modify the document and resubmit it for the Project Manager's approval in accordance with GCC Subclause 20.3.2. If the Project Manager approves the document subject to modification(s), the Contractor shall make the required modification(s), whereupon the document shall be deemed to have been approved.

20.3.5 If any dispute or difference occurs between the Employer and the Contractor in connection with or arising out of the disapproval by the Project Manager of any document and/or any modification(s) thereto that cannot be settled between the parties within a reasonable period, then such dispute or difference may be referred to a Dispute Board for determination in accordance with GCC Subclause 45.3 hereof. If such dispute or difference is referred to a Dispute Board, the Project Manager shall give instructions as to whether and, if so, how, performance of the Contract is to proceed. The Contractor shall proceed with the Contract in accordance with the Project Manager's instructions, provided that if the Dispute Board upholds the Contractor's view on the dispute and if the Employer has not given notice under Subclause 45.3 hereof, then the Contractor shall be reimbursed by the Employer for any additional costs incurred by reason of such instructions and shall be relieved of such responsibility or liability in connection with the dispute and the execution of the instructions as the Dispute Board shall decide, and the Time for Completion shall

be extended accordingly.

20.3.6 The Project Manager's approval, with or without modification of the document furnished by the Contractor, shall not relieve the Contractor of any responsibility or liability imposed upon it by any provisions of the Contract except to the extent that any subsequent failure results from modifications required by the Project Manager.

20.3.7 The Contractor shall not depart from any approved document unless the Contractor has first submitted to the Project Manager an amended document and obtained the Project Manager's approval thereof, pursuant to the provisions of this GCC Subclause 20.3.

If the Project Manager requests any change in any already approved document and/or in any document based thereon, the provisions of GCC Clause 39 shall apply to such request.

21. Procurement

21.1 Materials

Subject to GCC Subclause 14.2, the Contractor shall procure and transport all materials in an expeditious and orderly manner to the Site.

21.2 Employer-Supplied Materials

If the Appendix (Scope of Works and Supply by the Employer) to the Contract Agreement provides that the Employer shall furnish any specific items to the Contractor, the following provisions shall apply:

21.2.1 The Employer shall, at its own risk and expense, transport each item to the place on or near the Site as agreed upon by the parties and make such item available to the Contractor at the time specified in the program furnished by the Contractor, pursuant to GCC Subclause 18.2, unless otherwise mutually agreed.

21.2.2 Upon receipt of such item, the Contractor shall inspect the same visually and notify the Project Manager of any detected shortage, defect, or default. The Employer shall immediately remedy any shortage, defect, or default, or the Contractor shall, if practicable and possible, at the request of the Employer, remedy such shortage, defect, or default at the Employer's cost and expense. After inspection, such item shall fall under the care, custody, and control of the Contractor. The provision of this GCC Subclause 21.2.2 shall apply to any item supplied to remedy any such shortage or default or to substitute for any defective item, or shall apply to defective items that have been repaired.

21.2.3 The foregoing responsibilities of the Contractor and its obligations of care, custody, and control shall not relieve the Employer of liability for any undetected shortage, defect, or default, nor place the Contractor under any liability for any such shortage, defect or default whether under GCC Clause 27 or under any other provision of Contract.

21.3 Transportation

21.3.1 The Contractor shall at its own risk and expense transport all the materials and the Contractor's Equipment to the Site by the mode of transport that the Contractor judges most suitable

under all the circumstances.

21.3.2 Unless otherwise provided in the Contract, the Contractor shall be entitled to select any safe mode of transport operated by any person to carry the materials and the Contractor's Equipment.

21.3.3 Upon dispatch of each shipment of materials and the Contractor's Equipment, the Contractor shall notify the Employer by telex, cable, facsimile, or electronic means, of the description of the materials and of the Contractor's Equipment, the point and means of dispatch, and the estimated time and point of arrival in the country where the Site is located, if applicable, and at the Site. The Contractor shall furnish the Employer with relevant shipping documents to be agreed upon between the parties.

21.3.4 The Contractor shall be responsible for obtaining, if necessary, approvals from the authorities for transportation of the materials and the Contractor's Equipment to the Site. The Employer shall use its best endeavors in a timely and expeditious manner to assist the Contractor in obtaining such approvals, if requested by the Contractor. The Contractor shall indemnify and hold harmless the Employer from and against any claim for damage to roads, bridges, or any other traffic facilities that may be caused by the transport of the materials and the Contractor's Equipment to the Site.

21.4 Customs Clearance

The Contractor shall, at its own expense, handle all imported materials and Contractor's Equipment at the point(s) of import and shall handle any formalities for customs clearance, subject to the Employer's obligations under GCC Subclause 14.2, provided that if applicable laws or regulations require any application or act to be made by or in the name of the Employer, the Employer shall take all necessary steps to comply with such laws or regulations. In the event of delays in customs clearance that are not the fault of the Contractor, the Contractor shall be entitled to an extension in the Time for Completion, pursuant to GCC Clause 40.

22. Installation

22.1 Setting Out/Supervision

22.1.1 Benchmark

- (a) The Contractor shall be responsible for the true and proper setting-out of the Facilities in relation to bench marks, reference marks, and lines provided to it in writing by or on behalf of the Employer.
- (b) If, at any time during the progress of installation of the Facilities, any error shall appear in the position, level, or alignment of the Facilities, the Contractor shall forthwith notify the Project Manager of such error and, at its own expense, immediately rectify such error to the reasonable satisfaction of the Project Manager. If such error is based on incorrect data provided in writing by or on behalf of the Employer, the expense of rectifying the same shall be

borne by the Employer.

22.1.2 Contractor's Supervision

The Contractor shall give or provide all necessary superintendence during the installation of the Facilities, and the Construction Manager or its deputy shall be constantly on the Site to provide full-time superintendence of the installation. The Contractor shall provide and employ only technical personnel who are skilled and experienced in their respective callings and supervisory staff who are competent to adequately supervise the work at hand.

22.2 Labor

22.2.1 Engagement of Staff and Labor

- (a) Except as otherwise stated in the Specification, the Contractor shall make arrangements for the engagement of all staff and labor, local or otherwise, and for their payment, housing, feeding, and transport.
- (b) The Contractor shall provide and employ on the Site in the installation of the Facilities such skilled, semi-skilled, and unskilled labor as is necessary for the proper and timely execution of the Contract. The Contractor is encouraged to use local labor that has the necessary skills.
- (c) The Contractor shall be responsible for obtaining all necessary permit(s) and/or visa(s) from the appropriate authorities for the entry of all labor and personnel to be employed on the Site into the country where the Site is located. The Employer will, if requested by the Contractor, use his best endeavors in a timely and expeditious manner to assist the Contractor in obtaining any local, state, national, or government permission required for bringing in the Contractor's personnel.
- (d) The Contractor shall at its own expense provide the means of repatriation to all of its and its Subcontractor's personnel employed on the Contract at the Site to the place where they were recruited or to their domicile. It shall also provide suitable temporary maintenance of all such persons from the cessation of their employment on the Contract to the date programmed for their departure. In the event that the Contractor defaults in providing such means of transportation and temporary maintenance, the Employer may provide the same to such personnel and recover the cost of doing so from the Contractor.

22.2.2 Persons in the Service of Employer

The Contractor shall not recruit, or attempt to recruit, staff and labor from amongst the Employer's Personnel.

22.2.3 Labor Laws

- (a) The Contractor shall comply with all the relevant labor

Laws applicable to the Contractor's Personnel, including Laws relating to their employment, health, safety, welfare, immigration, and emigration, and shall allow them all their legal rights.

- (b) The Contractor shall at all times during the progress of the Contract use its best endeavors to prevent any unlawful, riotous, or disorderly conduct or behavior by or amongst its employees and the labor of its Subcontractors.
- (c) The Contractor shall, in all dealings with its labor and the labor of its Subcontractors currently employed on or connected with the Contract, pay due regard to all recognized festivals, official holidays, religious, or other customs and all local laws and regulations pertaining to the employment of labor.

22.2.4 Rates of Wages and Conditions of Labor

- (a) The Contractor shall pay rates of wages, and observe conditions of labor, which are not lower than those established for the trade or industry where the work is carried out. If no established rates or conditions are applicable, the Contractor shall pay rates of wages and observe conditions which are not lower than the general level of wages and conditions observed locally by employers whose trade or industry is similar to that of the Contractor.
- (b) The Contractor shall inform the Contractor's Personnel about their liability to pay personal income taxes in the Country in respect of such of their salaries, wages, and allowances as are chargeable under the Laws for the time being in force, and the Contractor shall perform such duties in regard to such deductions thereof as may be imposed on him by such Laws.

22.2.5 Working Hours

- (a) No work shall be carried out on the Site on locally recognized days of rest, or outside the normal working hours stated in the SCC, unless
 - (i) otherwise stated in the Contract;
 - (ii) the Project Manager gives consent; or
 - (iii) the work is unavoidable, or necessary for the protection of life or property or for the safety of the Works, in which case the Contractor shall immediately advise the Project Manager.
- (b) If and when the Contractor considers it necessary to carry out work at night or on public holidays so as to meet the Time for Completion and requests the Project Manager's consent thereto, the Project Manager shall not unreasonably withhold such consent.
- (c) This Subclause shall not apply to any work which is customarily carried out by rotary or double shifts.

22.2.6 Facilities for Staff and Labor

- (a) Except as otherwise stated in the Specification, the Contractor shall provide and maintain all necessary accommodation and welfare facilities for the Contractor's Personnel. The Contractor shall also provide facilities for the Employer's Personnel as stated in the Specification.
- (b) The Contractor shall not permit any of the Contractor's Personnel to maintain any temporary or permanent living quarters within the structures forming part of the Permanent Works.

22.2.7 Health and Safety

- (a) The Contractor shall at all times take all reasonable precautions to maintain the health and safety of the Contractor's Personnel. In collaboration with local health authorities, the Contractor shall ensure that medical staff, first aid facilities, sick bay, and ambulance service are available at all times at the Site and at any accommodation for Contractor's and Employer's Personnel, and that suitable arrangements are made for all necessary welfare and hygiene requirements and for the prevention of epidemics.
- (b) The Contractor shall appoint an accident prevention officer at the Site, responsible for maintaining safety and protection against accidents. This person shall be qualified for this responsibility, and shall have the authority to issue instructions and take protective measures to prevent accidents. Throughout the performance of the Contract, the Contractor shall provide whatever is required by this person to exercise this responsibility and authority.
- (c) The Contractor shall send to the Project Manager, details of any accident as soon as practicable after its occurrence. The Contractor shall maintain records and make reports concerning health, safety, and welfare of persons, and damage to property, as the Project Manager may reasonably require.

22.2.8 Funeral Arrangements

In the event of the death of any of the Contractor's personnel or accompanying members of their families, the Contractor shall be responsible for making the appropriate arrangements for their return or burial, unless otherwise specified in the SCC.

22.2.9 Records of Contractor's Personnel

The Contractor shall keep accurate records of the Contractor's personnel, including the number of each class of Contractor's Personnel on the Site and the names, ages, gender, hours worked, and wages paid to all workers. These records shall be summarized on a monthly basis in a form approved by the Project Manager and shall be available for inspection by the Project Manager until the Contractor has completed all work.

22.2.10 Supply of Foodstuff

The Contractor shall arrange for the provision of a sufficient supply of suitable food as may be stated in the Specification at reasonable prices for the Contractor's Personnel for the purposes of or in connection with the Contract.

22.2.11 Supply of Water

The Contractor shall, having regard to local conditions, provide on the Site an adequate supply of drinking and other water for the use of the Contractor's Personnel.

22.2.12 Measures against Insect and Pest Nuisance

The Contractor shall at all times take the necessary precautions to protect the Contractor's Personnel employed on the Site from insect and pest nuisance, and to reduce their danger to health. The Contractor shall comply with all the regulations of the local health authorities, including use of appropriate insecticide.

22.2.13 Alcoholic Liquor or Drugs

The Contractor shall not, otherwise than in accordance with the Laws of the Country, import, sell, give barter, or otherwise dispose of any alcoholic liquor or drugs, or permit or allow importation, sale, gift barter, or disposal by Contractor's Personnel.

22.2.14 Arms and Ammunition

The Contractor shall not give, barter, or otherwise dispose of, to any person, any arms or ammunition of any kind, or allow Contractor's Personnel to do so.

22.2.15 Prohibition of All Forms of Forced or Compulsory Labor

The contractor shall not employ "forced or compulsory labor" in any form. "Forced or compulsory labor" consists of all work or service, not voluntarily performed, that is extracted from an individual under threat of force or penalty.

22.2.16 Prohibition of Harmful Child Labor

The Contractor shall not employ any child to perform any work that is economically exploitative, or is likely to be hazardous to, or to interfere with, the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral, or social development.

22.3 Contractor's Equipment

22.3.1 All Contractor's Equipment brought by the Contractor onto the Site shall be deemed to be intended to be used exclusively for the execution of the Contract. The Contractor shall not remove the same from the Site without the Project Manager's consent that such Contractor's Equipment is no longer required for the execution of the Contract.

22.3.2 Unless otherwise specified in the Contract, upon completion of the Facilities, the Contractor shall remove from the Site all Equipment brought by the Contractor onto the Site and any surplus materials remaining thereon.

- 22.3.3 The Employer will, if requested, use its best endeavors to assist the Contractor in obtaining any local, state or national government permission required by the Contractor for the export of the Contractor's Equipment imported by the Contractor for use in the execution of the Contract that is no longer required for the execution of the Contract.

22.4 Site Regulations and Safety

The Employer and the Contractor shall establish Site regulations setting out the rules to be observed in the execution of the Contract at the Site and shall comply therewith. The Contractor shall prepare and submit to the Employer, with a copy to the Project Manager, proposed Site regulations for the Employer's approval, which approval shall not be unreasonably withheld.

Such Site regulations shall include, but shall not be limited to, rules in respect of security, safety of the Facilities, gate control, sanitation, medical care, and fire prevention.

22.5 Opportunities for Other Contractors

- 22.5.1 The Contractor shall, upon written request from the Employer or the Project Manager, give all reasonable opportunities for carrying out the work to any other contractors employed by the Employer on or near the Site.

- 22.5.2 If the Contractor, upon written request from the Employer or the Project Manager, makes available to other contractors any roads or ways the maintenance for which the Contractor is responsible, permits the use by such other contractors of the Contractor's Equipment, or provides any other service of whatsoever nature for such other contractors, the Employer shall fully compensate the Contractor for any loss or damage caused or occasioned by such other contractors in respect of any such use or service, and shall pay to the Contractor reasonable remuneration for the use of such equipment or the provision of such services.

- 22.5.3 The Contractor shall also so arrange to perform its work as to minimize, to the extent possible, interference with the work of other contractors. The Project Manager shall determine the resolution of any difference or conflict that may arise between the Contractor and other contractors and the workers of the Employer in regard to their work.

- 22.5.4 The Contractor shall notify the Project Manager promptly of any defects in the other Contractors' work that come to its notice, and that could affect the Contractor's work. The Project Manager shall determine the corrective measures, if any, required to rectify the situation after inspection of the Facilities. Decisions made by the Project Manager shall be binding on the Contractor.

22.6 Emergency Work

If, by reason of an emergency arising in connection with and during the execution of the Contract, any protective or remedial work is necessary as a matter of urgency to prevent damage to the Facilities, the

Contractor shall immediately carry out such work.

If the Contractor is unable or unwilling to do such work immediately, the Employer may do or cause such work to be done as the Employer may determine is necessary in order to prevent damage to the Facilities. In such event the Employer shall, as soon as practicable after the occurrence of any such emergency, notify the Contractor in writing of such emergency, the work done and the reasons therefor. If the work done or caused to be done by the Employer is work that the Contractor was liable to do at its own expense under the Contract, the reasonable costs incurred by the Employer in connection therewith shall be paid by the Contractor to the Employer. Otherwise, the cost of such remedial work shall be borne by the Employer.

22.7 Site Clearance

22.7.1 Site Clearance in Course of Performance

In the course of carrying out the Contract, the Contractor shall keep the Site reasonably free from all unnecessary obstruction, store, or remove any surplus materials, clear away any wreckage, rubbish, or temporary works from the Site, and remove any Contractor's Equipment no longer required for execution of the Contract.

22.7.2 Clearance of Site after Completion

After Completion of all parts of the Facilities, the Contractor shall clear away and remove all wreckage, rubbish, and debris of any kind from the Site, and shall leave the Site and Facilities in a clean and safe condition.

22.8 Watching and Lighting

The Contractor shall provide and maintain at its own expense all lighting, fencing, and watching when and where necessary for the proper execution and the protection of the Facilities, or for the safety of the owners and occupiers of adjacent property and for the safety of the public.

23. Test and Inspection

- 23.1** The Contractor shall at its own expense carry out at the place of manufacture and/or on the Site all such tests and/or inspections of the Plant and any part of the Facilities as are specified in the Contract.
- 23.2** The Employer and the Project Manager or their designated representatives shall be entitled to attend the aforesaid test and/or inspection, provided that the Employer shall bear all costs and expenses incurred in connection with such attendance including, but not limited to, all traveling and board and lodging expenses.
- 23.3** Whenever the Contractor is ready to carry out any such test and/or inspection, the Contractor shall give a reasonable advance notice of such test and/or inspection and of the place and time thereof to the Project Manager. The Contractor shall obtain from any relevant third party or manufacturer any necessary permission or consent to enable the Employer and the Project Manager or their designated representatives to attend the test and/or inspection.

- 23.4 The Contractor shall provide the Project Manager with a certified report of the results of any such test and/or inspection.

If the Employer or Project Manager or their designated representatives fails to attend the test and/or inspection, or if it is agreed between the parties that such persons shall not do so, then the Contractor may proceed with the test and/or inspection in the absence of such persons, and may provide the Project Manager with a certified report of the results thereof.

- 23.5 The Project Manager may require the Contractor to carry out any test and/or inspection not required by the Contract, provided that the Contractor's reasonable costs and expenses incurred in the carrying out of such test and/or inspection shall be added to the Contract Price. Further, if such test and/or inspection impedes the progress of work on the Facilities and/or the Contractor's performance of its other obligations under the Contract, due allowance will be made in respect of the Time for Completion and the other obligations so affected.

- 23.6 If any Plant or any part of the Facilities fails to pass any test and/or inspection, the Contractor shall either rectify or replace such Plant or part of the Facilities and shall repeat the test and/or inspection upon giving a notice under GCC Subclause 23.3.

- 23.7 If any dispute or difference of opinion shall arise between the parties in connection with or arising out of the test and/or inspection of the Plant or part of the Facilities that cannot be settled between the parties within a reasonable period of time, it may be referred to a Dispute Board for determination in accordance with GCC Subclause 45.3.

- 23.8 The Contractor shall afford the Employer and the Project Manager, at the Employer's expense, access at any reasonable time to any place where the Plant are being manufactured or the Facilities are being installed, in order to inspect the progress and the manner of manufacture or installation, provided that the Project Manager shall give the Contractor a reasonable prior notice.

- 23.9 The Contractor agrees that neither the execution of a test and/or inspection of Plant or any part of the Facilities, nor the attendance by the Employer or the Project Manager, nor the issue of any test certificate pursuant to GCC Subclause 23.4, shall release the Contractor from any other responsibilities under the Contract.

- 23.10 No part of the Facilities or foundations shall be covered up on the Site without the Contractor carrying out any test and/or inspection required under the Contract. The Contractor shall give a reasonable notice to the Project Manager whenever any such parts of the Facilities or foundations are ready or about to be ready for test and/or inspection; such test and/or inspection and notice thereof shall be subject to the requirements of the Contract.

- 23.11 The Contractor shall uncover any part of the Facilities or foundations, or shall make openings in or through the same as the Project Manager may from time to time require at the Site, and shall reinstate and make good such part or parts.

If any parts of the Facilities or foundations have been covered up at the Site after compliance with the requirement of GCC Subclause 23.10 and are found to be executed in accordance with the Contract, the expenses of uncovering, making openings in or through, reinstating, and making good the same shall be borne by the Employer, and the Time for Completion shall be reasonably adjusted to the extent that the Contractor has thereby been delayed or impeded in the performance of any of its obligations under the Contract.

24. Completion of the Facilities

24.1 As soon as the Facilities or any part thereof has, in the opinion of the Contractor, been completed operationally and structurally and put in a tight and clean condition as specified in the Employer's Requirements, excluding minor items not materially affecting the operation or safety of the Facilities, the Contractor shall so notify the Employer in writing.

24.2 Within 7 days after receipt of the notice from the Contractor under GCC Subclause 24.1, the Employer shall supply the operating and maintenance personnel specified in the Appendix (Scope of Works and Supply by the Employer) to the Contract Agreement for Pre-commissioning of the Facilities or any part thereof.

Pursuant to the Appendix (Scope of Works and Supply by the Employer) to the Contract Agreement, the Employer shall also provide, within the said 7-day period, the raw materials, utilities, lubricants, chemicals, catalysts, facilities, services, and other matters required for Pre-commissioning of the Facilities or any part thereof.

24.3 As soon as reasonably practicable after the operating and maintenance personnel have been supplied by the Employer and the raw materials, utilities, lubricants, chemicals, catalysts, facilities, services, and other matters have been provided by the Employer in accordance with GCC Subclause 24.2, the Contractor shall commence Pre-commissioning of the Facilities or the relevant part thereof in preparation for Commissioning, subject to GCC Subclause 25.5.

24.4 As soon as all works in respect of Pre-commissioning are completed and, in the opinion of the Contractor, the Facilities or any part thereof is ready for Commissioning, the Contractor shall so notify the Project Manager in writing.

24.5 The Project Manager shall, within 14 days after receipt of the Contractor's notice under GCC Subclause 24.4, either issue a Completion Certificate in the form specified in the Employer's Requirements (Forms and Procedures), stating that the Facilities or that part thereof have reached Completion as of the date of the Contractor's notice under GCC Subclause 24.4, or notify the Contractor in writing of any defects and/or deficiencies.

If the Project Manager notifies the Contractor of any defects and/or deficiencies, the Contractor shall then correct such defects and/or deficiencies, and shall repeat the procedure described in GCC Subclause 24.4.

If the Project Manager is satisfied that the Facilities or that part thereof have reached Completion, the Project Manager shall, within 7 days after receipt of the Contractor's repeated notice, issue a Completion Certificate stating that the Facilities or that part thereof have reached

Completion as of the date of the Contractor's repeated notice.

If the Project Manager is not so satisfied, then it shall notify the Contractor in writing of any defects and/or deficiencies within 7 days after receipt of the Contractor's repeated notice, and the above procedure shall be repeated.

- 24.6 If the Project Manager fails to issue the Completion Certificate and fails to inform the Contractor of any defects and/or deficiencies within 14 days after receipt of the Contractor's notice under GCC Subclause 24.4 or within 7 days after receipt of the Contractor's repeated notice under GCC Subclause 24.5, or if the Employer makes use of the Facilities or part thereof, then the Facilities or that part thereof shall be deemed to have reached Completion as of the date of the Contractor's notice or repeated notice, or as of the Employer's use of the Facilities, as the case may be.
- 24.7 As soon as possible after Completion, the Contractor shall complete all outstanding minor items so that the Facilities are fully in accordance with the requirements of the Contract, failing which the Employer will undertake such completion and deduct the costs thereof from any monies owing to the Contractor.
- 24.8 Upon Completion, the Employer shall be responsible for the care and custody of the Facilities or the relevant part thereof, together with the risk of loss or damage thereto, and shall thereafter take over the Facilities or the relevant part thereof.

25. Commissioning and Operational Acceptance

25.1 Commissioning

25.1.1 Commissioning of the Facilities or any part thereof shall be commenced by the Contractor immediately after issue of the Completion Certificate by the Project Manager, pursuant to GCC Subclause 24.5, or immediately after the date of the deemed Completion, under GCC Subclause 24.6.

25.1.2 The Employer shall supply the operating and maintenance personnel and all raw materials, utilities, lubricants, chemicals, catalysts, facilities, services, and other matters required for Commissioning.

25.1.3 In accordance with the requirements of the Contract, the Contractor's and Project Manager's advisory personnel shall attend the Commissioning, including the Guarantee Test, and shall advise and assist the Employer.

25.2 Guarantee Test

25.2.1 Subject to GCC Subclause 25.5, the Guarantee Test and repeats thereof shall be conducted by the Contractor during Commissioning of the Facilities or the relevant part thereof to ascertain whether the Facilities or the relevant part can attain the Functional Guarantees specified in the Appendix (Functional Guarantees) to the Contract Agreement. The Employer shall promptly provide the Contractor with such information as the Contractor may reasonably require in relation to the conduct and

results of the Guarantee Test and any repeats thereof.

25.2.2 If for reasons not attributable to the Contractor, the Guarantee Test of the Facilities or the relevant part thereof cannot be successfully completed within the period from the date of Completion specified in the SCC or any other period agreed upon by the Employer and the Contractor, the Contractor shall be deemed to have fulfilled its obligations with respect to the Functional Guarantees, and GCC Subclauses 28.2 and 28.3 shall not apply.

25.3 Operational Acceptance

25.3.1 Subject to GCC Subclause 25.4 below, Operational Acceptance shall occur in respect of the Facilities or any part thereof when

- (a) the Guarantee Test has been successfully completed and the Functional Guarantees are met; or
- (b) the Guarantee Test has not been successfully completed or has not been carried out for reasons not attributable to the Contractor within the period from the date of Completion specified in the SCC, or any other agreed upon period as specified in GCC Subclause 25.2.2 above; or
- (c) the Contractor has paid the liquidated damages specified in GCC Subclause 28.3 hereof; and
- (d) any minor items mentioned in GCC Subclause 24.7 hereof relevant to the Facilities or that part thereof have been completed.

25.3.2 At any time after any of the events set out in GCC Subclause 25.3.1 have occurred, the Contractor may give a notice to the Project Manager requesting the issue of an Operational Acceptance Certificate in the form provided in the Employer's Requirements (Forms and Procedures) in respect of the Facilities or the part thereof specified in such notice as of the date of such notice.

25.3.3 The Project Manager shall, after consultation with the Employer, and within 7 days after receipt of the Contractor's notice, issue an Operational Acceptance Certificate.

25.3.4 If within 7 days after receipt of the Contractor's notice, the Project Manager fails to issue the Operational Acceptance Certificate or fails to inform the Contractor in writing of the justifiable reasons why the Project Manager has not issued the Operational Acceptance Certificate, the Facilities or the relevant part thereof shall be deemed to have been accepted as of the date of the Contractor's said notice.

25.4 Partial Acceptance

25.4.1 If the Contract specifies that Completion and Commissioning shall be carried out in respect of parts of the Facilities, the provisions relating to Completion and Commissioning including the Guarantee Test shall apply to each such part of the Facilities individually, and the Operational Acceptance Certificate shall be

issued accordingly for each such part of the Facilities.

25.4.2 If a part of the Facilities comprises facilities such as buildings, for which no Commissioning or Guarantee Test is required, then the Project Manager shall issue the Operational Acceptance Certificate for such facility when it attains Completion, provided that the Contractor shall thereafter complete any outstanding minor items that are listed in the Operational Acceptance Certificate.

25.5 Delayed Pre-Commissioning and/or Guarantee Test

25.5.1 In the event that the Contractor is unable to proceed with the Pre-commissioning of the Facilities pursuant to Subclause 24.3, or with the Guarantee Test pursuant to Subclause 25.2, for reasons attributable to the Employer either on account of non availability of other facilities under the responsibilities of other contractor(s), or for reasons beyond the Employer's control, the provisions leading to "deemed" completion of activities such as Completion, pursuant to GCC Subclause 24.6, and Operational Acceptance, pursuant to GCC Subclause 25.3.4, and Contractor's obligations regarding Defect Liability Period, pursuant to GCC Subclause 27.2, Functional Guarantee, pursuant to GCC Clause 28, and Care of Facilities, pursuant to GCC Clause 32, and GCC Clause 41.1, Suspension, shall not apply. In this case, the following provisions shall apply.

25.5.2 When the Contractor is notified by the Project Manager that he will be unable to proceed with the activities and obligations pursuant to above Subclause 25.5.1, the Contractor shall be entitled to the following:

- (a) the Time of Completion shall be extended for the period of suspension without imposition of liquidated damages pursuant to GCC Subclause 26.2;
- (b) payments due to the Contractor in accordance with the provision specified in the Appendix (Terms and Procedures of Payment) to the Contract Agreement, which would not have been payable in normal circumstances due to noncompletion of the subject activities, shall be released to the Contractor against submission of a security in the form of a bank guarantee of equivalent amount acceptable to the Employer, and which shall become null and void when the Contractor will have complied with its obligations regarding those payments, subject to the provision of Subclause 25.5.3 below;
- (c) the expenses towards the above security and extension of other securities under the contract, of which validity needs to be extended, shall be reimbursed to the Contractor by the Employer;
- (d) the additional charges towards the care of the Facilities pursuant to GCC Subclause 32.1 shall be reimbursed to

the Contractor by the Employer for the period between the notification mentioned above and the notification mentioned in Subclause 25.5.4 below. The provision of GCC Subclause 33.2 shall apply to the Facilities during the same period.

25.5.3 In the event that the period of suspension under above Subclause 25.5.1 actually exceeds 180 days, the Employer and Contractor shall mutually agree to any additional compensation payable to the Contractor.

25.5.4 When the Contractor is notified by the Project Manager that the plant is ready for Pre-commissioning, the Contractor shall proceed without delay in performing all the specified activities and obligations under the contract.

F. Guarantees and Liabilities

26. Completion Time Guarantee

26.1 The Contractor guarantees that it shall attain Completion of the Facilities (or a part for which a separate time for completion is specified) within the Time for Completion specified in the SCC pursuant to GCC Subclause 8.2, or within such extended time to which the Contractor shall be entitled under GCC Clause 40 hereof.

26.2 If the Contractor fails to attain Completion of the Facilities or any part thereof within the Time for Completion or any extension thereof under GCC Clause 40, the Contractor shall pay to the Employer liquidated damages in the amount specified in the SCC as a percentage rate of the Contract Price or the relevant part thereof. The aggregate amount of such liquidated damages shall in no event exceed the amount specified as "Maximum" in the SCC as a percentage rate of the Contract Price. Once the "Maximum" is reached, the Employer may consider termination of the Contract, pursuant to GCC Subclause 42.2.2.

Such payment shall completely satisfy the Contractor's obligation to attain Completion of the Facilities or the relevant part thereof within the Time for Completion or any extension thereof under GCC Clause 40. The Contractor shall have no further liability whatsoever to the Employer in respect thereof.

However, the payment of liquidated damages shall not in any way relieve the Contractor from any of its obligations to complete the Facilities or from any other obligations and liabilities of the Contractor under the Contract.

Save for liquidated damages payable under this GCC Subclause 26.2, the failure by the Contractor to attain any milestone or other act, matter or thing by any date specified in the Appendix (Time Schedule) to the Contract Agreement and/or other program of work prepared pursuant to GCC Subclause 18.2 shall not render the Contractor liable for any loss or damage thereby suffered by the Employer.

- 26.3 If the Contractor attains Completion of the Facilities or any part thereof before the Time for Completion or any extension thereof under GCC Clause 40, the Employer shall pay to the Contractor a bonus in the amount specified in the SCC. The aggregate amount of such bonus shall in no event exceed the amount specified as "Maximum" in the SCC.

27. Defect Liability

- 27.1 The Contractor warrants that the Facilities or any part thereof shall be free from defects in the design, engineering, materials, and workmanship of the Plant supplied and of the work executed.

- 27.2 The Defect Liability Period shall be 540 days from the date of Completion of the Facilities (or any part thereof) or 1 year from the date of Operational Acceptance of the Facilities (or any part thereof), whichever first occurs, unless specified otherwise in the SCC pursuant to GCC Subclause 27.10.

If during the Defect Liability Period any defect should be found in the design, engineering, materials, and workmanship of the Plant supplied or of the work executed by the Contractor, the Contractor shall promptly, in consultation and agreement with the Employer regarding appropriate remedying of the defects, and at its cost, repair, replace, or otherwise make good as the Contractor shall determine at its discretion, such defect as well as any damage to the Facilities caused by such defect. The Contractor shall not be responsible for the repair, replacement, or making good of any defect or of any damage to the Facilities arising out of or resulting from any of the following causes:

- (a) improper operation or maintenance of the Facilities by the Employer,
- (b) operation of the Facilities outside specifications provided in the Contract, or
- (c) normal wear and tear.

- 27.3 The Contractor's obligations under this GCC Clause 27 shall not apply to:

- (a) any materials that are supplied by the Employer under GCC Subclause 21.2, are normally consumed in operation, or have a normal life shorter than the Defect Liability Period stated herein;
- (b) any designs, specifications or other data designed, supplied, or specified by or on behalf of the Employer or any matters for which the Contractor has disclaimed responsibility herein; or
- (c) any other materials supplied or any other work executed by or on behalf of the Employer, except for the work executed by the Employer under GCC Subclause 27.7.

- 27.4 The Employer shall give the Contractor a notice stating the nature of any such defect together with all available evidence thereof, promptly following the discovery thereof. The Employer shall afford all reasonable opportunity for the Contractor to inspect any such defect.

- 27.5 The Employer shall afford the Contractor all necessary access to the Facilities and the Site to enable the Contractor to perform its

obligations under this GCC Clause 27.

The Contractor may, with the consent of the Employer, remove from the Site any Plant or any part of the Facilities that are defective if the nature of the defect, and/or any damage to the Facilities caused by the defect, is such that repairs cannot be expeditiously carried out at the Site.

- 27.6 If the repair, replacement or making good is of such a character that it may affect the efficiency of the Facilities or any part thereof, the Employer may give to the Contractor a notice requiring that tests of the defective part of the Facilities shall be made by the Contractor immediately upon completion of such remedial work, whereupon the Contractor shall carry out such tests.

If such part fails the tests, the Contractor shall carry out further repair, replacement or making good, as the case may be, until that part of the Facilities passes such tests. The tests shall be agreed upon by the Employer and the Contractor.

- 27.7 If the Contractor fails to commence the work necessary to remedy such defect or any damage to the Facilities caused by such defect within a reasonable time (which shall in no event be considered to be less than 15 days), the Employer may, following notice to the Contractor, proceed to do such work, and the reasonable costs incurred by the Employer in connection therewith shall be paid to the Employer by the Contractor or may be deducted by the Employer from any monies due the Contractor or claimed under the Performance Security.

- 27.8 If the Facilities or any part thereof cannot be used by reason of such defect and/or making good of such defect, the Defect Liability Period of the Facilities or such part, as the case may be, shall be extended by a period equal to the period during which the Facilities or such part cannot be used by the Employer because of any of the aforesaid reasons.

- 27.9 Except as provided in GCC Clauses 27 and 33, the Contractor shall be under no liability whatsoever and howsoever arising, and whether under the Contract or at law, in respect of defects in the Facilities or any part thereof, the Plant, design, or engineering, or work executed that appear after Completion of the Facilities or any part thereof, except where such defects are the result of the gross negligence, fraud, criminal, or willful action of the Contractor.

- 27.10 In addition, any such component of the Facilities and during the period of time as may be specified in the SCC shall be subject to an extended Defect Liability Period. Such obligation of the Contractor shall be in addition to the Defect Liability Period specified under GCC Subclause 27.2.

28. Functional Guarantees

- 28.1 The Contractor guarantees that during the Guarantee Test, the Facilities and all parts thereof shall attain the Functional Guarantees specified in the Appendix (Functional Guarantees) to the Contract Agreement, subject to, and upon the conditions therein specified.
- 28.2 If, for reasons attributable to the Contractor, the minimum level of the Functional Guarantees specified in the Appendix (Functional

Guarantees) to the Contract Agreement are not met either in whole or in part, the Contractor shall at its cost and expense make such changes, modifications, and/or additions to the Plant or any part thereof as may be necessary to meet at least the minimum level of such Guarantees. The Contractor shall notify the Employer upon completion of the necessary changes, modifications, and/or additions, and shall request the Employer to repeat the Guarantee Test until the minimum level of the Guarantees has been met. If the Contractor eventually fails to meet the minimum level of Functional Guarantees, the Employer may consider termination of the Contract, pursuant to GCC Subclause 42.2.2.

- 28.3 If, for reasons attributable to the Contractor, the Functional Guarantees specified in the Appendix (Functional Guarantees) to the Contract Agreement are not attained either in whole or in part, but the minimum level of the Functional Guarantees specified in the said Appendix to the Contract Agreement is met, the Contractor shall, at the Contractor's option, either
- (a) make such changes, modifications, and/or additions to the Facilities or any part thereof that are necessary to attain the Functional Guarantees at its cost and expense, and shall request the Employer to repeat the Guarantee Test or
 - (b) pay liquidated damages to the Employer in respect of the failure to meet the Functional Guarantees in accordance with the provisions in the Appendix (Functional Guarantees) to the Contract Agreement.
- 28.4 The payment of liquidated damages under GCC Subclause 28.3, up to the limitation of liability specified in the Appendix (Functional Guarantees) to the Contract Agreement, shall completely satisfy the Contractor's guarantees under GCC Subclause 28.3, and the Contractor shall have no further liability whatsoever to the Employer in respect thereof. Upon the payment of such liquidated damages by the Contractor, the Project Manager shall issue the Operational Acceptance Certificate for the Facilities or any part thereof in respect of which the liquidated damages have been so paid.

29. Patent Indemnity

- 29.1 The Contractor shall, subject to the Employer's compliance with GCC Subclause 29.2, indemnify and hold harmless the Employer and its employees and officers from and against any and all suits, actions, or administrative proceedings, claims, demands, losses, damages, costs, and expenses of whatsoever nature, including attorney's fees and expenses, which the Employer may suffer as a result of any infringement or alleged infringement of any patent, utility model, registered design, trademark, copyright, or other intellectual property right registered or otherwise existing at the date of the Contract by reason of (a) the installation of the Facilities by the Contractor or the use of the Facilities in the country where the Site is located, and (b) the sale of the products produced by the Facilities in any country.

Such indemnity shall not cover any use of the Facilities or any part thereof other than for the purpose indicated by or to be reasonably inferred from the Contract, any infringement resulting from the use of the Facilities or any part thereof, or any products produced thereby in association or combination with any other equipment, plant, or materials not supplied by the Contractor, pursuant to the Contract

Agreement.

- 29.2 If any proceedings are brought or any claim is made against the Employer arising out of the matters referred to in GCC Subclause 29.1, the Employer shall promptly give the Contractor a notice thereof, and the Contractor may at its own expense and in the Employer's name conduct such proceedings or claim and any negotiations for the settlement of any such proceedings or claim.

If the Contractor fails to notify the Employer within 28 days after receipt of such notice that it intends to conduct any such proceedings or claim, then the Employer shall be free to conduct the same on its own behalf. Unless the Contractor has so failed to notify the Employer within the 28-day period, the Employer shall make no admission that may be prejudicial to the defense of any such proceedings or claim.

The Employer shall, at the Contractor's request, afford all available assistance to the Contractor in conducting such proceedings or claim, and shall be reimbursed by the Contractor for all reasonable expenses incurred in so doing.

- 29.3 The Employer shall indemnify and hold harmless the Contractor and its employees, officers, and Subcontractors from and against any and all suits, actions or administrative proceedings, claims, demands, losses, damages, costs, and expenses of whatsoever nature, including attorney's fees and expenses, which the Contractor may suffer as a result of any infringement or alleged infringement of any patent, utility model, registered design, trademark, copyright, or other intellectual property right registered or otherwise existing at the date of the Contract arising out of or in connection with any design, data, drawing, specification, or other documents or materials provided or designed by or on behalf of the Employer.

30. Limitation of Liability

- 30.1 Except in cases of criminal negligence or willful misconduct,
- (a) the Contractor shall not be liable to the Employer, whether in contract, tort, or otherwise, for any indirect or consequential loss or damage, loss of use, loss of production, or loss of profits or interest costs, provided that this exclusion shall not apply to any obligation of the Contractor to pay liquidated damages to the Employer, and
 - (b) the aggregate liability of the Contractor to the Employer, whether under the Contract, in tort or otherwise, shall not exceed a multiple of the Contract Price specified in the SCC or, if a multiple is not so specified, the total Contract Price, provided that this limitation shall not apply to the cost of repairing or replacing defective equipment, or to any obligation of the Contractor to indemnify the Employer with respect to patent infringement.

G. Risk Distribution

31. Transfer of Ownership

- 31.1 Ownership of the Plant (including spare parts) to be imported into the country where the Site is located shall be transferred to the Employer upon loading on to the mode of transport to be used to convey the

Plant from the country of origin to that country.

- 31.2 Ownership of the Plant (including spare parts) procured in the country where the Site is located shall be transferred to the Employer when the Plant are brought on to the Site.
- 31.3 Ownership of the Contractor's Equipment used by the Contractor and its Subcontractors in connection with the Contract shall remain with the Contractor or its Subcontractors.
- 31.4 Ownership of any Plant in excess of the requirements for the Facilities shall revert to the Contractor upon Completion of the Facilities or at such earlier time when the Employer and the Contractor agree that the Plant in question are no longer required for the Facilities.
- 31.5 Notwithstanding the transfer of ownership of the Plant, the responsibility for care and custody thereof together with the risk of loss or damage thereto shall remain with the Contractor pursuant to GCC Clause 32 (Care of Facilities) hereof until Completion of the Facilities or the part thereof in which such Plant are incorporated.

32. Care of Facilities

- 32.1 The Contractor shall be responsible for the care and custody of the Facilities or any part thereof until the date of Completion of the Facilities pursuant to GCC Clause 24 or, where the Contract provides for Completion of the Facilities in parts, until the date of Completion of the relevant part, and shall make good at its own cost any loss or damage that may occur to the Facilities or the relevant part thereof from any cause whatsoever during such period. The Contractor shall also be responsible for any loss or damage to the Facilities caused by the Contractor or its Subcontractors in the course of any work carried out, pursuant to GCC Clause 27. Notwithstanding the foregoing, the Contractor shall not be liable for any loss or damage to the Facilities or that part thereof caused by reason of any of the matters specified or referred to in paragraphs (a), (b) and (c) of GCC Sub-clauses 32.2 and 38.1.
- 32.2 If any loss or damage occurs to the Facilities or any part thereof or to the Contractor's temporary facilities by reason of
 - (a) insofar as they relate to the country where the Site is located, nuclear reaction, nuclear radiation, radioactive contamination, pressure wave caused by aircraft or other aerial objects, or any other occurrences that an experienced contractor could not reasonably foresee, or if reasonably foreseeable could not reasonably make provision for or insure against, insofar as such risks are not normally insurable on the insurance market and are mentioned in the general exclusions of the policy of insurance, including War Risks and Political Risks, taken out under GCC Clause 34 hereof; or
 - (b) any use or occupation by the Employer or any third party other than a Subcontractor, authorized by the Employer of any part of the Facilities; or
 - (c) any use of or reliance upon any design, data, or specification provided or designated by or on behalf of the Employer, or any such matter for which the Contractor has disclaimed

responsibility herein,

the Employer shall pay to the Contractor all sums payable in respect of the Facilities executed, notwithstanding that the same be lost, destroyed, or damaged, and will pay to the Contractor the replacement value of all temporary facilities and all parts thereof lost, destroyed, or damaged. If the Employer requests the Contractor in writing to make good any loss or damage to the Facilities thereby occasioned, the Contractor shall make good the same at the cost of the Employer in accordance with GCC Clause 39. If the Employer does not request the Contractor in writing to make good any loss or damage to the Facilities thereby occasioned, the Employer shall either request a change in accordance with GCC Clause 39, excluding the performance of that part of the Facilities thereby lost, destroyed or damaged, or, where the loss or damage affects a substantial part of the Facilities, the Employer shall terminate the Contract pursuant to GCC Subclause 42.1 hereof.

32.3 The Contractor shall be liable for any loss of or damage to any Contractor's Equipment, or any other property of the Contractor used or intended to be used for purposes of the Facilities, except (i) as mentioned in GCC Subclause 32.2 with respect to the Contractor's temporary facilities, and (ii) where such loss or damage arises by reason of any of the matters specified in GCC Sub-clauses 32.2 (b) and (c) and 38.1.

32.4 With respect to any loss or damage caused to the Facilities or any part thereof or to the Contractor's Equipment by reason of any of the matters specified in GCC Subclause 38.1, the provisions of GCC Subclause 38.3 shall apply.

**33. Loss of or
Damage to
Property;
Accident or Injury
to Workers;
Indemnification**

33.1 Subject to GCC Subclause 33.3, the Contractor shall indemnify and hold harmless the Employer and its employees and officers from and against any and all suits, actions, or administrative proceedings, claims, demands, losses, damages, costs, and expenses of whatsoever nature, including attorney's fees and expenses, in respect of the death or injury of any person or loss of or damage to any property other than the Facilities whether accepted or not, arising in connection with the supply and installation of the Facilities and by reason of the negligence of the Contractor or its Subcontractors, or their employees, officers, or agents, except any injury, death, or property damage caused by the negligence of the Employer, its contractors, employees, officers, or agents.

33.2 If any proceedings are brought or any claim is made against the Employer that might subject the Contractor to liability under GCC Subclause 33.1, the Employer shall promptly give the Contractor a notice thereof and the Contractor may at its own expense and in the Employer's name conduct such proceedings or claim and any negotiations for the settlement of any such proceedings or claim.

If the Contractor fails to notify the Employer within 28 days after receipt of such notice that it intends to conduct any such proceedings or claim, then the Employer shall be free to conduct the same on its own behalf. Unless the Contractor has so failed to notify the Employer within the 28-day period, the Employer shall make no admission that may be

prejudicial to the defense of any such proceedings or claim.

The Employer shall, at the Contractor's request, afford all available assistance to the Contractor in conducting such proceedings or claim, and shall be reimbursed by the Contractor for all reasonable expenses incurred in so doing.

33.3 The Employer shall indemnify and hold harmless the Contractor and its employees, officers, and Subcontractors from any liability for loss of or damage to property of the Employer, other than the Facilities not yet taken over, that is caused by fire, explosion, or any other perils, in excess of the amount recoverable from insurances procured under GCC Clause 34, provided that such fire, explosion, or other perils were not caused by any act or failure of the Contractor.

33.4 The party entitled to the benefit of an indemnity under this GCC Clause 33 shall take all reasonable measures to mitigate any loss or damage which has occurred. If the party fails to take such measures, the other party's liabilities shall be correspondingly reduced.

34. Insurance

34.1 To the extent specified in the Appendix (Insurance Requirements) to the Contract Agreement, the Contractor shall at its expense take out and maintain in effect, or cause to be taken out and maintained in effect, during the performance of the Contract, the insurances set forth below in the sums and with the deductibles and other conditions specified in the said Appendix. The identity of the insurers and the form of the policies shall be subject to the approval of the Employer, who should not unreasonably withhold such approval.

(a) Cargo Insurance During Transport

Covering loss or damage occurring while in transit from the Contractor's or Subcontractor's works or stores until arrival at the Site, to the Plant (including spare parts therefor) and to the Contractor's Equipment.

(b) Installation All Risks Insurance

Covering physical loss or damage to the Facilities at the Site, occurring prior to Completion of the Facilities, with an extended maintenance coverage for the Contractor's liability in respect of any loss or damage occurring during the Defect Liability Period while the Contractor is on the Site for the purpose of performing its obligations during the Defect Liability Period.

(c) Third Party Liability Insurance

Covering bodily injury or death suffered by third parties including the Employer's personnel, and loss of or damage to property occurring in connection with the supply and installation of the Facilities.

(d) Automobile Liability Insurance

Covering use of all vehicles used by the Contractor or its Subcontractors, whether or not owned by them, in connection with the execution of the Contract.

(e) Workers' Compensation

In accordance with the statutory requirements applicable in any country where the Contract or any part thereof is executed.

(f) Employer's Liability

In accordance with the statutory requirements applicable in any country where the Contract or any part thereof is executed.

(g) Other Insurances

Such other insurances as may be specifically agreed upon by the parties hereto as listed in the Appendix (Insurance Requirements) to the Contract Agreement.

34.2 The Employer shall be named as co-insured under all insurance policies taken out by the Contractor pursuant to GCC Subclause 34.1, except for the Third Party Liability, Workers' Compensation, and Employer's Liability Insurances, and the Contractor's Subcontractors shall be named as co-insureds under all insurance policies taken out by the Contractor pursuant to GCC Subclause 34.1 except for the Cargo Insurance During Transport, Workers' Compensation, and Employer's Liability Insurances. All insurer's rights of subrogation against such co-insureds for losses or claims arising out of the performance of the Contract shall be waived under such policies.

34.3 The Contractor shall, in accordance with the provisions of the Appendix (Insurance Requirements) to the Contract Agreement, deliver to the Employer certificates of insurance or copies of the insurance policies as evidence that the required policies are in full force and effect. The certificates shall provide that no less than 21 days' notice shall be given to the Employer by insurers prior to cancellation or material modification of a policy.

34.4 The Contractor shall ensure that, where applicable, its Subcontractor(s) shall take out and maintain in effect adequate insurance policies for their personnel and vehicles and for work executed by them under the Contract, unless such Subcontractors are covered by the policies taken out by the Contractor.

34.5 The Employer shall at its expense take out and maintain in effect during the performance of the Contract those insurances specified in the Appendix (Insurance Requirements) to the Contract Agreement, in the sums and with the deductibles and other conditions specified in the said Appendix. The Contractor and the Contractor's Subcontractors shall be named as co-insureds under all such policies. All insurers' rights of subrogation against such co-insureds for losses or claims arising out of the performance of the Contract shall be waived under such policies. The Employer shall deliver to the Contractor satisfactory evidence that the required insurances are in full force and effect. The policies shall provide that not less than 21 days' notice shall be given to the Contractor by all insurers prior to any cancellation or material modification of the policies. If so requested by the Contractor, the Employer shall provide copies of the policies taken out by the Employer under this GCC Subclause 34.5.

34.6 If the Contractor fails to take out and/or maintain in effect the insurances referred to in GCC Subclause 34.1, the Employer may take out and maintain in effect any such insurances and may from time to time deduct from any amount due the Contractor under the Contract any premium that the Employer shall have paid to the insurer, or may otherwise recover such amount as a debt due from the Contractor. If the Employer fails to take out and/or maintain in effect the insurances referred to in GCC 34.5, the Contractor may take out and maintain in effect any such insurances and may from time to time deduct from any amount due the Employer under the Contract any premium that the Contractor shall have paid to the insurer, or may otherwise recover such amount as a debt due from the Employer. If the Contractor fails to or is unable to take out and maintain in effect any such insurances, the Contractor shall nevertheless have no liability or responsibility towards the Employer, and the Contractor shall have full recourse against the Employer for any and all liabilities of the Employer herein.

34.7 Unless otherwise provided in the Contract, the Contractor shall prepare and conduct all and any claims made under the policies effected by it pursuant to this GCC Clause 34, and all monies payable by any insurers shall be paid to the Contractor. The Employer shall give to the Contractor all such reasonable assistance as may be required by the Contractor. With respect to insurance claims in which the Employer's interest is involved, the Contractor shall not give any release or make any compromise with the insurer without the prior written consent of the Employer. With respect to insurance claims in which the Contractor's interest is involved, the Employer shall not give any release or make any compromise with the insurer without the prior written consent of the Contractor.

**35. Unforeseen
Conditions**

35.1 If, during the execution of the Contract, the Contractor shall encounter on the Site any physical conditions other than climatic conditions, or artificial obstructions that could not have been reasonably foreseen prior to the date of the Contract Agreement by an experienced contractor on the basis of reasonable examination of the data relating to the Facilities including any data as to boring tests, provided by the Employer, and on the basis of information that it could have obtained from a visual inspection of the Site if access thereto was available, or other data readily available to it relating to the Facilities, and if the Contractor determines that it will in consequence of such conditions or obstructions incur additional cost and expense or require additional time to perform its obligations under the Contract that would not have been required if such physical conditions or artificial obstructions had not been encountered, the Contractor shall promptly, and before performing additional work or using additional Plant or Contractor's Equipment, notify the Project Manager in writing of

- (a) the physical conditions or artificial obstructions on the Site that could not have been reasonably foreseen;
- (b) the additional work and/or Plant and/or Contractor's Equipment required, including the steps which the Contractor will or proposes to take to overcome such conditions or obstructions;
- (c) the extent of the anticipated delay; and

- (d) the additional cost and expense that the Contractor is likely to incur.

On receiving any notice from the Contractor under this GCC Subclause 35.1, the Project Manager shall promptly consult with the Employer and Contractor and decide upon the actions to be taken to overcome the physical conditions or artificial obstructions encountered. Following such consultations, the Project Manager shall instruct the Contractor, with a copy to the Employer, of the actions to be taken.

35.2 Any reasonable additional cost and expense incurred by the Contractor in following the instructions from the Project Manager to overcome such physical conditions or artificial obstructions referred to in GCC Subclause 35.1 shall be paid by the Employer to the Contractor as an addition to the Contract Price.

35.3 If the Contractor is delayed or impeded in the performance of the Contract because of any such physical conditions or artificial obstructions referred to in GCC Subclause 35.1, the Time for Completion shall be extended in accordance with GCC Clause 40.

36. Change in Laws and Regulations

36.1 If, after the date 28 days prior to the date of Bid submission, in the country where the Site is located, any law, regulation, ordinance, order or by-law having the force of law is enacted, promulgated, abrogated, or changed, which shall be deemed to include any change in interpretation or application by the competent authorities, that subsequently affects the costs and expenses of the Contractor and/or the Time for Completion, the Contract Price shall be correspondingly increased or decreased, and/or the Time for Completion shall be reasonably adjusted to the extent that the Contractor has thereby been affected in the performance of any of its obligations under the Contract. Notwithstanding the foregoing, such additional or reduced costs shall not be separately paid or credited if the same has already been accounted for in the price adjustment provisions where applicable, in accordance with the SCC, pursuant to GCC Subclause 11.2.

37. Force Majeure

37.1 "Force Majeure" shall mean any event beyond the reasonable control of the Employer or of the Contractor, as the case may be, and which is unavoidable notwithstanding the reasonable care of the party affected, and shall include, without limitation, the following:

- (a) war, hostilities, or warlike operations whether a state of war be declared or not, invasion, act of foreign enemy and civil war;
- (b) rebellion, revolution, insurrection, mutiny, usurpation of civil or military government, conspiracy, riot, civil commotion, and terrorist acts;
- (c) confiscation, nationalization, mobilization, commandeering or requisition by or under the order of any government or de jure or de facto authority or ruler or any other act or failure to act of any local state or national government authority;
- (d) strike, sabotage, lockout, embargo, import restriction, port congestion, lack of usual means of public transportation and communication, industrial dispute, shipwreck, shortage or

restriction of power supply, epidemics, quarantine, and plague;

- (e) earthquake, landslide, volcanic activity, fire, flood or inundation, tidal wave, typhoon or cyclone, hurricane, storm, lightning, or other inclement weather condition, nuclear, and pressure waves or other natural or physical disaster; and
- (f) shortage of labor, materials, or utilities where caused by circumstances that are themselves Force Majeure.

37.2 If either party is prevented, hindered, or delayed from or in performing any of its obligations under the Contract by an event of Force Majeure, then it shall notify the other in writing of the occurrence of such event and the circumstances thereof within 14 days after the occurrence of such event.

37.3 The party who has given such notice shall be excused from the performance or punctual performance of its obligations under the Contract for so long as the relevant event of Force Majeure continues and to the extent that such party's performance is prevented, hindered, or delayed. The Time for Completion shall be extended in accordance with GCC Clause 40.

37.4 The party or parties affected by the event of Force Majeure shall use reasonable efforts to mitigate the effect thereof upon its or their performance of the Contract and to fulfill its or their obligations under the Contract, but without prejudice to either party's right to terminate the Contract under GCC Sub-clauses 37.6 and 38.5.

37.5 No delay or nonperformance by either party hereto caused by the occurrence of any event of Force Majeure shall

- (a) constitute a default or breach of the Contract; or
- (b) give rise to any claim for damages or additional cost or expense occasioned thereby, subject to GCC Sub-clauses 32.2, 38.3 and 38.4

if and to the extent that such delay or nonperformance is caused by the occurrence of an event of Force Majeure.

37.6 If the performance of the Contract is substantially prevented, hindered, or delayed for a single period of more than 60 days or an aggregate period of more than 120 days on account of one or more events of Force Majeure during the currency of the Contract, the parties will attempt to develop a mutually satisfactory solution, failing which either party may terminate the Contract by giving a notice to the other, but without prejudice to either party's right to terminate the Contract under GCC Subclause 38.5.

37.7 In the event of termination pursuant to GCC Subclause 37.6, the rights and obligations of the Employer and the Contractor shall be as specified in GCC Sub-clauses 42.1.2 and 42.1.3.

37.8 Notwithstanding GCC Subclause 37.5, Force Majeure shall not apply to any obligation of the Employer to make payments to the Contractor herein.

38. War Risks

38.1 "War Risks" shall mean any event specified in paragraphs (a) and (b) of GCC Subclause 37.1 and any explosion or impact of any mine, bomb, shell, grenade, or other projectile, missile, munitions or explosive of war, occurring or existing in or near the country (or countries) where the Site is located.

38.2 Notwithstanding anything contained in the Contract, the Contractor shall have no liability whatsoever for or with respect to

- (a) destruction of or damage to Facilities, Plant, or any part thereof;
- (b) destruction of or damage to property of the Employer or any third party; or
- (c) injury or loss of life

if such destruction, damage, injury or loss of life is caused by any war risks, and the Employer shall indemnify and hold the Contractor harmless from and against any and all claims, liabilities, actions, lawsuits, damages, costs, charges, or expenses arising in consequence of or in connection with the same.

38.3 If the Facilities or any Plant or Contractor's Equipment or any other property of the Contractor used or intended to be used for the purposes of the Facilities shall sustain destruction or damage by reason of any war risks, the Employer shall pay the Contractor for

- (a) any part of the Facilities or the Plant so destroyed or damaged to the extent not already paid for by the Employer and so far as may be required by the Employer, and as may be necessary for completion of the Facilities;
- (b) replacing or making good any Contractor's Equipment or other property of the Contractor so destroyed or damaged; and
- (c) replacing or making good any such destruction or damage to the Facilities or the Plant or any part thereof.

If the Employer does not require the Contractor to replace or make good any such destruction or damage to the Facilities, the Employer shall either request a change in accordance with GCC Clause 39, excluding the performance of that part of the Facilities thereby destroyed or damaged or, where the loss, destruction, or damage affects a substantial part of the Facilities, shall terminate the Contract, pursuant to GCC Subclause 42.1.

If the Employer requires the Contractor to replace or make good on any such destruction or damage to the Facilities, the Time for Completion shall be extended in accordance with GCC 40.

38.4 Notwithstanding anything contained in the Contract, the Employer shall pay the Contractor for any increased costs or incidentals to the execution of the Contract that are in any way attributable to, consequent on, resulting from, or in any way connected with any war risks, provided that the Contractor shall as soon as practicable notify the Employer in writing of any such increased cost.

38.5 If during the performance of the Contract any war risks shall occur that

financially or otherwise materially affect the execution of the Contract by the Contractor, the Contractor shall use its reasonable efforts to execute the Contract with due and proper consideration given to the safety of its and its Subcontractors' personnel engaged in the work on the Facilities, provided, however, that if the execution of the work on the Facilities becomes impossible or is substantially prevented for a single period of more than sixty (60) days or an aggregate period of more than one hundred and twenty (120) days on account of any war risks, the parties will attempt to develop a mutually satisfactory solution, failing which either party may terminate the Contract by giving a notice to the other.

- 38.6 In the event of termination pursuant to GCC Sub-clauses 38.3 or 38.5, the rights and obligations of the Employer and the Contractor shall be specified in GCC Sub-clauses 42.1.2 and 42.1.3.

H. Change in Contract Elements

39. Change in the Facilities

39.1 Introducing a Change

39.1.1 Subject to GCC Sub-clauses 39.2.5 and 39.2.7, the Employer shall have the right to propose, and subsequently require, that the Project Manager order the Contractor from time to time during the performance of the Contract to make any change, modification, addition, or deletion to, in or from the Facilities hereinafter called "Change," provided that such Change falls within the general scope of the Facilities and does not constitute unrelated work and that it is technically practicable, taking into account both the state of advancement of the Facilities and the technical compatibility of the Change envisaged with the nature of the Facilities as specified in the Contract.

39.1.2 The Contractor may from time to time during its performance of the Contract propose to the Employer with a copy to the Project Manager, any Change that the Contractor considers necessary or desirable to improve the quality, efficiency, or safety of the Facilities. The Employer may at its discretion approve or reject any Change proposed by the Contractor, provided that the Employer shall approve any Change proposed by the Contractor to ensure the safety of the Facilities.

39.1.3 Notwithstanding GCC Sub-clauses 39.1.1 and 39.1.2, no change made necessary because of any default of the Contractor in the performance of its obligations under the Contract shall be deemed to be a Change, and such change shall not result in any adjustment of the Contract Price or the Time for Completion.

39.1.4 The procedure on how to proceed with and execute Changes is specified in GCC Sub-clauses 39.2 and 39.3, and further details and forms are provided in the Employer's Requirements (Forms and Procedures).

39.2 Changes Originating from Employer

39.2.1 If the Employer proposes a Change pursuant to GCC Subclause 39.1.1, it shall send to the Contractor a "Request for Change

Proposal,” requiring the Contractor to prepare and furnish to the Project Manager as soon as reasonably practicable a “Change Proposal,” which shall include the following:

- (a) brief description of the Change,
- (b) effect on the Time for Completion,
- (c) estimated cost of the Change,
- (d) effect on Functional Guarantees (if any),
- (e) effect on the Facilities, and
- (f) effect on any other provisions of the Contract.

39.2.2 Prior to preparing and submitting the “Change Proposal,” the Contractor shall submit to the Project Manager an “Estimate for Change Proposal,” which shall be an estimate of the cost of preparing and submitting the Change Proposal.

Upon receipt of the Contractor’s Estimate for Change Proposal, the Employer shall do one of the following:

- (a) accept the Contractor’s estimate with instructions to the Contractor to proceed with the preparation of the Change Proposal,
- (b) advise the Contractor of any part of its Estimate for Change Proposal that is unacceptable and request the Contractor to review its estimate
- (c) advise the Contractor that the Employer does not intend to proceed with the Change.

39.2.3 Upon receipt of the Employer’s instruction to proceed under GCC Subclause 39.2.2 (a), the Contractor shall, with proper expedition, proceed with the preparation of the Change Proposal, in accordance with GCC Subclause 39.2.1.

39.2.4 The pricing of any Change shall, as far as practicable, be calculated in accordance with the rates and prices included in the Contract. If such rates and prices are inequitable, the parties thereto shall agree on specific rates for the valuation of the Change.

39.2.5 If before or during the preparation of the Change Proposal it becomes apparent that the aggregate effect of compliance therewith and with all other Change Orders that have already become binding upon the Contractor under this GCC Clause 39 would be to increase or decrease the Contract Price as originally set forth in Article 2 (Contract Price) of the Contract Agreement by more than 15%, the Contractor may give a written notice of objection thereto prior to furnishing the Change Proposal as aforesaid. If the Employer accepts the Contractor’s objection, the Employer shall withdraw the proposed Change and shall

notify the Contractor in writing thereof.

The Contractor's failure to so object shall neither affect its right to object to any subsequent requested Changes or Change Orders herein, nor affect its right to take into account, when making such subsequent objection, the percentage increase or decrease in the Contract Price that any Change not objected to by the Contractor represents.

- 39.2.6 Upon receipt of the Change Proposal, the Employer and the Contractor shall mutually agree upon all matters therein contained. Within 14 days after such agreement, the Employer shall, if it intends to proceed with the Change, issue the Contractor with a Change Order.

If the Employer is unable to reach a decision within 14 days, it shall notify the Contractor with details of when the Contractor can expect a decision.

If the Employer decides not to proceed with the Change for whatever reason, it shall, within the said period of 14 days, notify the Contractor accordingly. Under such circumstances, the Contractor shall be entitled to reimbursement of all costs reasonably incurred by it in the preparation of the Change Proposal, provided that these do not exceed the amount given by the Contractor in its Estimate for Change Proposal submitted in accordance with GCC Subclause 39.2.2.

- 39.2.7 If the Employer and the Contractor cannot reach agreement on the price for the Change, an equitable adjustment to the Time for Completion, or any other matters identified in the Change Proposal, the Employer may nevertheless instruct the Contractor to proceed with the Change by issue of a "Pending Agreement Change Order."

Upon receipt of a Pending Agreement Change Order, the Contractor shall immediately proceed with effecting the Changes covered by such Order. The parties shall thereafter attempt to reach agreement on the outstanding issues under the Change Proposal.

If the parties cannot reach agreement within 60 days from the date of issue of the Pending Agreement Change Order, then the matter may be referred to the Dispute Board in accordance with the provisions of GCC Subclause 45.3.

39.3 Changes Originating from Contractor

- 39.3.1 If the Contractor proposes a Change pursuant to GCC Subclause 39.1.2, the Contractor shall submit to the Project Manager a written "Application for Change Proposal," giving reasons for the proposed Change and including the information specified in GCC Subclause 39.2.1.

Upon receipt of the Application for Change Proposal, the parties

shall follow the procedures outlined in GCC Sub-clauses 39.2.6 and 39.2.7. However, should the Employer choose not to proceed, the Contractor shall not be entitled to recover the costs of preparing the Application for Change Proposal.

40. Extension of Time for Completion

40.1 The Time(s) for Completion specified in the SCC shall be extended if the Contractor is delayed or impeded in the performance of any of its obligations under the Contract by reason of any of the following:

- (a) any Change in the Facilities as provided in GCC Clause 39;
- (b) any occurrence of Force Majeure as provided in GCC Clause 37, unforeseen conditions as provided in GCC Clause 35, or other occurrence of any of the matters specified or referred to in paragraphs (a), (b) and (c) of GCC Subclause 32.2;
- (c) any suspension order given by the Employer under GCC Clause 41 hereof or reduction in the rate of progress pursuant to GCC Subclause 41.2; or
- (d) any changes in laws and regulations as provided in GCC Clause 36; or
- (e) any default or breach of the Contract by the Employer, or any activity, act or omission of the Employer, or the Project Manager, or any other contractors employed by the Employer; or
- (f) any other matter specifically mentioned in the Contract; or
- (g) any delay on the part of a sub-contractor, provided such delay is due to a cause for which the Contractor himself would have been entitled to an extension of time under this Subclause

by such period as shall be fair and reasonable in all the circumstances and as shall fairly reflect the delay or impediment sustained by the Contractor.

40.2 Except where otherwise specifically provided in the Contract, the Contractor shall submit to the Project Manager a notice of a claim for an extension of the Time for Completion, together with particulars of the event or circumstance justifying such extension as soon as reasonably practicable after the commencement of such event or circumstance. As soon as reasonably practicable after receipt of such notice and supporting particulars of the claim, the Employer and the Contractor shall agree upon the period of such extension. In the event that the Contractor does not accept the Employer's estimate of a fair and reasonable time extension, the Contractor shall be entitled to refer the matter to a Dispute Board, pursuant to GCC Subclause 45.3.

40.3 The Contractor shall at all times use its reasonable efforts to minimize any delay in the performance of its obligations under the Contract.

In all cases where the Contractor has given a notice of a claim for an extension of time under GCC 40.2, the Contractor shall consult with the Project Manager in order to determine the steps (if any) which can be taken to overcome or minimize the actual or anticipated delay. The Contractor shall there after comply with all reasonable instructions,

which the Project Manager shall give in order to minimize such delay. If compliance with such instructions shall cause the Contractor to incur extra costs and the Contractor is entitled to an extension of time under GCC 40.1, the amount of such extra costs shall be added to the Contract Price.

41. Suspension

- 41.1 The Employer may request the Project Manager, by notice to the Contractor, to order the Contractor to suspend performance of any or all of its obligations under the Contract. Such notice shall specify the obligation of which performance is to be suspended, the effective date of the suspension and the reasons therefor. The Contractor shall thereupon suspend performance of such obligation, except those obligations necessary for the care or preservation of the Facilities, until ordered in writing to resume such performance by the Project Manager.

If, by virtue of a suspension order given by the Project Manager, other than by reason of the Contractor's default or breach of the Contract, the Contractor's performance of any of its obligations is suspended for an aggregate period of more than 90 days, then at any time thereafter and provided that at that time such performance is still suspended, the Contractor may give a notice to the Project Manager requiring that the Employer shall, within 28 days of receipt of the notice, order the resumption of such performance or request and subsequently order a change in accordance with GCC Clause 39, excluding the performance of the suspended obligations from the Contract.

If the Employer fails to do so within such period, the Contractor may, by a further notice to the Project Manager, elect to treat the suspension, where it affects a part only of the Facilities, as a deletion of such part in accordance with GCC Clause 39 or, where it affects the whole of the Facilities, as termination of the Contract under GCC Subclause 42.1.

- 41.2 If
- (a) the Employer has failed to pay the Contractor any sum due under the Contract within the specified period, has failed to approve any invoice or supporting documents without just cause pursuant to the Appendix (Terms and Procedures of Payment) to the Contract Agreement, or commits a substantial breach of the Contract, the Contractor may give a notice to the Employer that requires payment of such sum, with interest thereon as stipulated in GCC Subclause 12.3, requires approval of such invoice or supporting documents, or specifies the breach and requires the Employer to remedy the same, as the case may be. If the Employer fails to pay such sum together with such interest, fails to approve such invoice or supporting documents or give its reasons for withholding such approval, or fails to remedy the breach or take steps to remedy the breach within 14 days after receipt of the Contractor's notice; or
 - (b) the Contractor is unable to carry out any of its obligations under the Contract for any reason attributable to the Employer, including but not limited to the Employer's failure to provide possession of or access to the Site or other areas in accordance with GCC Subclause 10.2, or failure to obtain any governmental permit

necessary for the execution and/or completion of the Facilities,
then the Contractor may by 14 days' notice to the Employer suspend performance of all or any of its obligations under the Contract, or reduce the rate of progress.

- 41.3 If the Contractor's performance of its obligations is suspended, or the rate of progress is reduced pursuant to this GCC Clause 41, then the Time for Completion shall be extended in accordance with GCC Subclause 40.1, and any and all additional costs or expenses incurred by the Contractor as a result of such suspension or reduction shall be paid by the Employer to the Contractor in addition to the Contract Price, except in the case of suspension order or reduction in the rate of progress by reason of the Contractor's default or breach of the Contract.
- 41.4 During the period of suspension, the Contractor shall not remove from the Site any Plant, any part of the Facilities or any Contractor's Equipment, without the prior written consent of the Employer.

42. Termination

42.1 Termination for Employer's Convenience

42.1.1 The Employer may at any time terminate the Contract for any reason by giving the Contractor a notice of termination that refers to this GCC Subclause 42.1.

42.1.2 Upon receipt of the notice of termination under GCC Subclause 42.1.1, the Contractor shall, either immediately or upon the date specified in the notice of termination,

- (a) cease all further work, except for such work as the Employer may specify in the notice of termination for the sole purpose of protecting that part of the Facilities already executed, or any work required to leave the Site in a clean and safe condition;
- (b) terminate all subcontracts, except those to be assigned to the Employer pursuant to paragraph (d) (ii) below;
- (c) remove all Contractor's Equipment from the Site, repatriate the Contractor's and its Subcontractors' personnel from the Site, remove from the Site any wreckage, rubbish and debris of any kind, and leave the whole of the Site in a clean and safe condition; and
- (d) subject to the payment specified in GCC Subclause 42.1.3,
 - (i) deliver to the Employer the parts of the Facilities executed by the Contractor up to the date of termination;
 - (ii) to the extent legally possible, assign to the Employer all right, title and benefit of the Contractor to the Facilities and to the Plant as of the date of termination, and, as may be required by the Employer, in any subcontracts concluded between the Contractor and its Subcontractors; and
 - (iii) deliver to the Employer all non-proprietary drawings, specifications and other documents prepared by the Contractor or its Subcontractors as at the date of

termination in connection with the Facilities.

42.1.3 In the event of termination of the Contract under GCC Subclause 42.1.1, the Employer shall pay to the Contractor the following amounts:

- (a) the Contract Price, properly attributable to the parts of the Facilities executed by the Contractor as of the date of termination;
- (b) the costs reasonably incurred by the Contractor in the removal of the Contractor's Equipment from the Site and in the repatriation of the Contractor's and its Subcontractors' personnel;
- (c) any amounts to be paid by the Contractor to its Subcontractors in connection with the termination of any subcontracts, including any cancellation charges;
- (d) costs incurred by the Contractor in protecting the Facilities and leaving the Site in a clean and safe condition pursuant to paragraph (a) of GCC Subclause 42.1.2; and
- (e) the cost of satisfying all other obligations, commitments and claims that the Contractor may in good faith have undertaken with third parties in connection with the Contract and that are not covered by paragraphs (a) through (d) above.

42.2 Termination for Contractor's Default

42.2.1 The Employer, without prejudice to any other rights or remedies it may possess, may terminate the Contract forthwith in the following circumstances by giving a notice of termination and its reasons therefor to the Contractor, referring to this GCC Subclause 42.2:

- (a) if the Contractor becomes bankrupt or insolvent, has a receiving order issued against it, compounds with its creditors, or, if the Contractor is a corporation, a resolution is passed or order is made for its winding up, other than a voluntary liquidation for the purposes of amalgamation or reconstruction, a receiver is appointed over any part of its undertaking or assets, or if the Contractor takes or suffers any other analogous action in consequence of debt;
- (b) if the Contractor assigns or transfers the Contract or any right or interest therein in violation of the provision of GCC Clause 43; and
- (c) if the Contractor, in the judgment of the Employer has engaged in corrupt or fraudulent practices, as defined in GCC Clause 6, in competing for or in executing the Contract.

42.2.2 If the Contractor

- (a) has abandoned or repudiated the Contract;
- (b) has without valid reason failed to commence work on the Facilities promptly or has suspended, other than pursuant to GCC Subclause 41.2, the progress of Contract performance for more than 28 days after receiving a written instruction from the Employer to proceed;
- (c) persistently fails to execute the Contract in accordance with the Contract or persistently neglects to carry out its obligations under the Contract without just cause;
- (d) refuses or is unable to provide sufficient materials, services or labor to execute and complete the Facilities in the manner specified in the program furnished under GCC Subclause 18.2 at rates of progress that give reasonable assurance to the Employer that the Contractor can attain Completion of the Facilities by the Time for Completion as extended;

then the Employer may, without prejudice to any other rights it may possess under the Contract, give a notice to the Contractor, stating the nature of the default and requiring the Contractor to remedy the same. If the Contractor fails to remedy or to take steps to remedy the same within 14 days of its receipt of such notice, then the Employer may terminate the Contract forthwith by giving a notice of termination to the Contractor that refers to this GCC Subclause 42.2.

42.2.3 Upon receipt of the notice of termination under GCC Sub-clauses 42.2.1 or 42.2.2, the Contractor shall, either immediately or upon such date as is specified in the notice of termination,

- (a) cease all further work, except for such work as the Employer may specify in the notice of termination for the sole purpose of protecting that part of the Facilities already executed, or any work required to leave the Site in a clean and safe condition;
- (b) terminate all subcontracts, except those to be assigned to the Employer pursuant to paragraph (d) below;
- (c) deliver to the Employer the parts of the Facilities executed by the Contractor up to the date of termination;
- (d) to the extent legally possible, assign to the Employer all right, title and benefit of the Contractor to the Facilities and to the Plant as of the date of termination, and, as may be required by the Employer, in any subcontracts concluded between the Contractor and its Subcontractors; and
- (e) deliver to the Employer all drawings, specifications and other documents prepared by the Contractor or its Subcontractors as of the date of termination in connection

with the Facilities.

- 42.2.4 The Employer may enter upon the Site, expel the Contractor, and complete the Facilities itself or by employing any third party. The Employer may, to the exclusion of any right of the Contractor over the same, take over and use with the payment of a fair rental rate to the Contractor, with all the maintenance costs to the account of the Employer and with an indemnification by the Employer for all liability including damage or injury to persons arising out of the Employer's use of such equipment, any Contractor's Equipment owned by the Contractor and on the Site in connection with the Facilities for such reasonable period as the Employer considers expedient for the supply and installation of the Facilities.

Upon completion of the Facilities or at such earlier date as the Employer thinks appropriate, the Employer shall give notice to the Contractor that such Contractor's Equipment will be returned to the Contractor at or near the Site and shall return such Contractor's Equipment to the Contractor in accordance with such notice. The Contractor shall thereafter without delay and at its cost remove or arrange removal of the same from the Site.

- 42.2.5 Subject to GCC Subclause 42.2.6, the Contractor shall be entitled to be paid the Contract Price attributable to the Facilities executed as of the date of termination, the value of any unused or partially used Plant on the Site, and the costs, if any, incurred in protecting the Facilities and in leaving the Site in a clean and safe condition pursuant to paragraph (a) of GCC Subclause 42.2.3. Any sums due the Employer from the Contractor accruing prior to the date of termination shall be deducted from the amount to be paid to the Contractor under this Contract.

- 42.2.6 If the Employer completes the Facilities, the cost of completing the Facilities by the Employer shall be determined.

If the sum that the Contractor is entitled to be paid, pursuant to GCC Subclause 42.2.5, plus the reasonable costs incurred by the Employer in completing the Facilities, exceeds the Contract Price, the Contractor shall be liable for such excess.

If such excess is greater than the sums due the Contractor under GCC Subclause 42.2.5, the Contractor shall pay the balance to the Employer, and if such excess is less than the sums due the Contractor under GCC Subclause 42.2.5, the Employer shall pay the balance to the Contractor.

The Employer and the Contractor shall agree, in writing, on the computation described above and the manner in which any sums shall be paid.

42.3 Termination by Contractor

42.3.1 If

- (a) the Employer has failed to pay the Contractor any sum due under the Contract within the specified period, has failed to approve any invoice or supporting documents without just cause pursuant to the Appendix (Terms and Procedures of Payment) to the Contract Agreement, or commits a substantial breach of the Contract, the Contractor may give a notice to the Employer that requires payment of such sum, with interest thereon as stipulated in GCC Subclause 12.3, requires approval of such invoice or supporting documents, or specifies the breach and requires the Employer to remedy the same, as the case may be. If the Employer fails to pay such sum together with such interest, fails to approve such invoice or supporting documents or give its reasons for withholding such approval, fails to remedy the breach or take steps to remedy the breach within 14 days after receipt of the Contractor's notice; or
- (b) the Contractor is unable to carry out any of its obligations under the Contract for any reason attributable to the Employer, including but not limited to the Employer's failure to provide possession of or access to the Site or other areas or failure to obtain any governmental permit necessary for the execution and/or completion of the Facilities;

then the Contractor may give a notice to the Employer thereof, and if the Employer has failed to pay the outstanding sum, to approve the invoice or supporting documents, to give its reasons for withholding such approval, or to remedy the breach within 28 days of such notice, or if the Contractor is still unable to carry out any of its obligations under the Contract for any reason attributable to the Employer within 28 days of the said notice, the Contractor may by a further notice to the Employer referring to this GCC Subclause 42.3.1, forthwith terminate the Contract.

42.3.2 The Contractor may terminate the Contract forthwith by giving a notice to the Employer to that effect, referring to this GCC Subclause 42.3.2, if the Employer becomes bankrupt or insolvent, has a receiving order issued against it, compounds with its creditors, or, being a corporation, if a resolution is passed or order is made for its winding up (other than a voluntary liquidation for the purposes of amalgamation or reconstruction), a receiver is appointed over any part of its undertaking or assets, or if the Employer takes or suffers any other analogous action in consequence of debt.

42.3.3 If the Contract is terminated under GCC Sub-clauses 42.3.1 or 42.3.2, then the Contractor shall immediately

- (a) cease all further work, except for such work as may be necessary for the purpose of protecting that part of the Facilities already executed, or any work required to leave the Site in a clean and safe condition;
- (b) terminate all subcontracts, except those to be assigned to the Employer pursuant to paragraph (d) (ii);
- (c) remove all Contractor's Equipment from the Site and repatriate the Contractor's and its Subcontractors'

personnel from the Site; and

- (d) subject to the payment specified in GCC Subclause 42.3.4,
 - (i) deliver to the Employer the parts of the Facilities executed by the Contractor up to the date of termination;
 - (ii) to the extent legally possible, assign to the Employer all right, title and benefit of the Contractor to the Facilities and to the Plant as of the date of termination, and, as may be required by the Employer, in any subcontracts concluded between the Contractor and its Subcontractors; and
 - (iii) deliver to the Employer all drawings, specifications and other documents prepared by the Contractor or its Subcontractors as of the date of termination in connection with the Facilities.

42.3.4 If the Contract is terminated under GCC Sub-clauses 42.3.1 or 42.3.2, the Employer shall pay to the Contractor all payments specified in GCC Subclause 42.1.3, and reasonable compensation for all loss, except for loss of profit, or damage sustained by the Contractor arising out of, in connection with or in consequence of such termination.

42.3.5 Termination by the Contractor pursuant to this GCC Subclause 42.3 is without prejudice to any other rights or remedies of the Contractor that may be exercised in lieu of or in addition to rights conferred by GCC Subclause 42.3.

42.4 In this GCC Clause 42, the expression "Facilities executed" shall include all work executed, Installation Services provided, and all Plant acquired, or subject to a legally binding obligation to purchase, by the Contractor and used or intended to be used for the purpose of the Facilities, up to and including the date of termination.

42.5 In this GCC Clause 42, in calculating any monies due from the Employer to the Contractor, account shall be taken of any sum previously paid by the Employer to the Contractor under the Contract, including any advance payment paid pursuant to the Appendix (Terms and Procedures of Payment) to the Contract Agreement.

43. Assignment

43.1 Neither the Employer nor the Contractor shall, without the express prior written consent of the other party which consent shall not be unreasonably withheld, assign to any third party the Contract or any part thereof, or any right, benefit, obligation or interest therein or thereunder, except that the Contractor shall be entitled to assign either absolutely or by way of charge any monies due and payable to it or that may become due and payable to it under the Contract.

I. Claims, Disputes, and Arbitration

44. Contractor's

44.1 If the Contractor considers himself to be entitled to any extension of the Time for Completion and/or any additional payment, under any Clause

Claims

of these Conditions or otherwise in connection with the Contract, the Contractor shall submit a notice to the Project Manager, describing the event or circumstance giving rise to the claim. The notice shall be given as soon as practicable, and not later than 28 days after the Contractor became aware, or should have become aware, of the event or circumstance.

If the Contractor fails to give notice of a claim within such period of 28 days, the Time for Completion shall not be extended, the Contractor shall not be entitled to additional payment, and the Employer shall be discharged from all liability in connection with the claim. Otherwise, the following provisions of this Subclause shall apply.

The Contractor shall also submit any other notices, which are required by the Contract, and supporting particulars for the claim, all as relevant to such event or circumstance.

The Contractor shall keep such contemporary records as may be necessary to substantiate any claim, either on the Site or at another location acceptable to the Project Manager. Without admitting the Employer's liability, the Project Manager may, after receiving any notice under this Subclause, monitor the record keeping and/or instruct the Contractor to keep further contemporary records. The Contractor shall permit the Project Manager to inspect all these records, and shall (if instructed) submit copies to the Project Manager.

Within 42 days after the Contractor became aware (or should have become aware) of the event or circumstance giving rise to the claim, or within such other period as may be proposed by the Contractor and approved by the Project Manager, the Contractor shall send to the Project Manager a fully detailed claim, which includes full supporting particulars of the basis of the claim and of the extension of time and/or additional payment claimed. If the event or circumstance giving rise to the claim has a continuing effect,

- (a) this fully detailed claim shall be considered as interim;
- (b) the Contractor shall send further interim claims at monthly intervals, giving the accumulated delay and/or amount claimed, and such further particulars as the Project Manager may reasonably require; and
- (c) the Contractor shall send a final claim within 28 days after the end of the effects resulting from the event or circumstance, or within such other period as may be proposed by the Contractor and approved by the Project Manager.

Within 42 days after receiving a claim or any further particulars supporting a previous claim, or within such other period as may be proposed by the Project Manager and approved by the Contractor, the Project Manager shall respond with approval, or with disapproval and detailed comments. He may also request any necessary further particulars, but shall nevertheless give his response on the principles of the claim within such time.

Each payment certificate shall include such amounts for any claim as have been reasonably substantiated as due under the relevant provision of the Contract. Unless and until the particulars supplied are sufficient to substantiate the whole of the claim, the Contractor shall only be entitled to payment for such part of the claim as he has been able to substantiate.

The Project Manager shall agree with the Contractor or estimate: (i) the extension (if any) of the Time for Completion (before or after its expiry) in accordance with GCC Clause 40, and/or (ii) the additional payment (if any) to which the Contractor is entitled under the Contract.

The requirements of this Subclause are in addition to those of any other Subclause, which may apply to a claim. If the Contractor fails to comply with this or another Subclause in relation to any claim, any extension of time and/or additional payment shall take account of the extent (if any) to which the failure has prevented or prejudiced proper investigation of the claim, unless the claim is excluded under the second paragraph of this Subclause.

In the event that the Contractor and the Employer cannot agree on any matter relating to a claim, either party may refer the matter to the Dispute Board pursuant to GCC 45 hereof.

45. Disputes and Arbitration

45.1 Appointment of the Dispute Board

Disputes shall be referred to a Dispute Board for decision in accordance with GCC Subclause 45.3. The Parties shall appoint a Dispute Board by the date stated in the SCC.

The Dispute Board shall comprise, as stated in the SCC, either one or three suitably qualified persons ("the members"), each of whom shall be fluent in the language for communication defined in the Contract and shall be a professional experienced in the type of activities involved in the performance of the Contract and with the interpretation of contractual documents. If the number is not so stated and the Parties do not agree otherwise, the Dispute Board shall comprise three persons, one of whom shall serve as chairman.

If the Parties have not jointly appointed the Dispute Board 21 days before the date stated in the SCC and the Dispute Board is to comprise three persons, each Party shall nominate one member for the approval of the other Party. The first two members shall recommend and the Parties shall agree upon the third member, who shall act as chairman.

However, if a list of potential members is included in the SCC, the members shall be selected from those on the list, other than anyone who is unable or unwilling to accept appointment to the Dispute Board.

The agreement between the Parties and either the sole member or each of the three members shall incorporate by reference the General Conditions of Dispute Board Agreement contained in the Appendix to these General Conditions, with such amendments as are agreed

between them.

The terms of the remuneration of either the sole member or each of the three members, including the remuneration of any expert whom the Dispute Board consults, shall be mutually agreed upon by the Parties when agreeing the terms of appointment of the member or such expert (as the case may be). Each Party shall be responsible for paying one-half of this remuneration.

If a member declines to act or is unable to act as a result of death, disability, resignation or termination of appointment, a replacement shall be appointed in the same manner as the replaced person was required to have been nominated or agreed upon, as described in this Subclause.

The appointment of any member may be terminated by mutual agreement of both Parties, but not by the Employer or the Contractor acting alone. Unless otherwise agreed by both Parties, the appointment of the Dispute Board (including each member) shall expire when the Operational Acceptance Certificate has been issued in accordance with GCC Clause 25.3.

45.2 Failure to Agree Dispute Board

If any of the following conditions apply, namely:

- (a) the Parties fail to agree upon the appointment of the sole member of the Dispute Board by the date stated in the first paragraph of GCC Subclause 45.1;
- (b) either Party fails to nominate a member (for approval by the other Party) of a Dispute Board of three persons by such date;
- (c) the Parties fail to agree upon the appointment of the third member (to act as chairman) of the Dispute Board by such date; or
- (d) the Parties fail to agree upon the appointment of a replacement person within 42 days after the date on which the sole member or one of the three members declines to act or is unable to act as a result of death, disability, resignation, or termination of appointment;

then the appointing entity or official named in the SCC shall, upon the request of either or both of the Parties and after due consultation with both Parties, appoint this member of the Dispute Board. This appointment shall be final and conclusive. Each Party shall be responsible for paying one-half of the remuneration of the appointing entity or official.

45.3 Obtaining Dispute Board's Decision

If a dispute (of any kind whatsoever) arises between the Parties in connection with the performance of the Contract, including any dispute as to any certificate, determination, instruction, opinion or valuation of the Project Manager, either Party may refer the dispute in writing to the Dispute Board for its decision, with copies to the other Party and the

Project Manager. Such reference shall state that it is given under this Subclause.

For a Dispute Board of three persons, the Dispute Board shall be deemed to have received such reference on the date when it is received by the chairman of the Dispute Board.

Both Parties shall promptly make available to the Dispute Board all such additional information, further access to the Site, and appropriate facilities, as the Dispute Board may require for the purposes of making a decision on such dispute. The Dispute Board shall be deemed to be not acting as arbitrator(s).

Within 84 days after receiving such reference, or within such other period as may be proposed by the Dispute Board and approved by both Parties, the Dispute Board shall give its decision, which shall be reasoned and shall state that it is given under this Subclause. The decision shall be binding on both Parties, who shall promptly give effect to it unless and until it shall be revised in an amicable settlement or an arbitral award as described below. Unless the Contract has already been abandoned, repudiated or terminated, the Contractor shall continue to proceed with the performance of the Facilities in accordance with the Contract.

If either Party is dissatisfied with the Dispute Board's decision, then either Party may, within 28 days after receiving the decision, give notice to the other Party of its dissatisfaction and intention to commence arbitration. If the Dispute Board fails to give its decision within the period of 84 days (or as otherwise approved) after receiving such reference, then either Party may, within 28 days after this period has expired, give notice to the other Party of its dissatisfaction and intention to commence arbitration.

In either event, this notice of dissatisfaction shall state that it is given under this Subclause, and shall set out the matter in dispute and the reason(s) for dissatisfaction. Except as stated in GCC Subclauses 45.6 and 45.7, neither Party shall be entitled to commence arbitration of a dispute unless a notice of dissatisfaction has been given in accordance with this Subclause.

If the Dispute Board has given its decision as to a matter in dispute to both Parties, and no notice of dissatisfaction has been given by either Party within 28 days after it received the Dispute Board's decision, then the decision shall become final and binding upon both Parties.

45.4 Amicable Settlement

Where notice of dissatisfaction has been given under GCC Subclause 45.3 above, both Parties shall attempt to settle the dispute amicably before the commencement of arbitration. However, unless both Parties agree otherwise, arbitration may be commenced on or after the fifty-sixth day after the day on which notice of dissatisfaction and intention to commence arbitration was given, even if no attempt at amicable settlement has been made.

45.5 Arbitration

Unless settled amicably, any dispute in respect of which the Dispute Board's decision (if any) has not become final and binding shall be finally settled by international arbitration. Unless otherwise agreed by both Parties,

- (a) arbitration proceedings shall be conducted as stated in the Special Conditions;
- (b) if no arbitration proceedings is so stated, the dispute shall be finally settled by institutional arbitration under the Rules of Arbitration of the International Chamber of Commerce;
- (c) the dispute shall be settled by three arbitrators; and
- (d) the arbitration shall be conducted in the language for communications defined in GCC Subclause 5.3.

The arbitrator(s) shall have full power to open up, review and revise any certificate, determination, instruction, opinion or valuation of the Project Manager, and any decision of the Dispute Board, relevant to the dispute. Nothing shall disqualify the Project Manager from being called as a witness and giving evidence before the arbitrator(s) on any matter whatsoever relevant to the dispute.

Neither Party shall be limited in the proceedings before the arbitrator(s) to the evidence or arguments previously put before the Dispute Board to obtain its decision, or to the reasons for dissatisfaction given in its notice of dissatisfaction. Any decision of the Dispute Board shall be admissible in evidence in the arbitration.

Arbitration may be commenced prior to or after completion of the Works. The obligations of the Parties, the Project Manager and the Dispute Board shall not be altered by reason of any arbitration being conducted during the progress of the Works.

45.6 Failure to Comply with Dispute Board's Decision

In the event that a Party fails to comply with a Dispute Board decision which has become final and binding, then the other Party may, without prejudice to any other rights it may have, refer the failure itself to arbitration under GCC Subclause 45.5. GCC Subclauses 45.3 and 45.4 shall not apply to this reference.

45.7 Expiry of Dispute Board's Appointment

If a dispute arises between the Parties in connection with the performance of the Contract, and there is no Dispute Board in place, whether by reason of the expiry of the Dispute Board's appointment or otherwise,

- (a) GCC Subclauses 45.3 and 45.4 shall not apply, and
- (b) the dispute may be referred directly to arbitration under GCC Subclause 45.5.

APPENDIX A

General Conditions of Dispute Board Agreement

1 Definitions

Each "Dispute Board Agreement" is a tripartite agreement by and between

- (a) the "Employer";
- (b) the "Contractor"; and
- (c) the "Member" who is defined in the Dispute Board Agreement as being
 - (i) the sole member of the "Dispute Board" and, where this is the case, all references to the "Other Members" do not apply; or
 - (ii) one of the three persons who are jointly called the "Dispute Board" and, where this is the case, the other two persons are called the "Other Members".

The Employer and the Contractor have entered (or intend to enter) into a contract, which is called the "Contract" and is defined in the Dispute Board Agreement, which incorporates this Appendix. In the Dispute Board Agreement, words and expressions which are not otherwise defined shall have the meanings assigned to them in the Contract.

2 General Provisions

Unless otherwise stated in the Dispute Board Agreement, it shall take effect on the latest of the following dates:

- (a) the Commencement Date defined in the Contract;
- (b) when the Employer, the Contractor and the Member have each signed the Dispute Board Agreement; or
- (c) when the Employer, the Contractor and each of the Other Members (if any) have respectively each signed a dispute board agreement.

This employment of the Member is a personal appointment. At any time, the Member may give not less than 70 days' notice of resignation to the Employer and to the Contractor, and the Dispute Board Agreement shall terminate upon the expiry of this period.

3 Warranties

The Member warrants and agrees that he/she is and shall be impartial and independent of the Employer, the Contractor and the Project Manager. The Member shall promptly disclose, to each of them and to the Other Members (if any), any fact or circumstance which might appear inconsistent with his/her warranty and agreement of impartiality and independence.

When appointing the Member, the Employer and the Contractor relied upon the Member's representations that he/she is

- (a) experienced in the work, which the Contractor is to carry out under the Contract,
- (b) experienced in the interpretation of contract documentation, and
- (c) fluent in the language for communications defined in the Contract.

4 General Obligations of the Member

The Member shall

- (a) have no interest financial or otherwise in the Employer, the Contractor or the Project Manager, nor any financial interest in the Contract except for payment under the Dispute Board Agreement;
- (b) not previously have been employed as a consultant or otherwise by the Employer, the Contractor, or the Project Manager, except in such circumstances as were disclosed in writing to the Employer and the Contractor before they signed the Dispute Board Agreement;
- (c) have disclosed in writing to the Employer, the Contractor, and the Other Members (if any), before entering into the Dispute Board Agreement and to his/her best knowledge and recollection, any professional or personal relationships with any director, officer, or employee of the Employer, the Contractor, or the Project Manager, and any previous involvement in the overall project of which the Contract forms part;
- (d) not, for the duration of the Dispute Board Agreement, be employed as a consultant or otherwise by the Employer, the Contractor, or the Project Manager, except as may be agreed in writing by the Employer, the Contractor, and the Other Members (if any);
- (e) comply with the annexed procedural rules and with GCC Subclause 45.3;
- (f) not give advice to the Employer, the Contractor, the Employer's Personnel, or the Contractor's Personnel concerning the conduct of the Contract, other than in accordance with the annexed procedural rules;
- (g) not while a Member enter into discussions or make any agreement with the Employer, the Contractor, or the Project Manager regarding employment by any of them, whether as a consultant or otherwise, after ceasing to act under the Dispute Board Agreement;
- (h) ensure his/her availability for all site visits and hearings as are necessary;
- (i) become conversant with the Contract and with the progress of the Facilities (and of any other parts of the project of which the Contract forms part) by studying all documents received, which shall be maintained in a current working file;
- (j) treat the details of the Contract and all the Dispute Board's activities and hearings as private and confidential, and not publish or disclose them without the prior written consent of the Employer, the Contractor, and the Other Members (if any); and
- (k) be available to give advice and opinions on any matter relevant to the Contract when requested by both the Employer and the Contractor, subject to the agreement of the Other Members (if any).

5 General Obligations of the Employer and the Contractor

The Employer, the Contractor, the Employer's Personnel and the Contractor's Personnel shall not request advice from or consultation with the Member regarding the Contract, otherwise than in the normal course of the Dispute Board's activities under the Contract and the Dispute Board Agreement. The Employer and the Contractor shall be responsible for compliance with this provision, by the Employer's Personnel and the Contractor's Personnel respectively.

The Employer and the Contractor undertake to each other and to the Member that the Member shall not, except as otherwise agreed in writing by the Employer, the Contractor, the Member and the Other Members (if any)

- (a) be appointed as an arbitrator in any arbitration under the Contract;
- (b) be called as a witness to give evidence concerning any dispute before arbitrator(s) appointed for any arbitration under the Contract; or
- (c) be liable for any claims for anything done or omitted in the discharge or purported discharge of the Member's functions, unless the act or omission is shown to have been in bad faith.

The Employer and the Contractor hereby jointly and severally indemnify and hold the Member harmless against and from claims from which he is relieved from liability under the preceding paragraph.

Whenever the Employer or the Contractor refers a dispute to the Dispute Board under GCC Subclause 45.3, which will require the Member to make a site visit and attend a hearing, the Employer or the Contractor shall provide appropriate security for a sum equivalent to the reasonable expenses to be incurred by the Member. No account shall be taken of any other payments due or paid to the Member.

6 Payment

The Member shall be paid as follows, in the currency named in the Dispute Board Agreement:

- (a) a retainer fee per calendar month, which shall be considered as payment in full for
 - (i) being available on 28 days' notice for all site visits and hearings;
 - (ii) becoming and remaining conversant with all project developments and maintaining relevant files;
 - (iii) all office and overhead expenses including secretarial services, photocopying and office supplies incurred in connection with his duties; and
 - (iv) all services performed hereunder except those referred to in sub-paragraphs (b) and (c) of this Clause.

The retainer fee shall be paid with effect from the last day of the calendar month in which the Dispute Board Agreement becomes effective; until the last day of the calendar month in which the Taking-Over Certificate is issued for the whole of the Works.

With effect from the first day of the calendar month following the month in which Taking-Over Certificate is issued for the whole of the Works, the retainer fee shall be reduced by one-third. This reduced fee shall be paid until the first day of the calendar month in which the Member resigns or the Dispute Board Agreement is otherwise terminated.

- (b) a daily fee, which shall be considered as payment in full for
 - (i) each day or part of a day up to a maximum of 2 days' travel time in each direction for the journey between the Member's home and the site, or another location of a meeting with the Other Members (if any);
 - (ii) each working day on site visits, hearings, or preparing decisions; and
 - (iii) each day spent reading submissions in preparation for a hearing.
- (c) all reasonable expenses, including necessary travel expenses (air fare in less than first class, hotel and subsistence and other direct travel expenses) incurred in connection with the Member's duties, as well as the cost of telephone calls, courier charges, facsimiles, and telexes, and use of the internet: a receipt shall be required for each item in excess of 5% of the daily fee referred to in sub-paragraph (b) of this Clause;
- (d) any taxes properly levied in the Country on payments made to the Member (unless a national or permanent resident of the Country) under this Clause 6.

The retainer and daily fees shall be as specified in the Dispute Board Agreement. Unless it specifies otherwise, these fees shall remain fixed for the first 24 calendar months, and shall thereafter be adjusted by agreement between the Employer, the Contractor and the Member, at each anniversary of the date on which the Dispute Board Agreement became effective.

If the parties fail to agree on the retainer fee or the daily fee, the appointing entity or official named in the SCC shall determine the amount of the fees to be used.

The Member shall submit invoices for payment of the monthly retainer and air fares quarterly in advance. Invoices for other expenses and for daily fees shall be submitted following the conclusion of a site visit or hearing. All invoices shall be accompanied by a brief description of activities performed during the relevant period and shall be addressed to the Contractor.

The Contractor shall pay each of the Member's invoices in full within 56 calendar days after receiving each invoice and shall apply to the Employer (in the Statements under the Contract) for reimbursement of one-half of the amounts of these invoices. The Employer shall then pay the Contractor in accordance with the Contract.

If the Contractor fails to pay to the Member the amount to which he/she is entitled under the Dispute Board Agreement, the Employer shall pay the amount due to the Member and any other amount which may be required to maintain the operation of the Dispute Board; and without prejudice to the Employer's rights or remedies. In addition to all other rights arising from this default, the Employer shall be entitled to reimbursement of all sums paid in excess of one-half of these payments, plus all costs of recovering these sums and financing charges calculated at the rate specified in accordance with GCC Subclause 12.3.

If the Member does not receive payment of the amount due within 70 days after submitting a valid invoice, the Member may (i) suspend his/her services (without notice) until the

payment is received, and/or (ii) resign his/her appointment by giving notice under Clause 7.

7 Termination

At any time: (i) the Employer and the Contractor may jointly terminate the Dispute Board Agreement by giving 42 days' notice to the Member, or (ii) the Member may resign as provided for in Clause 2.

If the Member fails to comply with the Dispute Board Agreement, the Employer and the Contractor may, without prejudice to their other rights, terminate it by notice to the Member. The notice shall take effect when received by the Member.

If the Employer or the Contractor fails to comply with the Dispute Board Agreement, the Member may, without prejudice to his other rights, terminate it by notice to the Employer and the Contractor. The notice shall take effect when received by them both.

Any such notice, resignation and termination shall be final and binding on the Employer, the Contractor and the Member. However, a notice by the Employer or the Contractor, but not by both, shall be of no effect.

8 Default of the Member

If the Member fails to comply with any of his obligations under Clause 4 concerning his impartiality or independence in relation to the Employer or the Contractor, he/she shall not be entitled to any fees or expenses hereunder and shall, without prejudice to their other rights, reimburse each of the Employer and the Contractor for any fees and expenses received by the Member and the Other Members (if any), for proceedings or decisions (if any) of the Dispute Board which are rendered void or ineffective by the said failure to comply.

9 Disputes

Any dispute or claim arising out of or in connection with this Dispute Board Agreement, or the breach, termination or invalidity thereof, shall be finally settled by institutional arbitration. If no other arbitration institute is agreed, the arbitration shall be conducted under the Rules of Arbitration of the International Chamber of Commerce by one arbitrator appointed in accordance with these Rules of Arbitration.

Annex - DISPUTE BOARD GUIDELINES

1. Unless otherwise agreed by the Employer and the Contractor, the Dispute Board shall visit the site at intervals of not more than 140 days, including times of critical construction events, at the request of either the Employer or the Contractor. Unless otherwise agreed by the Employer, the Contractor, and the Dispute Board, the period between consecutive visits shall not be less than 70 days, except as required to convene a hearing as described below.
2. The timing of and agenda for each site visit shall be as agreed jointly by the Dispute Board, the Employer, and the Contractor, or in the absence of agreement, shall be decided by the Dispute Board. The purpose of site visits is to enable the Dispute Board to become and remain acquainted with the progress of the Works and of any actual or potential problems or claims, and, as far as reasonable, to prevent potential problems or claims from becoming disputes.
3. Site visits shall be attended by the Employer, the Contractor, and the Project Manager and shall be coordinated by the Employer in cooperation with the Contractor. The Employer shall ensure the provision of appropriate conference facilities and secretarial and copying services. At the conclusion of each site visit and before leaving the site, the Dispute Board shall prepare a report on its activities during the visit and shall send copies to the Employer and the Contractor.
4. The Employer and the Contractor shall furnish to the Dispute Board one copy of all documents which the Dispute Board may request, including Contract documents, progress reports, variation instructions, certificates, and other documents pertinent to the performance of the Contract. All communications between the Dispute Board and the Employer or the Contractor shall be copied to the other Party. If the Dispute Board comprises three persons, the Employer and the Contractor shall send copies of these requested documents and these communications to each of these persons.
5. If any dispute is referred to the Dispute Board in accordance with GCC Subclause 45.3, the Dispute Board shall proceed in accordance with GCC Subclause 45.3 and these Guidelines. Subject to the time allowed to give notice of a decision and other relevant factors, the Dispute Board shall
 - (a) act fairly and impartially as between the Employer and the Contractor, giving each of them a reasonable opportunity of putting his case and responding to the other's case; and
 - (b) adopt procedures suitable to the dispute, avoiding unnecessary delay or expense.
6. The Dispute Board may conduct a hearing on the dispute, in which event it will decide on the date and place for the hearing and may request that written documentation and arguments from the Employer and the Contractor be presented to it prior to or at the hearing.
7. Except as otherwise agreed in writing by the Employer and the Contractor, the Dispute Board shall have power to adopt an inquisitorial procedure, to refuse admission to hearings or audience at hearings to any persons other than representatives of the Employer, the Contractor, and the Project Manager, and to proceed in the absence of any party who the Dispute Board is satisfied received notice of the hearing; but shall have discretion to decide whether and to what extent this power may be exercised.
8. The Employer and the Contractor empower the Dispute Board, among other things, to

- (a) establish the procedure to be applied in deciding a dispute;
 - (b) decide upon the Dispute Board's own jurisdiction, and as to the scope of any dispute referred to it;
 - (c) conduct any hearing as it thinks fit, not being bound by any rules or procedures other than those contained in the Contract and these Guidelines;
 - (d) take the initiative in ascertaining the facts and matters required for a decision;
 - (e) make use of its own specialist knowledge, if any;
 - (f) decide upon the payment of financing charges in accordance with the Contract;
 - (g) decide upon any provisional relief such as interim or conservatory measures;
 - (h) open up, review and revise any certificate, decision, determination, instruction, opinion or valuation of the Project Manager, relevant to the dispute; and
 - (i) appoint, should the Dispute Board so consider necessary and the Parties agree, a suitable expert at the cost of the Parties to give advice on a specific matter relevant to the dispute.
9. The Dispute Board shall not express any opinions during any hearing concerning the merits of any arguments advanced by the Parties. Thereafter, the Dispute Board shall make and give its decision in accordance with GCC Subclause 45.3, or as otherwise agreed by the Employer and the Contractor in writing. If the Dispute Board comprises three persons
- (a) it shall convene in private after a hearing, in order to have discussions and prepare its decision;
 - (b) it shall endeavour to reach a unanimous decision: if this proves impossible the applicable decision shall be made by a majority of the Members, who may require the minority Member to prepare a written report for submission to the Employer and the Contractor; and
 - (c) if a Member fails to attend a meeting or hearing, or to fulfil any required function, the other two Members may nevertheless proceed to make a decision, unless
 - (i) either the Employer or the Contractor does not agree that they do so, or
 - (ii) the absent Member is the chairman and he/she instructs the other Members to not make a decision.



Procurement of Works

JAIPUR METRO RAIL CORPORATION LIMITED

BIDDING DOCUMENT

for

Procurement on International Competitive Bidding Mode

of

ICB No.- JP/JS 21 (Phase-1B)

**DESIGN, MANUFACTURE, SUPPLY, INSTALLATION, TESTING &
COMMISSIONING OF AUTOMATIC FARE COLLECTION SYSTEM
FOR JMRC PHASE 1B**

PART - III CONDITIONS OF CONTRACT AND CONTRACT FORMS

Section 8 – Special Conditions of Contractors (SCC)

**3rd Floor, RAJSICO Building, Udhog Bhawan, Tilak Marg,
C- Scheme, Jaipur (Rajasthan) PIN-302005
Country: India**

Section 8 - Special Conditions of Contract

The following Special Conditions of Contract (SCC) shall supplement the General Conditions of Contract (GCC). Whenever there is a conflict, the provisions herein shall prevail over those in the GCC. The clause number of the SCC is the corresponding clause number of the GCC.

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1.	Sub Clause 1.1	<p>Definitions</p> <p>The Employer is: Jaipur Metro Rail Corporation (JMRC) and its legal successors or permitted assigns.</p> <p>The Project Manager is: Authorized Officer of DMRC</p> <p>The Bank is : Asian Development Bank</p> <p>Country of Origin: As per list of Eligible countries defined in section-5</p>
2.	Sub Clause 5.1	<p>Law and Language</p> <p>The Contract shall be interpreted in accordance with the laws of Republic of India</p>
	Sub Clause 5.2	<p>The ruling language is English</p>
	Sub Clause 5.3	<p>The language for communications is English</p>
3.	Sub Clause 7.3	<p>Scope of Facilities</p> <p>(a) The Contractor shall submit along with the tender a schedule of spare parts duly indicating, for each item of spares, its description, part number, lead time, shelf life and number of units required for the system during the first ten years, principal as well as secondary sources of supply. The Contractor/Tenderer shall submit the above list duly unit priced with escalation/de-escalation formula in the Package as part of Schedule no. 6 (a), Section 4- Bidding Forms. This price will not be used for bid evaluation.</p> <p>(b) The Employer may, during a period of ten years from the date of taking over of the whole works, purchase as many parts as required by him, at the rates indicated in this schedule.</p> <p>(c) If during the period of ten years, the Contractor intends to discontinue the manufacture of spare or replacement parts for the Telecommunication/AFC systems, the Contractor shall immediately give notice to the Employer of such intention. The Employer shall be given the opportunity of ordering at reasonable prices such quantities of such spare or replacement parts as the Employer requires in relation to the anticipated life of the equipment.</p> <p>In the event of Contractor failing to supply the spare parts in accordance with this Clause, he shall in respect of each item of spare, furnish free of cost to the Employer, the</p>

		<p>drawings, specifications, patterns and other information to enable the Employer to make or have made such spare parts. The Employer shall be entitled to retain the aforesaid drawings etc., for such time only as is necessary for the exercise by the Employer of his rights under this clause and the drawings, if the Contractor so requires, shall be returned by the Employer to the Contractor in good order and condition (fair wear and tear excepted).</p> <p>Under such circumstances, the Contractor shall also grant to the Employer, without payment of any royalty or charge, full right and</p> <p>liberty to make or have made spare or replacement parts as aforesaid and for such purposes only to use, make and have made copies of all drawings, patterns, specifications and other information supplied by the Contractor to the Employer pursuant to the Contract.</p> <p>(d) The Contractor will so far as it is reasonably able to bind his sub-contractors to conform with the requirements of this Clause and shall, prior to entry into any sub-contracts, provide the Employer with full details of any sub-contractor who will not so conform in which event the Employer may direct the Contractor to seek an alternative sub-contractor.</p> <p>If the Contractor fails to provide spare or replacement parts as described in this Sub-clause and these are available from the Contractor's sub-contractor, the Employer shall have the right to obtain such spare and replacement parts from the sub-contractor or any other supplier and any additional cost incurred by the Employer shall be recoverable from the Contractor.</p> <p>(e) The foregoing shall hold equally good for the Contractor, any or all of his sub-contractors and vendors.</p> <p>(f) The Employer may require the Contractor to enter into a Maintenance Contract with the Employer for the System / Machine provided under the Contract under terms and conditions to be mutually agreed.</p> <p>(g) The contractor shall furnish a bank guarantee from an Indian nationalized bank for an amount equivalent to ten percent of cost of spares (without escalation/de-escalation) required for maintenance of AFC system during a period of ten years. This guarantee will be in a form similar to performance security and is to be submitted at the time of issue of Performance Certificate. The submission of this guarantee will be one of the conditions precedent to the release of Performance Security.</p>
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4.	Sub Clause 8.1	<p>Time for Commencement</p> <p>The Contractor shall commence work on the Facilities on the date specified in the Letter of Acceptance or if no date is specified in the Letter of Acceptance, on the date specified in an instruction in writing to that effect from the Project Manager (Notice to Proceed).</p> <p>Thereafter the Contractor shall proceed with due diligence, without delay, and in accordance with the programme or any revised or modified programme of the Works. Time will be the essence of Contract and time for Completion shall run from the date the Contractor is to commence the Works under this Clause.</p> <p>The Contractor shall not commence the construction, manufacture or installation of the Works or of any part of the Works unless and until the Project Manager has endorsed the relevant Working Drawings in accordance with the Employer's Requirements.</p>
5.	Sub Clause 8.2	<p>Time for Completion</p> <p>The Time for Completion of the whole of the Facilities shall be as per Key dates defined in Appendix 4 of Section 9-Contract Forms.</p> <p>The Access Dates shown in the Employer's Requirements are for planning purposes only.</p> <p>The Employer reserves the right to make each site available to the Contractor any time during the period from 60 days before to 90 days after the Access Dates. The Project Manager will notify the Contractor of the actual Access Dates at least 30 days in advance for each part of the works. This Notice will specify the area to which it refers is accessible and in a sufficient state of completion to permit the Contractor to begin installation and testing therein. It shall not imply that the Contractor will enjoy exclusive use of the area or that the work of other Contractor's therein is complete. The Contractor shall begin installation in each area by the actual Access Date, and shall complete all installation and testing in each area by the relevant Key Date.</p> <p>Notwithstanding the actual Access Date, whether before or after the stipulated Access Dates, the Employer shall not accept any increase in cost to the Employer.</p>

6.	Sub Clause 9.8	<p>Protection of the Environment</p> <p>The contractor shall refer SHE Manual (part of Employer's Requirements) for all such activities.</p>
7.	Sub Clause 11.1	<p>Contract Price</p> <p>The Contract Price shall be specified in Article 2 (Contract Price and Terms of Payment) of the Contract Agreement as given in Section 9.</p> <p>The rates and prices quoted in the Bill of Quantities shall be quoted separately in the following currencies:</p> <ul style="list-style-type: none"> a) For inputs to the Works, which are expected to be supplied from within India, in Indian Rupees. b) For those inputs to the works, which are expected to be supplied from outside India, in foreign currencies. <p>The Contract Price shall not be adjusted on account of fluctuations in the rates of exchange between the foreign currencies of the Contract and Indian Rupees.</p> <p>The bidder is required to note the following while quoting his prices:</p> <p>As this project is funded by the Asian Development Bank (ADB), the project is governed by the following exemptions.</p> <p>A. Custom Duty</p> <ul style="list-style-type: none"> a. The project is eligible for exemption of custom duty as per notification no. 84/97 – customs dated 11.11.1997, as amended by notification no. 85/99 cus. Dated 6.7.1999 and no. 119/99-cus. Dated 2.11.1999 and notification no. 75/2001 dated 01-07-01 and notification no. 107/2001-cus. Dated 12.10.2001. (Subject to the GST notifications, only for the part which is not subsumed in the GST) <p>Note : 1. Amendments to above notification, if any, up to the date 28 days prior to the deadline for submission of bids shall also be deemed to be taken into consideration in the Contract Price. The copy of above notification is attached as Annexure- I to the SCC.</p> <p>Note: 2 In addition to above exemptions (Custom duty) if any other exemptions which are available to the Contractor by virtue of any notification of Government/ Local Bodies existing as on 28 days prior to the submission of the bids, may be availed by the contract and JMRC will assist wherever it is required to in respect of any permission, certificate</p>

		<p>from the government and issue the necessary documents.</p> <p>B. Bid Evaluation:-</p> <ol style="list-style-type: none"> 1. The Bidders shall quote fix lump sum price or as per BOQ price (as the case may be) inclusive of taxes, levies, duties, cess, freight, insurance and all other incidental charges except GST required to fulfill the contract requirements including statutory deduction viz., TDS towards income Tax/GST etc. except the exemptions stated in Clause A above to the extent the same are applicable and available. 2. However, any new taxes/duties or any statutory variation in the existing taxes/duties applicable to the JMRC project during the contractual completion shall be to the employers account i.e. reduction is to be passed on to the employer and increase to be reimbursed by the employer. The contractor shall furnish the documentary evidence in support of their claims for reimbursement from JMRC. However, any increase in cost due to new taxes/duties or any statutory variation in the existing taxes/duties applicable to the JMRC project during extended contractual period due to contractors fault shall be to contractor account, whereas any decrease in the taxes/duties shall be employers account. <p>C.</p> <p>Taxes and duties paid to the sub-vendors shall not be paid separately and therefore are to be included in the price.</p>
	Sub Clause 11.2	No price escalation shall be provided.
8.	Sub Clause 12.1	<p>Terms of Payment</p> <p>The fixed Lump Sum Price shall be apportioned by the Contractor amongst the various Cost Centers in accordance with Form MIS of Section-4 (Bidding Form), wherever applicable. The amount thus apportioned under each Cost Centre will be further apportioned amongst various Milestones with the approval of the Employer. The Contractor shall be entitled to submit to the Project Manager requests for interim payments only upon the achievement of one or more of the Milestones described in the Cost Centre.</p> <p>At the beginning of each month, the Project Manager shall issue to the Contractor certificate in respect of each Milestone</p>

		<p>due to be achieved in the preceding month stating:</p> <ul style="list-style-type: none"> (a) the date on which the Milestone was achieved; or (b) the non-achievement of the Milestone. <p>The Contractor shall submit a statement in three copies to the Project Manager at the beginning of each month, in a form approved by the Project Manager, showing the amounts to which the Contractor is entitled, together with supporting documents, including Milestone Certificates. The statement shall include the following items, as applicable, which shall be expressed in the various currencies in which the Contract Price is payable, in the sequence listed:</p> <ul style="list-style-type: none"> a) the amount due in respect of Milestones certified achieved by the Project Manager under each Cost Centre; b) any amounts to be added and deducted for the advance payments and recovery thereof; c) any other additions or deductions is due and approved by the Project Manager in accordance with the Contract; and d) the deduction of the amounts certified in all previous Interim Payment Certificates. <p>The Contractor shall not submit more than one request for interim payment per month.</p> <p>If any Milestone is not achieved by the end of the month in which it is scheduled to be achieved, the Project Manager shall suspend the payment relating to the Cost Centre in which the Milestone is included.</p> <p>Payments suspended under this Clause shall be resumed by being included in the next application for interim payment made after the Milestone is achieved.</p>
		<p>A. Payment- Interim and Final</p> <ul style="list-style-type: none"> (a) After preliminary scrutiny and certification by the Engineer, payment of 80% of the certified interim amount shall be made by the Employer within 14 days. The amount certified shall account for all deductions, including statutory deductions, recoveries for advances and any amounts due from the Contractor. The balance 20% shall be paid within 28 days, from the date of the preliminary certification of the bill by the Engineer. (b) Next 80% interim payment shall be made only after 100%

		<p>payment of preceding interim payment certified has been completed.</p> <p>(c) the Employer shall pay the amount certified in the Final Payment Certificate within 56 days from the date of issue of the Certificate.</p> <p>Payments shall be made into a bank account, nominated by the Contractor in Indian rupees in a bank in India unless otherwise permitted in Special Conditions of Contract. If payments are to be made in more than one currency, separate bank accounts may be nominated by the Contractor for each currency, and payments shall be made by the Employer accordingly.</p> <p>If and to the extent that the Pricing Document expressly specifies in relation to a Cost Centre that the Contractor is entitled to payment in a currency other than Indian Rupees, or the Engineer makes a determination of Cost in a currency other than Indian Rupees, all such payments shall be made in the relevant foreign currency and no adjustment shall be made to any payment or to the Final Contract Sum on account of any fluctuation in the exchange rate between Indian Rupees and such other currency from the Base Date.</p> <p>All payments in a foreign currency shall be made against an irrevocable Letter of Credit or through Electronic funds transfer.</p> <p>Contractor may apply for part completion of any milestone, if the milestone activity has been at least 50% completed, along with supporting details justifying the percentage completion being requested. The Employer's Engineer shall have the full authority to accept, modify or reject any such request. The decision of the Engineer is final.</p>
		<p>B. Application for Final Payment Certificate</p> <p>Not later than 56 days after the issue of the Performance Certificate, the Contractor shall submit to the Engineer three copies of a draft final statement with supporting documents showing in detail, in a form approved by the Engineer:</p> <ul style="list-style-type: none"> (a) the value of all work done in accordance with the Contract, and (b) any further sums which the Contractor considers to be due to him under the Contract or otherwise. <p>If the Engineer disagrees with or cannot verify any part of the draft final statement, the Contractor shall submit such further</p>

		<p>information as the Engineer may reasonably require and shall make changes in the draft as may be agreed between them. The Contractor shall then prepare and submit to the Engineer the Final Statement as agreed.</p> <p>If, following discussions between the Engineer and the Contractor and any changes to the draft final statement which may be agreed between them, it becomes evident that a dispute exists, the Employer shall pay those parts of the draft final statement as certified by the Engineer as not being in dispute. The remainder of the dispute may then be resolved under Clause 45, GCC in which case the Contractor shall then prepare and submit to the Engineer a Final Statement in accordance with the outcome of the dispute.</p> <p>Discharge</p> <p>When submitting the final statement, the Contractor shall submit a written discharge which confirms that the total of the Final Statement represents full and final settlement of all monies due to the Contractor under the Contract. Such discharge may state that it shall become effective only after payment due under the Final Payment Certificate has been made and the Performance security referred to in Sub-Clause 13.3, GCC has been returned to the Contractor.</p>
		<p>C. Issue of Final Payment Certificate</p> <p>The Engineer shall issue to the Employer, with a copy to the Contractor, the Final Payment Certificate within 28 days after receiving the Final Statement and written discharge in accordance with Clause 8(C) , stating:</p> <ul style="list-style-type: none"> (a) the amount which is finally due, and (b) after giving credit to the Employer for all amounts previously paid by the Employer and for all sums to which the Employer is entitled, the balance, if any, due from the Employer to the Contractor or from the Contractor to the Employer, as the case may be. <p>If the Contractor has not applied for a Final Payment Certificate in accordance with Clause 8 (B), the Engineer shall request the Contractor to do so. If the Contractor fails to make such an application within a period of 28 days, the Engineer shall issue the Final Payment Certificate for such amount as he considers to be due.</p>

		<p>D. Signature On Receipts For Payments</p> <p>Every receipt of payment to Contractor including refund of the Performance Security shall be signed by the person authorized to do so on his behalf. In the event of death of any of the Contractor's partners in case the Contractor is a partnership firm, during the currency of the Contract, it is hereby expressly agreed that every receipt by any one of surviving Contractor's partners, shall, if so signed as aforesaid, be a good and sufficient discharge as aforesaid, provided that nothing in this Clause shall be deemed to prejudice or affect any claim, which the Employer may hereafter have against the legal representatives of any Contractor's partner so dying, for or in respect of breach of any of the conditions of the Contract. Provided also that nothing contained in this clause shall be deemed to prejudice or affect the respective rights and obligations of the Contractor's partners, or of the legal heirs / representatives of any deceased Contractor / partner inters.</p>
		<p>E. Recovery of money due to the Employer</p> <p>All damages (including, without limitation, liquidated damages), costs, charges, expenses, debts, or sums for which the Contractor is liable to the Employer under any provision of the Contract may be deducted by the Employer from monies due to the Contractor under the Contract (including, without limitation, liquidated damages) and the Employer shall have the power to recover any balance not so deducted from monies due to the Contractor under any other contract between the Employer and the Contractor.</p> <p>When the Contractor has assigned to a third party the right to receive monies due, or, to become due, under the Contract to the Contractor or charged such monies in favour of a third party, the Employer's right to deduct damages (including without limitation liquidated damages), costs, charges, expenses, debts or sums for which the Contractor is liable to the Employer from monies due to the Contractor under the Contract shall be limited to the right expressed above.</p>

9.	Sub Clause 13.1	<p>Issuance of Securities</p> <p>The forms of Performance security and Advance Payment Guarantee shall be in the formats given in the contract forms, Section 9 of the contract. The forms of Parent Company Undertaking, Parent Company Guarantee and Contractor's warranty shall be in the formats given in the annexures VI, VII & VIII respectively to these Special Conditions of Contract. Even if not described or stated in the Employer's Requirements and the Contractor's Technical Proposals, the Contractor shall carry out and complete the design of the Works, including the selection of specifications for the kind and standard of Plant, Materials and workmanship to be used therein.</p> <p>The Contractor warrants to the Employer (Annexure VIII) that:</p> <ul style="list-style-type: none"> (a) the Works will, when completed, comply in all respects with the Employer's Requirements. (b) the Works have been or will be manufactured, constructed, executed, supplied, installed and tested to the highest standards available using proven up-to-date good practice; (c) the Works will, when completed, comply with enactments and regulations relevant to the Works; and (d) no Materials generally known to be deleterious or not in accordance with good engineering practice have been or will be selected or incorporated in the Works, by the Contractor. <p>The Contractor shall not, under any circumstance, have or make any claim for additional payment or an extension of time or be relieved from any liability or obligation under the Contract, where the cause of delay, suspension, impediment to or adverse effect upon the progress of the Works is due to failure by the Contractor.</p> <p>The Schedules attached to SCC may be modified as considered necessary at the time of finalisation of the Contract.</p>
10.	Sub Clause 13.2	<p>Advance Payment Security</p> <p>Mobilisation advance shall be paid interest free against acceptable Bank Guarantee from a scheduled commercial bank in India. The value of Bank Guarantee taken towards security of "Mobilisation advance" shall be 110% of the advance taken by the contractor.</p> <p>The Advance Payment shall be</p>

		<p>a) Mobilisation advance of 10% of the Fixed Lump Sum Price when the Contract becomes effective.</p> <p>b) The advance payment shall be in the same proportion of currencies in which the Fixed Lump Sum Price has been quoted.</p> <p>c) The first installment shall be paid after mobilisation has started and next installment shall be paid after satisfactory utilization of earlier installment.</p> <p>d) Amount of advance payment guarantee will be reduced by an amount by which mobilization advance has been recovered from the contractor's interim payment requests. Such adjustment in the amount of advance payment guarantee will be carried out every six months.</p> <p>Recovery of Advance</p> <p>a) The recovery of advances shall commence when 20% of the original contract value of the work has been paid and it will be completed by the time 85% of the contract value has been paid or the original completion date whichever is earlier. As far as possible the recovery of advances shall be limited to 30% of an account bill.</p> <p>b) No advance shall be given after 40% of the original contract amount has been paid.</p> <p>c) The contractor shall always have the option to have the recoveries commenced and/ or completed earlier, and /or to have recoveries affected in installments of higher amount and also to repay part or whole of the advance by direct payment rather than through On-account Bills</p> <p>d) In case the contract is terminated due to default of the contractor or rescinded/foreclosed due to any other reason, the contractor shall return the un recovered amount of all advances within 15 days of issue of notice of termination /rescission/fore closer of the contract and if the contractor fails to do so due to any reason whatsoever , then interest at an interest rate equal to State Bank of India prime lending rate plus 2% per annum or 10% per annum whichever is higher shall be charged on the unrecovered amount of such advances from 16th day onwards till the same is returned by the contractor .</p> <p>Interest in case of Delay in repayment of Advances</p> <p>Should there be delay in progress and completion of work, as a result of which is not possible to recover the advance</p>
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		<p>and interest thereon, before the date of completion stipulated in the Contract, then the interest to be charged from the Contractor on the remaining portion of the advance beyond the original completion date specified in the Contract, shall be the State Bank of India prime lending Rate plus 2% per annum or 10% per annum whichever is higher.</p> <p>Advances to be used only for this work</p> <ul style="list-style-type: none"> a) The advances shall be used by the Contractor strictly for the purpose of the Contract, and for the purpose for which they are paid. Under no circumstances, shall the advances be diverted for other purposes. Any such diversion shall be construed as a breach of the contract and the contractor shall be asked to return the advance at once and pay interest at 15% per annum till the advance is recovered back from him .The Contractor shall return the advance and pay the interest in one go without demur. b) Employer retains the right for any other remedy prescribed for breach of Contract in this regard. c) The Contractor, if required by the Project Manager shall provide the details of utilization of Mobilization advance.
11.	Sub Clause 13.3.1	<p>Performance Security</p> <p>Within 28 days of receipt of the Letter of Acceptance, the successful Tenderer shall furnish Performance Security in the form of a bank guarantee from a branch in India of a scheduled foreign bank or from a scheduled commercial bank in India acceptable to the Employer for an amount of 10% of the Contract value in types and proportions of currencies in which the Contract Price is payable.</p>
		<p>Whenever the contract value exceeds beyond 25% of the original contract value either due to Employer's variation or due to Contractor's variation, the contractor shall submit additional performance security equal to an amount of 10% of the variation reduced by an amount equal to 5% of the work already certified as completed by the Project Manager -in-Charge on the date of variation subject to a maximum limit of 10% of the variation amount.</p>
		<p>No additional performance security will be required to be submitted if the variation is within 25% of the original contract value.</p>

		<p>The performance security shall be in the form of the bank guarantee as per form included in Section 9 (Contract Forms).</p>
	<p>Sub Clause 13.3.3</p>	<p>Forfeiture</p> <ul style="list-style-type: none"> i. Failure of the successful Bidder to furnish the required Performance Security shall be a ground for the annulment of the award of Contract and forfeiture of the tender security. ii. The whole of the Performance Security amount shall be liable to be forfeited by the Employer at the discretion of the Employer, in the event of any breach of contract on the part of the Contractor. iii. On termination of contract due to contractor's default as per GCC Clause 42.2 the performance security shall be forfeited by encashing the bank guarantee and the balance work shall be got done independently without risk and cost of the failed contractor. The failed contractor shall be debarred from participating in the tender for executing the balance work. If the failed contractor is a JV or a partnership firm, then every member/partner of such JV or partnership firm shall be debarred from participating in the bid for the balance work either in his/her individual capacity or as a partner of any other JV/partnership firm. <p>The Project Manager shall not make a claim under the Performance Security except for amounts to which the JMRC is entitled under the contract (Not withstanding and/or without prejudice to any other provisions in the contract agreement) in the event of:</p> <ul style="list-style-type: none"> a) Failure by the contractor to extend the validity of the Performance Security, in which event the Project Manager may claim the full amount of the Performance Security. b) Failure by the contractor to pay JMRC any amount due, either as agreed by the contractor or determined under any or the Clauses/Conditions of the agreement, within 30 days of the service of notice to this effect by Project Manager. <p>The contractor being determined or rescinded under provision of the GCC, the Performance Security shall be forfeited in full and shall be absolutely at the disposal of the JMRC.</p>

		<p>Release</p> <ul style="list-style-type: none"> i. On completion of the entire work, one half of the Performance Security shall be refunded to the Contractor, on issue of Completion Certificate by the Project Manager. This shall not relieve the Contractor from his obligations and liabilities, to make good that may be detected during the Defects Liability Period. ii. The balance amount shall become due and shall be paid to the Contractor on signing of the Performance Certificate after the expiry of the final Defects Liability Period in accordance with GCC Clause 27 & SCC Clause 29 & 55.
12.	Sub Clause 15	<p>Intellectual Property</p> <p>In addition to GCC following shall also apply-</p> <p>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.</p> <p style="padding-left: 40px;">The Contractor shall be deemed (by signing the Contract) to give to the Employer an on-terminable transferable non-exclusive royalty-free license to Copy, use and communicate the Contractor's Documents, including making and using modifications of them .This license shall:</p> <ul style="list-style-type: none"> a) Apply throughout the actual or intended working life(whichever is longer)of the relevant parts of the Works, <p>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 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 the Contract, including replacements of Any computers supplied by the Contractor.</p>
13.	Sub Clause 17	<p>Project Manager's Authority to Delegate</p> <ul style="list-style-type: none"> i. The Project Manager, may from time to time assign and delegate authority to Project manager's representatives/assistants and may also revoke such assignments and delegations. The delegation or revocation

		<p>shall be in writing and shall be applicable only after same has been notified in writing to the Contractor.</p> <p>ii. Each Assistant to whom duties have been assigned or authority has been delegated shall be authorized to issue instructions to the Contractor to the extent defined by the delegation. Any determination, approval, check, certificate, consent, examination, inspection, instruction, notice, proposal, request, test or similar act by an assistance shall have the same effect as though the act had been an act of the Project manager. However:</p> <p>(a) Any failure to disapprove any Plant, Goods , Material, design and workmanship shall not prejudice the right of the Project manager to reject such Plant, Goods , Material, design and workmanship;</p> <p>(b) if the Contractor questions any determination or instruction of an assistant of the Project manager, the Contractor may refer the matter to the Project manager within three days of such decision having been given, who shall confirm, reverse or vary such determination or instruction</p> <p>Project Manager's Instructions</p> <p>The Contractor shall comply with instructions given by the Project manager in accordance with the Contract.</p> <p>The Contractor shall give reasonable notice to the Project manager of any instruction, which he considers necessary for the execution of the Works, to enable the Project manager to issue the instruction so that progress of the Works is not delayed. The Project manager shall not, however, be bound to issue any instruction which, in his opinion, is unnecessary.</p> <p>No act or omission by the Project manager or the assistants to the Project manager in the performance of any of the Project manager's duties or the exercise of any of the Project manager's powers under the Contract shall, in any way, operate to relieve the Contractor of any of the duties, responsibilities, obligations or liabilities imposed upon the Contractor by any of the provisions of the Contract.</p> <p>Project manager to Attempt Agreement</p> <p>When the Project manager is required to determine value, cost or extension of time, he shall consult with the Contractor and the Employer in an endeavour to reach agreement. If agreement is not achieved, the Project manager shall determine the matter fairly, reasonably and in accordance with the Contract, with the approval of Employer</p>
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14.	Sub Clause 18.2	<p>Work Programme</p> <p>The Contractor shall submit a detailed programme to the Project Manager after receipt of the Letter of Acceptance within the period stipulated in the Employer's Requirements.</p> <p>. The Contractor shall also submit a revised programme whenever the Project Manager finds that the previous programme is inconsistent with actual progress or with the Contractor's obligations.</p> <p>The Works Programme and any other document submitted along with the Tender shall not in any event be construed as a submission of the Programme under Employer's Requirements.</p> <p>Manufacture, Supply, Installation, Testing and Commissioning (Including Integrated Testing and Commissioning) Methods</p> <p>The Contractor shall submit complete documents and information pertaining to the methods of manufacture, supply, installation, testing and commissioning (including Integrated Testing and Commissioning) which the Contractor proposes to adopt or use on Corridors. The Engineer / Project Manager will then check to see whether, if such methods are adhered to, the Works can be executed in accordance with the Contract and without detriment to the Works (when completed) and to other works comprising the Project.</p> <p>The Engineer / Project Manager shall inform the Contractor in writing within 21 days after receipt of the above information</p> <ul style="list-style-type: none"> (a) that the Contractor's proposed methods of manufacture, testing and commissioning (including Integrated Testing and Commissioning) have the consent of the Project Manager; or (b) in what respects, in the opinion of the Project Manager the Contractor's proposed methods of manufacture, etc: <ul style="list-style-type: none"> (i) fail to comply with the Employer's

		<p>Requirements and/or the Final Design;</p> <p>(ii) would be detrimental to the Works and/or to the other works comprising the Project;</p> <p>(iii) do not comply with the other requirements of the Contract; or</p> <p>(c) as to the further documents or information which are required to enable the Project Manager to properly assess the proposed methods of manufacture, etc.</p> <p>In the event that the Project Manager does not give his consent, the Contractor shall take such steps or make such changes in the said methods or supply such further documents or information as may be necessary to meet the Project Manager's requirements and to obtain his consent. The Contractor shall not change the methods of manufacture, supply, installation, testing and commissioning (including Integrated Testing and Commissioning) which have received the Project Manager's consent without further review and consent in writing of the Project Manager.</p> <p>Notwithstanding the foregoing provisions of this Clause, or that certain of the Contractor's proposed methods of manufacture, etc. may be the subject of the consent of the Project Manager, the Contractor shall not be relieved of any liability or obligation under the Contract.</p>
15.	Sub Clause 19	<p>Sub-contracting</p> <p>19.1 The Employer shall screen in detail the sub-contractors and vendors listed in Appendix 5 during the Contract execution Phase. It will be obligatory for the Contractor to obtain Notice of No Objection from the Project Manager to the identity of the sub-contractors and vendors selected by the Contractor from the list included at the time of the Tender.</p> <p>For installation and other sub-contracts for items not included in Appendix 5, each costing over INR Ten Lakh, it will be obligatory on the part of the Contractor to obtain consent of the Employer to the identity of the sub-contractor. The Employer will give his consent after assessing the technical suitability of the sub-system/system including proven performance, and feasibility of its maintenance in India, etc.</p>

		<p>The terms and conditions of the sub-contract/vending agreement are the sole prerogative of the Contractor and are deemed to be included in the Lump Sum Price.</p> <p>In case the Employer intends to withhold his consent, he shall inform the Contractor in time to enable him to make alternative arrangements to fulfill his programme.</p> <p>(a) The Contractor shall provide sufficient superintendence, whether on the Site or elsewhere, to ensure that the work to be carried out by a sub-contractor complies with the requirements of the contract.</p> <p>(b) The proposed sub-contract terms and conditions shall impose on the sub-contractor such of the terms of the Contract as are applicable and appropriate to the part of the Works to be sub-contracted, to enable the Contractor to comply with his obligations under the Contract.</p> <p>(c) In case of urgency and on receipt of application from the contractor the Project Manager may shorten the notice period from 28 days required for a sub-contractor's work to be commenced.</p> <p>(d) After the Notice of No Objection issued by the Project Manager to the identity of the sub-contractor/vendor, any change in the identity of sub-contractor/vendor shall require prior approval of the Project Manager.</p> <p>Notwithstanding any consent to sub-contract given by the Project Manager, if in his opinion he considers it necessary, the Engineer shall have full power to order the removal of any sub-contractor from the Site or off-Site place of manufacture or storage, which power shall not be exercised unreasonably.</p> <p>The form of the Sub-Contractor's Warranty shall be in the format given in Annexure IV.</p>
16.	Sub Clause 20	<p>Design and Engineering</p> <p>Following shall be read in conjunction with GCC clause:</p> <p>General Obligations/Statutory Requirements</p> <p>The Design and Construction Standards shall be in conformity with the requirements of "Rules for Opening of a</p>

		<p>Railway or a Section of a Railway for Public Carriage of Passengers" and "Rules for Introduction of New Type of Rolling Stock" and to the satisfaction of the Commissioner of Railway Safety whose sanction is mandatory for commissioning of the System. The Contractor shall in this regard carry out all statutory tests and trials necessary for obtaining sanction of the competent authority for opening the system for public carriage of passengers and provide assistance and information as required by the appropriate statutory authorities in India.</p> <p>In the event that the Contractor employs a Designer, then the Contractor shall furnish a Designer's Warranty in the format given in Annexure V.</p> <p>Construction and/or Manufacture Documents</p> <p>The Contractor shall submit drawings and documents, as required by the Contract, to the Project Manager/ Engineer in accordance with any submittal schedule agreed with the Project Manager. This submittal shall be made sufficiently before the Works are to be carried out to give the Project Manager and the Employer reasonable time to examine the drawings or other documents, to prepare comments and for any changes to be accommodated by the Contractor.</p> <p>Where the consent of the Project Manager is required, the Project Manager shall notify the Contractor in writing of his decision either within such period as may expressly be stipulated in the Contract or otherwise within a reasonable time.</p> <p>If the Project Manager has reasonable cause for being dissatisfied with the proposals set out in the Contractor's drawings or documents, the Project Manager shall, within a period of 28 days from the date of submittal, require the Contractor in writing to make such amendments thereto as the Project Manager may consider necessary. The Contractor shall make and be bound by such amendments at no additional expense to the Employer and shall resubmit the amended drawings or documents for Project Manager's consent.</p> <p>Within 14 days of notification of the Engineer / Project Manager's consent the Contractor shall provide the Project Manager with the type and number of sets of the relevant drawings or documents as stipulated in the Employer's Requirement.</p> <p>Should it be found at any time after notification of consent that the relevant drawings or documents do not comply with the Contract or do not agree with drawings or documents in</p>
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		<p>relation to which the Project Manager has previously notified his consent, the Contractor shall, at his own expense, make such alterations or additions as, in the opinion of the Project Manager, are necessary to remedy such non-compliance or non-agreement and shall submit all such varied or amended drawings or documents for the consent of the Project Manager.</p> <p>No examination by the Project Manager of the drawings or documents submitted by the Contractor, nor any consent of the Project Manager in relation to the same, with or without amendment, shall absolve the Contractor from any of his obligations under the Contract or any liability for or arising from such drawings or documents.</p> <p>The Operation and Maintenance Manuals and drawings submitted by the Contractor shall, if required, be updated during the Defects Liability Period and re-submitted for approval by the Project Manager.</p>
17.	Sub Clause 21.1	<p>Material</p> <p>The Contractor shall adequately record the condition of roads, agricultural land and other infrastructure prior to the start of transporting materials, goods and equipment, and construction.</p>
18.	Sub Clause 22.1.1	<p>Bench Mark</p> <p>The Contractor shall comply with</p> <p>i) The measures and requirements relevant to the Contractor which are set forth in the Resettlement Plan ("RP") /Environmental Management Plan ("EMP") attached as Annexure – IX to the SCC, to the extent it concerns impacts on affected people during construction; and</p> <p>ii) Any corrective or preventive actions set out in safeguards monitoring reports that the Employer will prepare from time to time to monitor implementation of the resettlement plan</p>
19.	Sub Clause 22.2.3	<p>Labour laws</p> <p>The Contractor shall not make employment decisions based upon personal characteristics unrelated to job requirements. The Contractor shall base the employment relationship upon equal opportunity and fair treatment, and shall not discriminate with respect to aspects of the employment relationship, including recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment or retirement, and discipline.</p> <p>The Contractor shall provide equal wages and benefits to men and women for work of equal value or type.</p>
20.	Sub Clause 22.2.5	<p>Working Hours</p> <p>Normal working hours are: 8 Hours per day. The Contractor, if required, shall carry out work during night and in shifts. No extra</p>

		<p>payments shall be admissible for night work. The Contractor shall provide adequate lightning and safety arrangements.</p> <p>The Contractor shall take due approval from the employer before carrying out any works necessitated by the provisions of contract in or around the sites deemed part of the works of phase 1-A, JMRTS. All work permits shall be taken in accordance with the procedures laid down by employer and work shall be done in accordance with safety and quality provisions of this contract.</p>
21.	Sub Clause 22.2.7	<p>Health and Safety</p> <p>a. The Contractor shall throughout the contract (including the Defect Liability Period):</p> <ul style="list-style-type: none"> (i) conduct Information, Education and Consultation Communication (IEC) campaigns, at least every other month, addressed to all the Site staff and labor (including all the Contractor's employees, all Sub-Contractors and Employer's and Project Manager's' employees, and all truck drivers and crew making deliveries to Site for construction activities) and to the immediate local communities, concerning the risks, dangers and impact, and appropriate avoidance behavior with respect to of Sexually Transmitted Diseases (STD)—or Sexually Transmitted Infections (STI) in general and HIV/AIDS in particular; (ii) provide male or female condoms for all Site staff and labor as appropriate; and (iii) provide for STI and HIV/AIDS screening, diagnosis, counseling and referral to a dedicated national STI and HIV/AIDS program, (unless otherwise agreed) of all Site staff and labor. <p>The Contractor shall include in the program to be submitted for the execution of the Facilities under Sub-Clause 18.2 an alleviation program for Site staff and labor and their families in respect of Sexually Transmitted Infections (STI) and Sexually Transmitted Diseases (STD) including HIV/AIDS. The STI, STD and HIV/AIDS alleviation program shall indicate when, how and at what cost the Contractor plans to satisfy the requirements of this Sub-Clause and the related specification. For each component, the program shall detail the resources to be provided or utilized and any related sub-contracting proposed. The program shall also include</p>

		<p>provision of a detailed cost estimate with supporting documentation. Payment to the Contractor for preparation and implementation this program shall not exceed the Provisional Sum dedicated for this purpose.</p>
		<p>b. Safety Precautions</p> <p>After the date of Notice to Proceed, the Contractor shall submit a detailed and comprehensive contract-specific Site Safety Plan based on the Employer's Safety, Health and Environmental Manual (SHE Manual). The Contractor is required to make himself aware of all the requirements of the Employer's Safety, Health and Environmental Manual in this regard and comply with them. The Site Safety Plan shall include detailed policies, procedures and regulations which, when implemented, will ensure compliance with 22.2.7 of General Conditions of Contract. The Contractor shall, from time to time and as necessary or required by the Project Manager, produce supplements to the Site Safety Plan such that it is at all times a detailed, comprehensive and contemporaneous statement by the Contractor of his site safety and industrial health obligations, responsibilities, policies and procedures (under the laws of India) or as stated in the Contract or elsewhere relating to work on Site.</p> <p>If at any time the Site Safety Plan is, in the opinion of the Project Manager, insufficient or requires revision or modification to ensure the security of the Works and the safety of all workmen upon, and visitors to the Site, the Project Manager may instruct the Contractor to revise the Site Safety Plan. The Contractor shall, within 14 days, submit the revised plan to the Project Manager for review.</p> <p>Any omission, inconsistency or error in the Site Safety Plan or the Project Manager concurrence or rejection of the Site Safety Plan and/or supplements thereto shall be without prejudice to the Contractor's obligations with respect to site safety and industrial health and shall not excuse any failure by the Contractor to adopt proper and recognised safety practices throughout the execution of the Works.</p> <p>The Contractor shall adhere to the Site Safety Plan and shall ensure that all sub-contractors of all tiers have a copy of the Site Safety Plan and comply with its provisions.</p> <p>The Contractor shall provide all necessary access, assistance and facilities to enable the Project Manager and the Employer to carry out surveillance to verify that the Site Safety Plan is being properly and fully implemented.</p> <p>The Contractor shall notify the Project Manager immediately of any occurrence or incident that results in death or serious</p>

		<p>injury as defined in the Indian Penal Code. Such initial notification may be verbal and confirmed in writing thereafter and shall be followed by a comprehensive written report within 24 hours of the occurrence/incident. The Contractor shall duly complete standard forms as required by the Project Manager and Statutory Authorities.</p> <p>The Contractor shall provide and maintain all necessary temporary fire protection and fire fighting facilities on the Site during the construction of the Works in accordance with the statutory regulations and as required by the Project Manager. The Contractor shall ensure that all gases, fuels and other dangerous Materials and goods are stored and handled in a safe manner and in accordance with the statutory regulations and as required by the Project Manager.</p> <p>The obligations and requirements for safety and industrial health under this Contract are entirely without prejudice to, and do not derogate from, the Contractor's statutory obligations, with respect to safety and industrial health.</p> <p>A minimum penalty of Rs. 10000/- shall be imposed along with the cost of non provision of services as per Jaipur Metro SHE manual for each instance.</p>
22.	Sub Clause 22.2.8	<p>Funeral Arrangements</p> <p>Funeral arrangements: The bidder shall be responsible for making funeral arrangements if required.</p>
23.	Sub Clause 22.2.16	<p>Prohibition of Harmful Child Labour</p> <p>"Child" means a child below the statutory minimum age specified under applicable national, provincial or local law of India.</p>
24.	Sub Clause 22.4	<p>Site Regulations and Safety</p> <p>The following is added to existing GCC Clause.</p> <p>The Contractor shall take all measures necessary to ensure such security, including exercising control over all persons and vehicles which are employed or engaged on the Site or in connection with the Works or the other works comprising the Project and with the security arrangements applicable to any other site within the Project.</p> <p>The Contractor shall arrange the issue of passes for the admission of all persons and vehicles to the Site or to any part thereof and may refuse admission to or remove from the Site any person or vehicle failing to show an appropriate pass on demand to any duly authorised person. If required by the Engineer/ Project Manager, the Contractor shall submit a list identifying all persons to whom passes have been issued together with two photographs of each person</p>

		<p>and all entities to which a pass has been issued in respect of any vehicle and shall satisfy the Project Manager of the bonafides of any such person or entity.</p> <p>The Contractor shall not, without the written permission of the Engineer / Project Manager or otherwise in accordance with the Contract, allow access to the Site to any person unless the presence on Site of such person is necessary in connection with the execution of the Works or with the discharge of the duties of any relevant authority.</p> <p>All lights provided by the Contractor shall be so placed or screened as not to interfere with signs, signals or lights. The Contractor shall not in any way obscure or affect signs, signals or lights, in use by any relevant authority. In the event that the Contractor does so, the Contractor shall pay all costs associated with the re-setting, re-instating or provision of alternatives for any sign, signal or light, obscured or affected.</p> <p>For the purposes of this Clause only, "Site" shall include off-Site places of manufacture or storage and the Contractor's Work Areas and shall include, areas provided to the Contractor by others.</p>
25.	Sub Clause 24	<p>Completion of the Facilities</p> <p>The Works shall be taken over by the Employer when the same have been completed in accordance with the Contract, have passed the Tests on Completion, including Integrated Testing and Commissioning where ever applicable as per the contract, and a Completion Certificate/ Taking Over Certificate for the Works shall be issued. If the Works are divided into Sections, the Contractor shall be entitled to apply for a Completion Certificate for each Section.</p> <p>No Completion certificate/ Taking Over Certificate shall be issued before successful completion of Integrated Testing and Commissioning as per Employer's requirements and the contractor shall be responsible for care and custody of the works including risk of loss or damage thereto before works are taken over by employer with issuance of Taking Over Certificate.</p> <p>The Contractor may apply by notice to the Engineer / Project Manager for a Completion Certificate/ Taking Over Certificate not earlier than 14 days before the works or section (as the case may be) will, in the Contractor's opinion, be complete and ready for taking over. The Engineer / Project Manager shall, within 28 days after the receipt of the Contractor's application shall conduct a complete joint survey of the works including carrying out any tests prescribed in the contract and prepare a</p>

		<p>list of defects and outstanding works and :</p> <p>(a) issue the Completion Certificate/ Taking Over Certificate to the Contractor, stating the date on which the Works or Section were completed, including the Tests on Completion and Integrated Testing and Commissioning where ever applicable as per the contract in accordance with the Contract if defects and/or outstanding works are minor that does not affect the use and safety of the Works or Section for their intended purposes. The list of such works along with the target date of completion for each work shall be enclosed with the Completion certificate and completion of all these works /rectification of defects within the stipulated time shall be the responsibility of the contractor and any failure in it may be considered a reason by the Project Manager to cancel the taking over certificate issued earlier; or</p> <p>(b) reject the application, giving his reasons and specifying the work required to be done by the Contractor to enable the Completion Certificate/ Taking Over Certificate to be issued. The Contractor shall then complete such work before issuing a further notice under this Sub-Clause.</p> <p>The Engineer / Project Manager may, at the sole discretion of the Employer issue a Completion Certificate/ Taking Over Certificate for any part of the Permanent Works by following the procedure stipulated in this SCC clause if:.</p> <p>(a) the Employer uses that part of the Works for revenue service before the Completion Certificate/ Taking Over Certificate is issued for the entire work.</p> <p>(b) the balance part is not completed not due to the fault of the contractor and contractual date of completion for the completed part is over.</p> <p>Upon the completion of construction, the Contractor shall fully reinstate pathways, other local infrastructure, and agricultural land to at least their pre-project condition as recorded by the Contractor in consonance with its obligation in Clause 21.1</p> <p>Scope of Works and Supply by the Employer</p> <p>Except for the facilities as stated in Employer's Requirements, Section 6 of this Contract, no other facilities/works shall be provided by the Employer to the Contractor.</p>
26.	Sub Clause 25.1	<p>Commissioning</p> <p>The Contractor shall undertake commissioning of the system</p>

		after successful completion of installation of the systems with Employer's consent and without issuance of any certificates to proceed or provision of any facilities by the employer except as stated in SCC Clause 25, so as to achieve the completion dates as specified in Time Schedule, Section 9.
27.	Sub Clause 25.3 & 25.4	<p>Operational & Partial Acceptance</p> <p>The Integrated tests and System acceptance tests shall be successfully completed within the time stipulated in Key Dates specified in Time Schedule, Section 9, prior to which, no acceptance certificate of any kind whatsoever shall be issued.</p> <p>The only certificate for which contractor is entitled other than that of Performance Certificate shall be the Completion Certificate/Taking Over Certificate in accordance with SCC Clause 25 herein.</p>
	Sub Clause 25.5	<p>Delayed Pre-Commissioning and/or Guarantee Test</p> <p>For any delays in commissioning of system arising whether on part of contractor or not, the Contractor shall not be entitled for any additional charges towards care of facilities or any other additional compensation.</p> <p>The contractor shall only be entitled for Extension of Time for Completion in accordance with SCC Clause 35.</p> <p>Payment to contractor shall only be released after completion of milestones as per terms of payment specified herein and in Appendix-1, Section 9.</p>
28.	Sub Clause 26.2	<p>Completion Time Guarantee</p> <p>Time is the essence of the contract and therefore if the work is delayed on account of the contractor, liquidated damage shall be recovered as provided for in the contract. Annexure-III to SCC shall include in respect of the Works and in respect of any Stage, a percentage of the total contract value which will be recoverable from the Contractor as liquidated damages for delay in completion of the Works or in achievement of a stage by a particular Key Date. The total amount of liquidated damages in respect of the Works in all stages shall, however, not exceed the limit of liquidated damages stated in the Annexure-III to SCC. The aforesaid liquidated damages do not, however, include the sums payable by the Employer to Designated Contractors on account of delay caused by the Contractor to Designated Contractors which sums shall be recoverable from the Contractor in addition to any liquidated damages payable under this clause, the total ceiling limit of which is 10% of the contract value including liquidated damages levied under the provision of Annexure-III to the</p>

		<p>SCC.</p> <p>The liquidated damages are recovered by the Employer from the Contractor for delay and not as penalty.</p> <p>The Employer may, without prejudice to any other method of recovery, deduct the amount of such damages from any sum due, or to become due, to the Contractor. In the event of an extension of time being granted, the amount due under this Sub-Clause shall be recalculated accordingly, and any over-payment refunded. The payment or deduction of such damages shall not relieve the Contractor from his obligations to complete the Works, or from any other of his duties, obligations or responsibilities under the Contract.</p> <p>The Contractor shall use and continue to use his best endeavours to avoid or reduce further delay to the Works, or any relevant Stages.</p> <p>At any time after the Employer has become entitled to liquidated damages, the Engineer /Project Manager may give notice to the Contractor under clause 42 of GCC requiring the Contractor to complete the Works within a specified reasonable time. Such action shall not prejudice the Employer's entitlements to recovery of liquidated damages, under this Sub-Clause and to terminate under clause 42 of GCC.</p>
	Sub Clause 26.3	No bonus will be given for earlier Completion of the Facilities or part thereof.
29.	Sub Clause 27.2	<p>Defect Liability</p> <p>During the Defects Liability Period the Contractor shall provide, free of cost, competent and skilled personnel and maintain adequate stock of spares so as to promptly fulfil his obligations during the Defects Liability Period as laid down in GCC and Employer's Requirements.</p> <p>The Defect Liability Period of a section shall start from the date of opening of the section for revenue services and shall continue until 24 months.</p> <p>For the equipment and software supplied for OCC, the Defect Liability Period shall start from the date of opening of the first section for revenue services and shall continue until 24 months.</p>
		Failure to Remedy Defects :

		<p>If the Contractor fails to remedy any defect or damage within such time as the Employer / Engineer may deem to be reasonable, the Employer or the Engineer may fix a date on or by which to remedy the defect or damage, and give the Contractor reasonable notice of such date. If the Contractor fails to remedy the defect or damage by such date and the necessity for such work is due to a cause stated below :-</p> <ul style="list-style-type: none"> • the design of the Works; • Plant, Systems, Materials or workmanship not being in accordance with the Contract; or • failure by the Contractor to comply with any of his other obligations <p>If in the opinion of the Engineer, such necessity is due to any other cause, he shall determine an adjustment to the Contract Price, with the approval of the Employer, and shall notify the Contractor accordingly.</p> <p>The Employer may (at his sole discretion):</p> <ol style="list-style-type: none"> 1. carry out the work himself or by others, in a reasonable manner and at the Contractor's risk and cost, but the Contractor shall have no responsibility for such work: the costs incurred by the Employer in remedying the defect or damage shall be recoverable from the Contractor by the Employer; 2. require the Engineer to determine and certify a reasonable reduction in the Contract Price; or 3. if the defect or damage is such that the Employer has been deprived of substantially the whole of the benefit of the Works or parts of the Works, terminate the Contract in respect of such parts of the Works as cannot be put to the intended use, the Employer shall then be entitled to recover all sums paid for such parts of the Works together with the cost of dismantling the same, clearing the Site and returning Plant, Rolling Stock and Materials to the Contractor
		<p>Supervision of Maintenance</p> <p>The Contractor shall provide experts for Supervision of Maintenance. The deployment of these Experts may not be continuous and they may be required to supervise the maintenance in short periods at a time. The number of man-months of Experts shall be Four.</p> <p>These Experts shall work under the administrative control of the Employer. These Experts shall ensure that the Client's maintenance staff acquire necessary skills and follow correct procedures and practices in the maintenance, overhaul and repairs of equipment and components for Telecom Systems as</p>

		<p>well as for the maintenance of the related software.</p> <p>The qualification and experience of the Experts to be deployed by the Contractor shall be reviewed by employer.</p> <p>Prior approval of the Employer shall be necessary before the Experts are deployed for supervision of maintenance. The Contractor shall replace promptly, Contractor's experts who are not considered suitable by the Project Manager.</p>
	Sub Clause 27.10	Additional defect liability on equipment other than those specified in SCC sub clause 27.2 shall not be applicable.
30.	Sub Clause 30.1	<p>Limitation of Liability</p> <p>(b) The multiplier of the Contract Price is: One</p>
31.	Sub Clause 34.3	<p>Insurance</p> <p>The Contractor shall, within the respective periods stated in the Annexure-III to SCC (calculated from the Commencement Date), submit to the Employer:</p> <ul style="list-style-type: none"> (a) evidence that the insurances described in this Clause have been effected, with an Indian Insurance Company ,and (b) copies of the policies for the insurances described in Sub-Clause 34.1. <p>When each premium has been paid, the contractor shall submit copy of receipts to the employer. The contractor shall also, when providing such evidence, policies and receipts to the employer, notify the Project Manager of so doing.</p> <p>The contractor shall effect all insurances for which he is responsible with insurers and in terms approved by the employer. Each policy insuring against loss or damage shall provide for payments to be made in the currencies required to rectify such loss or damage. Payments received from insurers shall be used for the rectification of such loss or damage.</p> <p>The contractor (and, if appropriate, the employer) shall comply with the conditions stipulated in each of the insurance policies. The contractor shall make no material alteration to the terms of any insurance without the prior approval of the employer. If an insurer makes (or purports to make) any such alteration, the contractor shall notify the employer immediately.</p>
	Sub Clause 34.6	If the contractor fails to effect and keep in force any of the insurances required under the contract, or fails to provide satisfactory evidence, policies and receipts in accordance with this sub-clause, the employer may, without prejudice to any other right or remedy, effect insurance for the coverage relevant to such default, and pay the premiums due. In such cases the premium paid by the employer plus overheads (equal to 50% of the premium paid) shall be recoverable from

		<p>the contractor by the employer, and may be deducted by the employer from any monies due, or to become due, to the contractor or recover the same as debt due from the contractor. The contractor shall not dispute the amount of premium paid by the employer or the overhead charges thereon.</p> <p>Nothing in this clause limits the obligations, liabilities or responsibilities of the contractor or the employer, under the other terms of the contract or otherwise. Any amount not insured or not recovered from the insurers shall be borne by the contractor.</p> <p>The Contractor shall submit to the Project Manager, the details of all claims made with the insurer and claims accepted by the insurer or any other details as required by the Project Manager on monthly basis.</p>
32.	Sub Clause 36.1	<p>Change in Laws and Regulations</p> <p>Any new taxes/duties or any statutory variation in the existing taxes/duties applicable to the JMRC project during the contractual completion shall be to the employers account i.e. reduction is to be passed on to the employer and increase to be reimbursed by the employer, The contractor shall furnish the documentary evidence in support of their claims for reimbursement from JMRC. However, any increase in cost due to new taxes/duties or any statutory variation in the existing taxes/duties applicable to the JMRC project during extended contractual period due to contractors fault shall be to contractor account, whereas any decrease in the taxes /duties shall be employers account.</p>
33.	Sub Clause 39.	<p>Change in the Facilities</p> <p>Following is added to the clause 39 of GCC</p> <p>Employer's Variations</p> <p>"Employer's Variation" means a change in the Employer's Requirements which makes necessary alteration or modification of the Design, quality or scope of Works as described by or referred to in the Employer's Requirements. Changes to any sequence, method or timing of manufacture, supply, installation, testing and commissioning including Integrated Testing and Commissioning and changes to any part of the Site or access thereto will not constitute Employer's Variation.</p> <p>If the Project Manager requests a proposal, prior to instructing a Variation which may be for additional work or alteration in the work on deletion / reduction in the scope of work, the Contractor shall submit at his own cost within 14 days or such period as the Project Manager may allow of the</p>

		<p>receipt of such request of the Project Manager</p> <ul style="list-style-type: none"> a a description of the proposed design and/or work to be performed and a programme for its execution, b the Contractor's proposal for any necessary modifications to the programme according to Sub-Clause 18.2, and c the Contractor's proposal for adjustment to the Contract Price, Time for Completion and/or modifications to the Contract. <p>Variation Procedure</p> <p>The Project Manager shall, as soon as practicable after receipt of proposals under this Sub-Clause and Sub-Clause 39.3, respond with approval, rejection or comments.</p> <p>After receipt of proposal, it will be the prerogative of the Employer, whether to Instruct and proceed ahead with the variation or drop the proposal in part or full. In that case, no cost of preparing And submitting the proposal will be payable to Contractor. In case, the design part of variation has been completed on submission of same to the Project Manager, the Employer decides to abandon the variation, only cost for design to the extent of work done will be paid to the Contractor.</p> <p>If the Project Manager instructs or approves a Variation, he shall proceed to agree or determine adjustments to the Contract Price, Time for Completion and Schedule of Payments in consultation with the Contractor and the Employer in an endeavour to reach agreement. If agreement is not achieved, the Project Manager shall determine the matter fairly, reasonably and in accordance with the Contract, with the approval of Employer</p> <p>An Employer's Variation shall be requested and implemented in accordance with and subject to the following provisions:</p> <ul style="list-style-type: none"> (a) within 14 days (or such other period as the Project Manager may allow) of the Project Manager informing the Contractor in writing of the intention to request an Employer's Variation, the Contractor shall notify the Project Manager in writing whether in his opinion the Employer's Variation would, if ordered: <ul style="list-style-type: none"> (i) give rise to any entitlement to an extension of time; or
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		<p>(ii) affect the achievement of any Milestone; or</p> <p>(iii) give rise to any entitlement to additional payment; or</p> <p>(iv) affect the warranties of the Contractor set out in Clause 6 of Special Conditions of Contract,</p> <p>and shall submit his proposals as to the terms upon which he would agree to implement the Employer's Variation.</p> <p>(b) The Project Manager shall determine the amount well in advance that should be added to or deducted from the relevant Cost Centre Total and/or the revisions (if any) which should be made to the Milestone Payment Schedules as a result of the Variation and get it prior approved by the Employer.</p> <p>In the event of the Project Manager and the Contractor failing to reach agreement on the revisions to be made to the Cost Centre Totals, the Project Manager shall, with the approval of the Employer, determine such revisions as shall be reasonable.</p> <p>In assessing work covered by any sub-contract, the Project Manager will have, where he deems necessary, access to the original sub-contract conditions, rates, prices and details of the variation claimed, to assist in evaluating any Variations.</p> <p>c) if the Project Manager withdraws the request for an Employer's Variation, the Contractor shall have no claim of any kind whatsoever arising out of or in connection with any of the proposals made or any failure to reach agreement. In case the Employer's Variation involves omission of part of the Works, the agreement shall address the issue of reduction in the Contract Price.</p> <p>i) The quantities of items shown in the Bill of Quantities are approximate, and liable to vary during the actual execution of the work. Some items/group of items may have to be altered, added or omitted. The Contractor shall be bound to carry out and complete the stipulated work as instructed by the Project Manager, irrespective</p>
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		<p>of the magnitude of variations including additions, alterations or omissions in the Bill of Quantities, individual items or group of items, specified in the Bill of Quantities.</p> <p>ii) Such variations shall be paid as follows:</p> <p>a) At the accepted rates of the Contract for Positive variation in quantities to the extent of 25% except in the case of foundation works. Unless otherwise specifically provided for in the Bill of Quantities or elsewhere in the Contract, the variation of 25% shall be applicable to a group of items mentioned therein and not to individual items. In case of variation in quantities on minus side, contract rates will be payable for executed quantities.</p> <p>b) For items against which the quantity given in the Bills of Quantities is "if or as required", there shall be no increase/decrease of rates whatever be the quantity finally executed.</p> <p>c) Variation in the quantity of items individually costing upto 1% of the total contract value, shall be payable at the rates stated in the Contract. Notwithstanding the magnitude of variation upto 2% of the original Contract Value for each item.</p> <p>d) In case the variation in individual items or the group of items as stipulated above, is more than 25% (positive or negative) , the rate for the varied quantity beyond 25% shall be negotiated between the Project Manager and the Contractor and mutually agreed rates arrived at before actual execution of the extra quantity.</p> <p>e) In case Project Manager introduces an item for which the Contract does not contain any rates or prices applicable to the varied Works, the rate of such items shall be derived, wherever possible, from rate for similar items available in the Bill of Quantities of the accepted Bid. In case this is not possible, the rate may be decided on the following basis:</p> <p>i) Cost of Materials at current market price, as actually utilised in the final finished Permanent Works, including a reasonable percentage for wastage and transportation.</p> <p>ii) Cost of enabling works if any(unless provided for separately) worked out on the above basis but with less stringent quality.</p>
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		disagreement or the difference regarding rates to be paid for the same shall be settled in the manner laid down under the conditions for the settlement of dispute.
34.	Sub Clause 39.3	<p>Changes Originating from Contractor</p> <p>The Contractor may submit to the Employer, in writing at its own cost, any engineering proposal as contractor's variation for modifying the Employer's Requirements, provision of additional land, access or feasibility over and above that is provided in the Contract for the purpose of saving in time, construction or manufacture costs. Such variation proposal shall not impair the essential character, functions or characteristics or the Work, including service life, economy of operation, ease of maintenance, desired appearance, or design and safety standards.</p> <p>The Contractor shall provide his variation proposal in a time limit prescribed by the Engineer / Project Manager. The Engineer / Project Manager's decision in this regard shall be communicated to the Contractor within a reasonable period of time. If by any reason the time limit specified by the Project Manager is exceeded, the proposal may not be considered. The decision of the Project Manager in this regard shall be final and binding.</p> <p>If the Employer requires or accepts it, and if the Contractor wants to proceed with the proposal, the Contractor must provide (at no cost to the Employer) a detailed report prepared by a consultant acceptable to the Employer and which shall include:</p> <ul style="list-style-type: none"> a. a general description of the original Contract requirements for the Works and the proposed changes b. a detail of all the proposed modifications to the drawings and specifications c. a detail of all Work and goods affected by the value engineering proposal d. detailed estimate of the construction cost based on the original Contract requirements and based on the proposed changes. e. any resultant time extensions or reductions for the Contract. f. statement to the extent of minimum saving expected. The Contractor's cost of preparing the variation proposal shall be excluded in determining the estimated net savings in construction costs.

		<p>The Employer may in his sole discretion, accept or reject the contractor's variation or any part thereof and determine the estimated net saving in the construction cost. The Employer shall not be liable for delays or damages to the Contractor due to any failure of the Employer to accept or act upon any such variation proposal submitted pursuant to this Clause.</p> <p>Once, the Employer or the Project Manager rejects the contractor's variation during proposition due to any reason, it shall not be pursued by Contractor in any other form.</p> <p>If the variation proposal is acceptable to the Employer/ Project Manager in whole or in parts, it will accept by execution of an amendment. Such amendment shall identify all the changes in the specifications, Contract Period etc. and shall specify net savings on construction costs which shall be adjusted in the contract value by the Employer.</p> <p>The Contractor shall either accept or reject any proposed amendment executed by the Project Manager pursuant to this section within 5 working days of its receipt date from the Employer. If the Contractor does not reject the same in the period stipulated above, the amendments shall be deemed to be accepted by the Contractor and shall become a variation to the Contract. The Contractor's acceptance shall be unconditional and the contract value / price shall be adjusted by the amount of saving due to the variation.</p>
35.	Sub Clause 40	<p>Extension of Time for Completion</p> <p>Time is the essence of Contract and will remain so at all times during the pendency of the Contract including the extended period of Contract. The Contractor shall ensure defect free completion and have passed the tests on the completion, including integrated testing where ever in the scope of work and commissioning of the whole of the Works and/or parts thereof before the same is taken over by the Employer.</p> <p>In case of delay on the part of the Contractor, the Contractor shall be liable to pay liquidated damages and any other compensation for the damages suffered by the Employer as per relevant clause. This is without prejudice to the right of the Employer to rescind the Contract.</p> <p>Failure or delay by the Employer or the Project Manager, to hand over to the Contractor the Site necessary for execution of Works, or any part of the Works, or to give necessary notice to commence the Works, or to provide necessary Drawings or instructions or clarifications or to supply any material, plant or</p>

		<p>machinery, which under the Contract, is the responsibility of the Employer, shall in no way affect or vitiate the Contract or alter the character thereof; or entitle the Contractor to damages or compensation thereof but in any such case, the Project Manager shall extend the time period for the completion of the Contract, as in his opinion is / are reasonable. The Contractor may apply for an extension of the Time for Completion if the Work is or will be delayed either before or after the Time for Completion by any of the following causes:</p> <ul style="list-style-type: none"> a. "Force Majeure" referred to in GCC Clause 37 b. The Contractor's work held up for not being given possession of or access to the Site in accordance with the Contract c. Instruction of the Project Manager to suspend the Works and the Contractor not being in default as to reasons of suspension. d. Acts or omissions of other Designated Contractors in executing work not forming part of this Contract and on whose performance, the performance of the Contractor necessarily depends. e. Any act of prevention or Breach of Contract by the Employer and not mentioned in this Clause f. Any order of Court restraining the performance of the Contract in full or in any part thereof g. Any other event or occurrence which, according to the Employer is not due to the Contractor's failure or fault, and is beyond his control without Employer being responsible for the same. h. An Employer's Variation <p>However, the Contractor shall not be entitled to any extension of time where the instructions or acts of the Employer or the Project Manager are necessitated by or intended to cure any default of or breach of Contract by the Contractor or where any delay is due to</p> <ul style="list-style-type: none"> a. the failure of sub-contractor, to commence or to carry out work in due time, b. non-availability, or shortage of Contractor's equipment, labour, utility services, Plant and Materials,
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		<p>c. inclement weather conditions, and</p> <p>d. the Contractor not fulfilling his obligations under contract.</p> <p>If the Contractor considers himself to be entitled to an extension of time for Completion, he shall give notice to the Project Manager of such intention as soon as possible and in any event within 28 days of the start of the event giving rise to the delay and full and final supporting details of his application within 21 days of the last day of delay, together with any notice required by the Contract and relevant to such Clause.</p> <p>The Project Manager shall proceed in consultation with the Contractor and the Employer in an endeavour to reach agreement or determine either prospectively or retrospectively such extension of the Time for Completion as may be due.. If agreement is not achieved, the Project Manager shall determine the matter fairly, reasonably and in accordance with the Contract, with the approval of Employer. The Project Manager shall notify the Contractor accordingly.</p> <p>The extension of time including that of key date shall not entitle the contractor to retain the advance which shall be governed by SCC Sub-Clause13.2.</p> <p>The Contractor shall not be entitled to an extension of time by reason of any delay to any activity in the carrying out of the Works unless in the opinion of the Project Manager such delay results in or may be expected to result in a delay to completion of the Works, or achievement of any Stage by the relevant Key Date. Whether or not the Contractor fails to achieve any Milestone by reason of any delay shall not by itself be material to the Contractor's entitlement to an extension of time.</p> <p>Any extension to a Key Date shall not by itself entitle the Contractor to an extension to any other Key Date.</p>
36.	Sub Clause 45	<p>Disputes and Arbitration</p> <p>The DB shall be appointed within 30 days after the Effective Date.</p> <p>If the efforts to resolve all or any of the disputes through conciliation fails, then such disputes or differences, whatsoever arising between the parties, arising out of touching or relating to construction/ manufacture, measuring operation or effect of the Contract or the breach thereof shall be referred to Arbitration in accordance with the following provisions:</p> <p><u>For Contracts with foreign contractors:</u> UNCITRAL Arbitration Rules will apply.</p> <p><u>For Contracts with national contractors:</u> Arbitration procedure</p>

		<p>below will apply.</p> <ol style="list-style-type: none"> 1. Matters to be arbitrated upon shall be referred to a sole Arbitrator if the total value of the claim is upto Rs.5 million and to a panel of three Arbitrators if total value of claims is more than Rs.5 million. The Employer shall provide a panel of three arbitrators for the claims upto Rs.5 million and a panel of five Arbitrators for claims of more than Rs.5 million. The Contractor shall have to choose the sole Arbitrator from the panel of three and/or one Arbitrator from the panel of five in case three Arbitrators are to be appointed. The Employer shall also choose one Arbitrator from this panel of five and the two so chosen will choose the third arbitrator from the panel only. The Arbitrator (s) shall be appointed within a period of 30 days from the date of receipt of written notice/ demand of appointment of Arbitrator from either party. Neither party shall be limited in the proceedings before such arbitrator(s) to the evidence or arguments put before the Project Manager for the purpose of obtaining his decision. No decision given by the Project Manager in accordance with the foregoing provisions shall disqualify him from being called as a witness and giving evidence before the arbitrator(s) on any matter, whatsoever, relevant to dispute or difference referred to arbitrator/s. The arbitration proceedings shall be held in Jaipur only. The language of proceedings, which of documents and communication shall be English. 2. The Employer at the time of offering the panel of Arbitrator(s) to be appointed as Arbitrator shall also supply the information with regard to the qualifications of the said Arbitrator nominated in the panel along with their professional experience, phone nos. and addresses to the contractor. 3. The award of the sole Arbitrator or the award by majority of three Arbitrators as the case may be shall be binding on all parties. <p>Interest on Arbitration Award</p> <p>Where the arbitral award is for the payment of money, no interest shall be payable on whole or any part of the money for any period, till the date on which the award is made.</p> <p>Cost of Arbitration</p> <p>The cost of arbitration shall be borne by the respective parties. The cost shall, inter alia, include the fees of the arbitrator (s) as agreed by both the parties or provided under</p>
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		<p>the International Arbitration Rules.</p> <p>Jurisdiction of Courts</p> <p><u>For national contractors only:</u></p> <p>Where recourse to a Court is to be made in respect of any matter, the court at Jaipur shall have the exclusive jurisdiction to try all disputes between the parties.</p> <p>Suspension of Work on Account of Arbitration</p> <p>The reference to Conciliation / Arbitration shall proceed notwithstanding that the Works shall not then be or be alleged to be complete, provided always that the obligations of the Employer, Project Manager and the Contractor shall not be altered by reasons of arbitration being conducted during the progress of the Works. Neither party shall be entitled to suspend the work or part of the work to which the dispute relates on account of arbitration and payments to the Contractor shall continue to be made in terms of the Contract.</p>
	Sub Clause 45.2	<p>Appointment (if not agreed) to be made by:</p> <p>(a) <u>Contracts with foreign contractors:</u> a neutral 3rd party .e.g. President of Institute of Engineers (India) or Secretary General of the Permanent Court of Arbitration, the Hague in the case of foreign contractor opting for the application of UNCITRAL Arbitration Rules.</p> <p>(b) <u>Contracts with contractors being nationals of the Employer's country:</u> President of Institute of Engineers (India).</p>
	Sub Clause 45.5	<p>Rules of procedure for arbitration proceedings:</p> <p>(a) Contracts with foreign contractors:</p> <p>International arbitration shall be conducted in accordance the Rules of the Singapore International Arbitration Centre (SIAC).</p> <p>Arbitration shall be administered by SIAC</p> <p>The place of arbitration shall be the place of the institution administering the arbitration.</p> <p>(b) Contracts with contractors being nationals of the Employer's country: As per law of the Republic of India</p>
37.	Additional Clause	<p>Eligibility</p> <p>1. The Contractor shall have the nationality of an ADB member country. The Contractor shall be deemed to have the nationality of a country if the Contractor is a citizen or is constituted, or incorporated, and operates in conformity with the provisions of the laws of that country. This criterion shall also apply to the determination of the nationality of proposed subcontractors or suppliers for any part of the</p>

		<p>Contract including related services.</p> <p>2 The materials, equipment and services to be supplied under the Contract shall have their origin in eligible source countries and all expenditures under the Contract will be limited to such materials, equipment, and services. At the Employer's request, the Contractor may be required to provide evidence of the origin of materials, equipment and services.</p> <p>3 For purposes of SCC Clause 37(2), "origin" means the place where the materials and equipment are mined, grown, produced or manufactured, and from which the services are provided. Materials and equipment are produced when, through manufacturing, processing, or substantial or major assembling of components, a commercially recognized product results that differs substantially in its basic characteristics or in purpose or utility from its components.</p>
38.	Additional Clause	<p>Claims, Disputes and Conciliation</p> <p>Procedure for Claims</p> <p>If the Contractor intends to claim any additional payment under any clause of these Conditions or otherwise, the Contractor shall give notice to the Project Manager as soon as possible and in any event within 28 days of the start of the event giving rise to the claim.</p> <p>The Contractor shall keep such contemporary records as may be necessary to substantiate any claim, either on the Site or at any other location acceptable to the Project Manager. Without admitting the Employer's liability, the Project Manager shall, on receipt of such notice, inspect such records and may instruct the Contractor to keep further contemporary records. The Contractor shall permit the Project Manager to inspect all such records, and shall (if instructed) submit copies to the Project Manager.</p> <p>Within 28 days of such notice, or such other time as may be agreed by the Project Manager, the Contractor shall send to the Project Manager an account, giving detailed particulars of the amount and basis of the claim. Where the event giving rise to the claim has a continuing effect, such amount shall be considered as interim. The Contractor shall then, at such intervals as the Project Manager may reasonably require, send further interim accounts giving the accumulated amount of the claim and any further particulars. Where interim accounts are sent to the Project Manager, the Contractor shall send a final account within 28 days of the end of the</p>

		<p>effects resulting from the event.</p> <p>If the Contractor fails to comply with this Sub-Clause, he shall not be entitled to claim any additional payment.</p> <p>Payment for Claims</p> <p>The Contractor shall be entitled to have included in any Interim Payment Certificate such amount for any claim as the Project Manager considers due, after taking approval from the Employer. If the particulars supplied are insufficient to substantiate the whole of the claim, the Contractor shall be entitled to payment for such part of the claim as has been substantiated.</p> <p>(iii) No legal action Till Dispute Settlement Procedure is Exhausted</p> <p>Any and all Disputes shall be settled in accordance with the provisions of this clause. No action at law concerning or arising out of any Dispute shall be commenced unless and until all applicable Dispute resolution procedures set out in this clause shall have been finally exhausted in relation to that Dispute or any Dispute out of which that Dispute shall have arisen with which it may be or may have been connected.</p> <p>(iv) Notice of Dispute</p> <p>For the purpose of clause (v), a Dispute shall be deemed to arise when one party serves on the other party a notice in writing (hereinafter called a "Notice of Dispute") stating the nature of the Dispute provided that no such notice shall be served later than 28 days after the date of issue of Performance Certificate by the Project Manager.</p> <p>(v) Two Stages for Dispute Resolution</p> <p>(a) For Contracts with foreign contractors: In accordance with the Rules of UNCITRAL Arbitration Rules</p> <p>(b) For Contracts with national contractors: Disputes shall be settled through two stages</p> <p>(i) Conciliation procedures as established by "The Arbitration and Conciliation Act-1996" (as amended from time to time) and in accordance with this Clause. In the event this procedure fails to resolve the Dispute then;</p> <p>(ii) Arbitration procedures undertaken as provided by "The Arbitration and Conciliation Act -1996" (as amended from time to time) and in accordance with this Clause.</p> <p>(vi) Conciliation</p> <p>Within 60 days of receipt of Notice of Dispute, either party</p>
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		<p>shall refer the matter in dispute to conciliation.</p> <p>Conciliation proceedings shall be initiated within 30 days of one party inviting the other in writing to Conciliation. Conciliation shall commence when the other party accepts in writing this invitation. If the invitation is not accepted then Conciliation shall not take place. If the party initiating conciliation does not receive a reply within 30 days from the date on which he sends the invitation he may elect to treat this as a rejection of the invitation to conciliate and inform the other party accordingly.</p> <p>The Conciliator shall assist the parties to reach an amicable settlement in an independent and impartial manner.</p> <p>(vii) Conciliation Procedure</p> <p>For the purpose of conciliation in this contract, the conciliation shall be undertaken by one conciliator selected from panel of conciliators maintained by the employer, who shall be from serving or retired engineers of Government Departments, or of Public Sector Undertakings. Out of this panel, a list of three Conciliators shall be sent to the Contractor who shall choose one of them to act as Conciliator and conduct conciliation proceedings in accordance with conciliation procedures as established by "The Arbitration and Conciliation Act-1996" (as amended from time to time) and in accordance with this Clause.</p> <p>The Employer and the Contractor shall in good faith co-operate with the Conciliator and, in particular, shall endeavour to comply with requests by the Conciliator to submit written materials, provide evidence and attend meetings. Each party may, on his own initiative or at the invitation of the Conciliator, submit to the Conciliator suggestions for the settlement of the dispute.</p> <p>When it appears to the Conciliator that there exist elements of a settlement which may be acceptable to the parties, he shall formulate the terms of a possible settlement and submit them to the parties for their observations. After receiving the observations of the parties, the Conciliator may reformulate the terms of a possible settlement in the light of such observations.</p> <p>If the parties reach agreement on a settlement of the dispute, they may draw up and sign a written settlement agreement. If requested by the parties, the Conciliator may draw up, or assist the parties in drawing up, the settlement agreement.</p> <p>When the parties sign the settlement agreement, it shall be final and binding on the parties and persons claiming under them respectively.</p> <p>The Conciliator shall authenticate the settlement agreement and furnish a copy thereof to each of the parties.</p> <p>As far as possible, the conciliation proceedings should be completed within 60 days of the receipt of notice by the</p>
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		<p>Conciliator.</p> <p>The parties shall not initiate, during the conciliation proceedings, any arbitral or judicial proceedings in respect of a dispute that is the subject matter of the conciliation proceedings.</p> <p>(viii) Termination of Conciliation Proceedings</p> <p>The conciliation proceedings shall be terminated:</p> <p>by the signing of the settlement agreement by the parties on the date of agreement; or</p> <p>by written declaration of the conciliator, after consultation with the parties, to the effect further efforts at conciliation are no longer justified, on the date of declaration; or</p> <p>by a written declaration of the parties to the conciliator to the effect that the conciliation proceedings are terminated, on the date of declaration; or</p> <p>by a written declaration of a party to the other party and the conciliator, if appointed, to the effect that the conciliation proceedings are terminated, on the date of declaration.</p> <p>Upon termination of the conciliation proceedings, the conciliator shall fix the costs of the conciliation and give written notice thereof to the parties. The costs shall be borne equally by the parties unless settlement agreement provides for a different apportionment. All other expenses incurred by a party shall be borne by that party.</p>
39.	Additional Clause	<p>Variation in the Bill of Quantities</p> <p>The Tenderer shall provide a Bill of Quantity (BoQ) in the format given in Schedule 1,2,3,4 of Section 4- Bidding Forms, to meet the entire scope of whole of works as stipulated in the Employer's Requirements using Table-I as a reference. The Tenderer shall note that the Contract is a lump sum contract and any change in quantities, other than those due to a change in scope of work, shall have no impact on the Contract price.</p> <p>Change of any item in Schedule 1, 2,3,4 up to $\pm 25\%$ in quantity due to change in scope of work during execution, shall be applied at the unit rate quoted by the Tenderer in Schedule 1,2,3,4 of Section 4- Bidding Forms and no additional amount whatsoever shall be payable to the Contractor,</p> <p>The Employer shall advise the Contractor about any reduction in quantities due to change in Scope of work within twelve months of Commencement date. However, the Employer may exercise any increase in quantity on any date before three months of scheduled opening (as per Key Date Table) of the last section.</p>

40.	Additional Clause	Not Used
41.	Additional Clause	<p>Indemnity Bond</p> <p>The contractor shall submit an Indemnity Bond in the format given in Annexure-II against payments made for Plant and Equipment delivered to Jaipur.</p>
42.	Additional Clause	<p>Quality Plan</p> <p>The detailed Quality Plan shall be developed from the Outline Quality Plan to meet the stipulations of the Employer's Requirements.</p> <p>Upon the Project Manager notifying his consent to the Site Quality Plan, or any supplement thereto, the Contractor shall, adhere to the principles and procedures contained in such document, except where the Project Manager gives his consent to any amended or varied version thereof. The Contractor shall cause any sub-contractors to adhere to this Plan.</p> <p>The Contractor shall appoint a suitably qualified and experienced person, not otherwise engaged in the performance of the Contract, to act as manager of the quality assurance system and shall provide such other personnel and resources as required to ensure effective operation of the quality assurance system. The said manager shall carry out audits of the application of the quality assurance system, and ensure effective quality control and delivery of quality assurance.</p> <p>The Contractor shall provide all necessary access, assistance and facilities to enable the Project Manager to carry out surveillance visits both on and off the Site to verify that the quality assurance system is being properly and fully implemented. No extra payment shall be made in this regard and the cost of the Work under this element shall be deemed to be included in the Contract Price.</p>
43.	Additional Clause	<p>Work by persons other than the Contractor</p> <p>If the Contractor shall fail to carry out any work required under the Contract or refuse to comply with any instruction or order given by the Employer or Project Manager in accordance with the Contract within a reasonable time, the Project Manager may give the Contractor 14 days' notice in writing to carry out such work or comply with such instruction. If the Contractor fails to comply with such notice, the Employer shall be entitled to carry out such work or</p>

		<p>instruction by his own workmen or by other contractors. Without prejudice to any other right or remedy, all additional expenditure properly incurred by the Employer in having such work or instruction carried out shall be recoverable by the Employer from the Contractor.</p> <p>If by reason of any accident or failure or other event occurring to, in, or in connection with the Works any remedial or other work shall, in the opinion of the Project Manager, be urgently necessary and the Contractor is unable or unwilling at once to do such remedial or other work, the Project Manager may authorise the carrying out of such remedial or other work by a person other than the Contractor. If the remedial or other work so authorised by the Project Manager is work, which, in the Project Manager's opinion, the Contractor was liable to do under the defect liability period Contract, all expenses properly incurred in carrying out the same shall be recoverable by the Employer from the Contractor, provided that the Project Manager shall, as soon after the occurrence of any such emergency as may be reasonably practicable, notify the Contractor thereof in writing.</p>
44.	Additional Clause	<p>Entry with full preparation as per SHE</p> <p>The contractor need to mobilize at site with full preparation with proper provision of display boards (mentioning various details like Contract Name, Contract Value, Scope, Organization, Contract Details, Labour Laws obligations as per agreement with the Project Manager), lighting, Water Supply, Ventilation Facility, Toilet Facility, Tea & Coffee facility, Cleaning arrangement etc (this list is indicative not exhaustive). The Project Manager shall approve after inspection and shall issue no objection certificate for erection of the equipment.</p>
45.	Additional Clause	<p>Nuisance</p> <p>Contractor will be responsible for any unhygienic conditions in the area under their possession and liable to be penalized if condition does not improve despite warnings/notices</p>
46.	Additional Clause	<p>Interface Requirement</p> <p>The contractor shall be responsible to interface with the other contractors as per the interface table provided in the contract. JMRC will supervise/facilitate the coordination between the contractor and other designated contractors. However, the contractor will allow for liaison with, and modifications to his design to cater for the work of such other contractors. The list of interface items is indicative only and</p>

		the ultimate responsibility of commissioning lies with the contractor.
47.	Additional Clause	<p>Site Progress</p> <p>The contractor shall prepare Performa in consultation with the Project Manager and submit to Project Manager the monthly progress report and will be required to deliver the Power Point presentation as and when instructed by the Project Manager.</p>
48.	Additional Clause	<p>Maintaining the Site</p> <p>In general the cleanliness, lighting, safety, security, drinking water, first aid etc will be the responsibility of the civil contractor as specified in the interface document.</p> <p>The contractor shall be responsible for maintaining the site. The daily sweeping and cleaning of the area under his possession/work shall be his responsibility.</p> <p>In case of repeated aberrations noticed by the Project Manager a minimum penalty of Rs. 5000/- shall be imposed for each instance.</p>
49.	Additional Clause	<p>BOCW (Building and Other Construction Works) Cess</p> <p>Bidders need to judge the applicability of BOCW for the work. Any liabilities on account of BOCW at any stage shall be on part of bidder and the quoted price shall be inclusive of BOCW charges.</p> <p>If same is not applicable, the bidder needs to submit required undertaking/certificates. The JMRC shall make the deduction accordingly and deposit the amount to the concerned authorities.</p>
50.	Additional Clause	<p>Professional Indemnity Insurance (PII)</p> <p>The Contractor shall effect and maintain professional indemnity insurance, preferably in the name of JMRC, for the amount in Indian Rupees stipulated in Annexure III, SCC in respect of any design of the Works to be carried out by, or on behalf of the Contractor. This insurance, which shall ensure the Contractor's liability by reason of professional negligence and errors in the design of the works, shall be valid from the date of commencement of Works, until 5 years after the date of issue of Performance Certificate. Alternatively the Contractor shall redeem the insurance before the expiry of the Yearly Insurance in such a way that the entire validity period is covered.</p> <p>The Project Manager will not issue Final Payment Certificate until the Contractor has produced evidence that coverage of the</p>

		<p>professional indemnity insurance has been provided for the aforesaid period.</p> <p>The Contractor shall, within the respective periods stated in the Bid documents (calculated from the Commencement Date), submit to the Employer:</p> <p>(a) evidence that the insurances described in this Clause have been effected, with an Insurance Company operating in India, and</p> <p>(b) copies of the policies for the insurances.</p> <p>When each premium has been paid, the contractor shall submit copy of receipts to the employer. The contractor shall also, when providing such evidence, policies and receipts to the employer, notify the Project Manager of so doing.</p> <p>The contractor shall effect all insurances for which he is responsible with insurers and in terms approved by the employer. Each policy insuring against loss or damage shall provide for payments to be made in the currencies required to rectify such loss or damage. Payments received from insurers shall be used for the rectification of such loss or damage.</p> <p>The contractor (and, if appropriate, the employer) shall comply with the conditions stipulated in each of the insurance policies. The contractor shall make no material alteration to the terms of any insurance without the prior approval of the employer. If an insurer makes (or purports to make) any such alteration, the contractor shall notify the employer immediately.</p> <p>If the contractor fails to effect and keep in force any of the insurances required under the contract, or fails to provide satisfactory evidence, policies and receipts in accordance with this sub-clause, the employer may, without prejudice to any other right or remedy, effect insurance for the coverage relevant to such default, and pay the premiums due. In such cases the premium paid by the employer plus overheads (equal to 50% of the premium paid) shall be recoverable from the contractor by the employer, and may be deducted by the employer from any monies due, or to become due, to the contractor or recover the same as debt due from the contractor. The contractor shall not dispute the amount of premium paid by the employer or the overhead charges thereon.</p> <p>Nothing in this clause limits the obligations, liabilities or responsibilities of the contractor or the employer, under the other terms of the contract or otherwise. Any amount not insured or not recovered from the insurers shall be borne by the contractor.</p>
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51.	Additional Clause	<p>As Built Record</p> <p>The Contractor shall prepare, and keep up-to-date, a complete set of “as-built records of the execution of the works, showing the exact “as-built” locations, sizes and details of the works as executed, with cross reference to relevant specifications and data sheets. These records shall be kept on the Site and shall be used exclusively for the purpose of this sub-clause. Four copies shall be submitted to the Project Manager prior to the CMRS inspection of the section.</p> <p>The Contractor shall prepare and submit to the Project Manager “as Built drawings” of the works, showing all works as executed. The drawing shall be prepared as the works proceed and shall be submitted to the Project Manager for his inspection. The Contractor shall obtain the consent of the Project Manager as to their size, the referencing system and other pertinent details.</p> <p>Prior to the issue of any Completion Certificate, the Contractor shall submit to the Project Manager/ Employer one electronic copy, one full-size original copy and two printed copies of the relevant “as-built drawing”, two copies of O&M manuals(if applicable) and any further construction and/or Manufacture Documents specified in the Employers Requirements. The works shall not be considered to be completed for the purpose of Taking Over under Sub- Clause 24.5 until such documents have been submitted to the Project Manager.</p>
52.	Additional Clause	<p>Non-Payment by main Contractors to Sub-Contractors</p> <p>Timely payment to the sub-contractors is the sole responsibility of the main contractor for smooth execution of the work. Though JMRC or Project Manager shall not interface in the day to day management of the contract between the main contractor and the sub-contractor, but if frequent complaints are received from any sub-contractor regarding non-payment or delay in payment by the main contractor to him then JMRC will notify to the main contractor to resolve the issue within the reasonable period (to be specified in the notice) and provide the details to JMRC. In case, the issue is not resolved and the details provided by the main contractor are not considered satisfactory, JMRC at its sole discretion may make direct payment to sub-contractor as per his claim and recover the same from any payment due to the main contractor.</p>

53.	Additional Clause	<p>Performance Certificate</p> <p>The Contract shall not be considered to be completed until the Performance Certificate has been signed by the Project Manager and delivered to the Contractor at the end of Defect Liability Period, stating the date on which the Contractor completed his obligations related to completion of works and rectification of defects during Defect Liability Period to the Project manager's satisfaction. Only the Performance Certificate shall be deemed to constitute approval of the Works.</p>
54.	Additional Clause	<p>Pricing mechanism for additional Sections/Station/Depots/On Board Equipments:</p> <p>The Employer shall have the right to exercise following pricing mechanism for the design, manufacture, supply, install, test and commission (including Integrated Testing and Commissioning) the Automatic Fare Collection System under this contract for additional section/Station/Depot/On board equipment before and after the Last ROD.</p> <p>In the event of having exercised the above the Employer may, without prejudice to any rights that he may have under the Contract, either:</p> <p>a) ask the contractor to submit the price as per the following pricing mechanism and instruct the Contractor to proceed with the Works,(as per SCC clause 7) or</p> <p>b) Invite tenders to award a separate Contract.</p> <p>1. Pricing Mechanism referred to in paragraph (a) above for Order upto last ROD.</p> <p>1.1 For Main Line:</p> <p>(i) The unit rates and the lump sum rates (for those items where unit rates are not available) of Schedules 1-4 for Main Line shall be remain firm for the additional section(s).</p> <p>(ii) In respect of Spares and Special Tools, the price will be determined on the basis of unit rate given in the offer and the quantity decided by the Employer.</p> <p>(iii) There will no additional type of items for additional section(s) than those covered in Schedule 1-4 of this contract.</p> <p>1.2 For Station/Depot(Extension/New):</p> <p>(i) The unit rates and lump sum rates (for those items where unit rates are not available of Schedules 1-4 for station/depot shall remain firm.</p> <p>(ii) For the items quoted as lump sum in Schedule 1-4 for station/depot, pro-rata rates based on material cost shall be applied.</p> <p>(iii) In respect of Spares and Special Tools, The price will be determined on the basis of unit rate given in the offer and the</p>

		<p>quantity decided by the Employer.</p> <p>(iv) There will no additional type of items for additional station/depot(s) than those covered in Schedules 1-4 of this Contract.</p> <p>2. Pricing Mechanism for the Order after the last ROD:</p> <p>2.1 In case, the above is exercised after the last ROD, pricing mechanism shall be same as in item 1.1, & 1.2, above and an escalation as per following methodology shall be applied:</p> <p>(i) Consumer Price Index (CPI) or any other equivalent index of respective country from where the resources are mobilized shall be used for calculating escalation (base date will be date of last ROD).</p> <p>(ii) The consumer price index to be used shall be submitted by tenderer with</p> <p>Tender submission for Employer's review and acceptance. For Schedule (Only Supply Items of Schedules): in case of off shore material- Producer price Index for Industrial product of the respective country shall be used. In case of On shore material- relevant IEEMA formula for Power Electronics shall be used. (base date will be date of last ROD).</p> <p>The producer price index to be used shall be submitted by tenderer with tender submission for Employer's review and acceptance.</p>
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ANNEXURE-I

9/3/13

Notification No. 84/97-Customs

Search

Liste

Seeks to Exempt Imports by United Nations or International organisation for execution of projects in India.

11-11-1997

Notification No. 84/97-Customs

In exercise of the powers conferred by sub-section (1) of section 25 of the Customs Act, 1962 (52 of 1962), read with sub-section (4) of section 68 of the Finance (No. 2) Act, 1996 (33 of 1996), the Central Government, being satisfied that it is necessary in the public interest so to do, hereby exempts all the goods imported into India for execution of projects financed by the United Nations or an International Organisation and approved by the Government of India, from the whole of the duty of customs leviable thereon under First Schedule to the Customs Tariff Act, 1975 (51 of 1975), the whole of the additional duty of customs leviable thereon under section 3 of the said Customs Tariff Act and the whole of the special duty of customs leviable under section 68 of the Finance (No. 2) Act 1996 (33 of 1996):

Provided that the importer, at the time of clearance of the goods, produces before the Assistant Commissioner of Customs or Deputy Commissioner of Customs, as the case may be, having jurisdiction, -

(i) in case the said goods are -

(a) Imported by an international organisation listed in the Annexure appended to this notification and intended to be used in a project that has been approved by the Government of India and financed (whether by a loan or a grant) by such an organisation, a certificate from such organisation that the said goods are required for the execution of the said project and that the said project has duly been approved by the Government of India; or

(b) imported for use in a project that has been approved by the Government of India and financed (whether by a loan or a grant) by an international organisation listed in the said Annexure, a certificate from an officer not below the rank of Deputy Secretary to the Government of India, in the Ministry of Finance (Department of Economic Affairs) that the said goods are required for the execution of the said project and that the said project has duly been approved by the Government of India;

(ii) in case the said goods are intended to be used in a project financed (whether by a loan or a grant) by the World Bank, the Asian Development Bank or any other international organisation other than those listed in the Annexure, and the said project has been approved by the Government of India, a certificate from the executive head of the Project Implementing Authority and countersigned by an officer not below the rank of a Joint Secretary to the Government of India, in the concerned Line Ministry in the Government of India, that the said goods are required for the execution of the said project and that the said project has duly been approved by the Government of India, and

(iii) in case the said goods are intended to be used in a project financed (whether by a loan or a grant) by the World Bank, the Asian Development Bank or any other international organisation, other than those listed in the Annexure and the said project has been approved by the Government of India for implementation by the Government of a State or a Union Territory, a certificate from the executive head of the Project Implementing Authority and countersigned by the Principal Secretary or the Secretary (Finance), as the case may be, in the concerned State Government or the Union Territory, that the said goods are required for the execution of the said project, and that the said project has duly been approved by the Government of India for implementation by the concerned State Government.

Explanation. - For the purposes of this notification, -

(a) "international organisation" means an international organisation to which the Central Government has declared, in pursuance of section 3 of the United Nations (Privileges and Immunities) Act, 1947 (46 of 1947), that the provisions of the Schedule to the said Act shall apply;

(b) "Line Ministry" means a Ministry in the Government of India, which has been so nominated with respect to a project, by the Government of India, in the Ministry of Finance (Department of Economic Affairs).

www.cbec.gov.in/customs/cs-act/notifications/notifs-before2k/cs84-97c.htm

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9/5/2013

Notification No. 84/97-Customs

133-5-

ANNEXURE

1. United Nations Development Programme,
2. United Nations International Childrens' Fund,
3. Food and Agricultural Organisation,
4. International Labour Organisation,
5. World Health Organisation,
6. United Nations Population Fund.
7. United Nations World Food Programme.
8. United Nations Industrial Development Organisation.

Notification No. 84/97-Cus., dated 11-11-1997 as amended by Notification No. 85/99-Cus., dated 6-7-1999 and No. 119/99-Cus., dated 2-11-1999. and Notification No. 75/2001 dt. 0-07-01 and Notification No. 107/2001-Cus., dated 12.10.2001.

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Cus Ntf No.85/1999 Date 6/7/1999

Imports for Projects financed by UN - Duty Exemption conditions changed

In exercise of the powers conferred by sub-section (1) of section 25 of the Customs Act, 1962 (52 of 1962), the Central Government, being satisfied that it is necessary in the public interest so to do, hereby makes the following amendment in the notification of the Government of India in the Ministry of Finance (Department of Revenue), No.84/97Customs, dated the 11th November, 1997, namely:

In the said notification,-

- i. for the words "all the goods imported into India by the United Nations or an international organisation for execution of projects financed by them", the following words shall be substituted, namely:-

"all the goods imported into India for execution of projects financed by the United Nations or an international organisation"

- ii. for the proviso, the following shall be substituted, namely: -

"Provided that the importer, at the time of clearance of the goods, produces before the Assistant Commissioner of Customs or Deputy Commissioner of Customs, as the case may be, having jurisdiction:-

- i. in case the said goods are intended to be used in a project financed (whether by a loan or a grant) by the United Nations and the said project has been approved by the Government of India, a certificate from an officer not below the rank of a Deputy Secretary to the Government of India, in the Ministry of Finance (Department of Economic Affairs), that the said goods are required for the execution of the said project financed by the United Nations and that the said project has duly been approved by the Government of India, or
- ii. in case the said goods are intended to be used in a project financed (whether by a loan or a grant) by the World Bank, the Asian Development Bank or any other international organisation, and the project has been approved by the Government of India, a certificate from the executive head of the Project Implementing Authority and countersigned by an officer not below the rank of a Joint Secretary to the Government of India, in the concerned Line Ministry in the Government of India, that the said goods are required for the execution of the said project and that the said project has duly been approved by the Government of India, and
- iii. in case the said goods are intended to be used in a project financed (whether by a loan or a grant) by the World Bank, the Asian Development Bank or any other international organisation, and the said project has been approved by the Government of India for implementation by the Government of a State or a Union Territory a certificate from the executive head of the Project Implementing Authority and countersigned by the Principal Secretary or the Secretary (Finance), as the case may be, in the concerned State

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Government or the Union Territory, that the said goods are required for the execution of the said project, and that the said project has duly been approved by the Government of India for implementation by the concerned State Government";

iii. for the Explanation, the following Explanation shall be substituted, namely:-

"Explanation For the purposes of this notification,-

- a. "international organisation" means an international organisation to which the central Government has declared, in pursuance of section 3 of the United Nations (Privileges and Immunities) Act, 1947 (46 of 1947), that the provisions of the Schedule to the said Act shall apply;
- b. "Line Ministry" means a Ministry in the Government of India, which has been so nominated with respect to a project, by the Government of India, in the Ministry of Finance (Department of Economic Affairs)".

Sd/-
(Prashant Kumar Sinha)
Under Secretary to the Government of India

Issued by:
Ministry of Finance Department of Revenue
New Delhi.

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Notification No. 108/95-CE, Dt. 28-8-95**Goods supplied to UN/Intnl. Organisations or Proj.****As amended vide Central Excise Notification No. 7/98-CE, dt. 2-6-1998; 33/98-CE, dt. 13-10-1998; 4/99-CE, dt. 11-2-99 and 40/99-CE, dt. 2-11-99.**

In exercise of the powers conferred by sub-section (1) of section 5A of the Central Excises and Salt Act, 1944 (1 of 1944) read with sub-section (3) of section 3 of the Additional Duties of Excise (Goods of Special Importance) Act, 1957 (58 of 1957), the Central Government, being satisfied that it is necessary in the public interest so to do, hereby exempts all goods falling under the Schedule to the Central Excise Tariff Act, 1985 (5 of 1986) (hereinafter referred to as the said goods) when supplied to the United Nations or an international organisation for their official use or supplied to the projects financed by the said United Nations or an international organisation and approved by the Government of India, from the whole of-

(i) the duty of excise leviable thereon under section 3 of the Central Excises Act, 1944 (1 of 1944); and

(ii) the additional duty of excise leviable thereon under sub-section (1) of section 3 of the Additional Duties of Excise (Goods of Special Importance) Act, 1957 (58 of 1957);

Provided that before clearance if the said goods, the manufacturer produces before the Assistant Commissioner of Central Excise having jurisdiction over his factory :-

(a) in case the said goods are intended for the official use by the United Nations or an international organisation, a certificate from the United Nations or that international organisation that the said goods are intended for such use;

(b) in case of the said goods are-

(i) Supplied to an international organisation listed in the Annexure appended to this notification for use in a project that has been approved by the Government of India and financed (whether by a loan or a grant) by such an organisation, a certificate from such an organisation that the said goods are required for the execution of the said project and that the said project has duly been approved by the Government of India; or

(ii) Supplied to a project that has been approved by the Government of India and financed (whether by a loan or a grant) by an international organisation listed in the said annexure, a certificate from an officer not below the rank of Deputy Secretary to the Government of India, in the Ministry of finance (Department of Economic Affairs) that the said goods are required for the execution of the said project and that the said project has duly been approved by the government of India;

(Above b) i & ii have been substituted vide Cen Exc NTF 40/99 dt. 2-11-99)

(c) in case the said goods are intended to be supplied to a project financed (whether by a loan or a grant) by the World Bank, the Asian Development Bank or any international organisation, other than those listed in the

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Annexure, and

(Above c) has been amended vide Cen Exc NTF 40/99 dt. 2-11-99)

(i) if the said project has been approved by the Government of India, a certificate from the executive head of the Project Implementing Authority and countersigned by an officer not below the rank of a Joint Secretary to the Government of India, in the concerned Line Ministry in the Government of India, that the said goods are required for the execution of the said project and that the said project has duly been approved by the Government of India, and

(ii) if the said project has been approved by the Government of India for implementation by the Government of a State or a Union Territory, a certificate from the executive head of the Project Implementing Authority and countersigned by the Principal Secretary or the Secretary (Finance), as the case may be, in the concerned State Government or the Union Territory, that the said goods are required for the execution of the said project, and that the said project has duly been approved by the Government of India for implementation by the concerned State Government.

(Above proviso has been amended vide Central Excise Notification No. 4/99 dt. 11-2-99)

Explanation.—For the purpose of this notification,–

(a) "international organisation" means an international organisation to which the Central Government has declared, in pursuance of section 3 of the United Nations (Privileges and Immunities) Act, 1947 (46 of 1947), that the provisions of the Schedule to the said Act shall apply;

(b) "Line Ministry" means a Ministry in the Government of India, which has been so nominated with respect to a project, by the Government of India, in the Ministry of Finance (Department of Economic Affairs).'

(Above explanation has been amended vide Central Excise Notification No. 4/99 dt. 11-2-99)

ANNEXURE

1. United Nations Development Programme,
2. United Nations International Childrens' Fund,
3. Food and Agricultural Organisation,
4. International Labour Organisation,
5. World health Organisation,
6. United Nations Population Fund.
7. United Nations World Food Programme

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8. United Nations Industrial Development Organisation.

(Above Sl. No. (8.) has been inserted vide Ntf. No. 50/2001-CE, dt. 12-10-2001)

(Above Sl. No. (7.) has been inserted vide Ntf. No. 36/2001-CE, dt. 6-7-2001)

(Above ANNEXURE has been added vide Cen NTF 40/99 dt. 2-11-99)

(Note:-see Ntf. No. 31/2001-CE(NT), dt. 21/06/2001)

Annexure-II

(Refer Clause 41 of SCC)

(To be stamped in accordance with Stamp Act)

INDENTURE FOR STAGE PAYMENT

THIS INDENTURE made onbetween(hereinafter called the contractor) which expression shall where the context do admits or implies be deemed to include its executors, administrators and assigns of the one part and the Jaipur Metro Rail Corporation Ltd. (herein after called JMRC of the other part.)

WHEREAS by the agreement (LOA No dated.....) (hereinafter called the said agreement) the contractor has agreed to "Design, Manufacture, Supply, Installation, Testing and Commissioning of AFC System for two underground Metro Stations at Chhoti Chouper and Badi Chouper on East-West Corridor of Jaipur Metro Phase- 1B" and whereas the contractor has applied to the JMRC Ltd. That they may be allowed advance on the security of materials absolutely belonging to them and brought by them to the site of the works covered under the project of the said agreement for use in the construction of such of the work as they have under taken to execute at rates fixed for the finished work (inclusive of the cost of materials and labour and other charges).

AND WHEREAS the JMRC Ltd. Has agreed to make stage payment to the contractor the total sum of Rs.----- (Rupees -----only) for stage payment Bill. The quantities and other particulars of which are detailed in this bill for the said works signed by the Contractor on "....." and JMRC Ltd has reserved to itself option of making any further advances till date on the security of other materials brought by the contractor to site of the said work.

NOW THIS INDENTURE WITNESS that in pursuance of the said agreement and its consideration of the sum of Rs. ----- (Rupees -----only) on or before the execution of these present amount paid to the contractor by the JMRC Ltd (the receipt where of the contractor) both hereby acknowledge and of such further Stage payment, if any, as may be made to him so aforesaid to the contractor do the covenant and agreed with the JMRC Ltd and declare as follows:

1. That the said sum of **Rs. ----- (Rupees ----- only)** so Stage Payment by the JMRC Ltd to the contractors as aforesaid and all or any further sum or sum's advanced as aforesaid shall be employed by the contractor in or towards the execution of the said works and for no other purpose whatsoever.
2. That the Stage Payment detailed in the said running account bill which have been offered to and accepted by the JMRC Ltd as security are absolutely the contractor's own property and free from encumbrances of any kind and the contractor's shall not make any application for or receive any further payments on the security of work executed which are not absolutely his own property and free from encumbrances of any kind the Contractor indemnifies the JMRC Ltd against all claims on any materials in respect of which any Stage Payment has been made to him as aforesaid.
3. That the Stage Payment detailed in the said running account bill and all other stage payments on the security of which further payments or Stage Payment any hereafter be made as aforesaid (hereinafter

called the said materials) shall be used by the contractor solely in the execution of the said works in accordance with the directions of the Project Manager / JMRC Ltd and in the terms of the said agreement.

4. That the contractor shall be fully liable for the materials/components and shall make at his own cost all necessary and adequate arrangement for the proper watch, safe custody and protection against all risks including, acts of the God of the said materials/components and provide on approved insurance in favour of JMRC Ltd that until used in construction as aforesaid the said materials shall remain at the site of said works in the contractor's custody and on his own responsibility and shall at the time be open to inspection by the Project Manager /JMRC Ltd. This insurance will be valid for a period until this material is approved and fixed in the building or advance has been fully recovered from contractor.
5. That the said materials/components shall not on any account be removed/shifted from the site of the works except with the written permission of the Project Manager /JMRC Ltd.
6. That issue of any Stage Payment excess of what is finally required to be used at site would be the contractor's property without any liability on JMRC Ltd., who would recover the cost of this from the contractor.
7. That the contractor hereby charges all the said materials components with the repayment to the JMRC of the said sum of **Rs. ----- (Rupees -----only)** and any further sum or sums advanced as aforesaid and all cost charges. Damages and expenses payable under these presents provided always and it is hereby agreed and declared that not with power contained therein, if any, whenever the convenient for payment, and repayment herein before contained shall become enforceable and the money owned shall not be paid in accordance therewith, the JMRC Ltd., may at any time thereafter adopt all or any of the following courses as he may deem best.
 - a. That if the contractor shall at any time not be able to complete any part of the Component / equipment as per provision in contract Agreement it shall be considered as the work being left incomplete by the contractor and action as per the conditions of the contract shall be taken.
 - b. Deduct all or any of the money owing out of the performance security or any sum due to the contractor under the said agreement.

That in the event of any conflict between the provisions of these presents and the said agreement the provisions of these presents shall prevail.

This widening shall be co-extensive to the agreement dated between Jaipur Metro Rail Corporation Limited, Khanij Bhawan, Tilak Marg, C-Scheme, Jaipur (Rajasthan), India, PIN-302 005. (Client) and (Contractor).

IN WITNESS where of the said contractor and by the order under the direction of JMRC Ltd has here set their respective hands the day and years first above written.

Signed, Sealed & Delivered by the said Contractor:

**IN THE PRESENCE OF:
WITNESS:**

1. NAME:

Signature:

SIGNED BY (ADDRESS)

BY THE ORDER AND DIRECTION OF THE JMRC LTD IN THE PRESENCE OF:

SIGNATURE:

WITNESS

(NAME AND ADDRESS)

Annexure-III**REQUIREMENTS UNDER GCC/SCC**

S.N	DESCRIPTION	Clause Ref.	REQUIREMENT
i	Amount of Performance Security	Clause 11 of the SCC	10% of the Contract Price in types and proportions of currencies in which the contract price is payable. In the event of variations during the execution of the contract which result in payments to the Contractor over and above the contract price, the Performance Security shall be suitably adjusted.
ii	Latest 'date for commencement' of the Works	Clause 4 of the SCC	As per the referred clauses of SCC
iii	'Time for completion' of the work from the date of commencement of the work	Clause 8.2 of the GCC	<i>As per key dates in Appendix-4, Section 9 of Contract.</i>
iv	Liquidated Damages	Clause 28 of the SCC	i) 0.05% of the fixed Lump Sum price per day of delay for the Key Dates related to the Taking-Over of a Section, and the Taking-Over of the whole of the Works. ii) 0.005% of the fixed Lump Sum price per day of delayed other than the ones relating to the Taking-Over of a Section. iii) The maximum limit shall be 10% of the contract price.
v	'Defects Liability Period' for the whole of the Works	Clause 29 of the SCC	As per clause 29 of SCC from the date of ROD for the equipments and systems employer starts using and accepted by employer for DLP.
vi	Amount of advance payment	Clause 10 of the SCC	As per the referred clauses of SCC
vii	Amount of Professional Indemnity Insurance (PII). (for	Clause 52 of SCC	Rs 6.6 million

	the contracts having Design in scope of work)		
viii	Insurance cover for Contractor's All Risk and other requirements as specified in the GCC	Clause 34 of the GCC	100% of the Total Contract Price.
ix	Amount of Third Party Insurance	Clause 34 of GCC	INR 0.50 Million for any one incident, with no. of incidents unlimited.
x	Period in which all insurances have to be submitted	Clause 34 of GCC	Within 12 weeks from the "Date of commencement of Work"
xi	Contract Key Dates		As per Appendix-4 of Contract Forms

- (a) he will execute and complete the Sub-contract works/supply, and will carry out each and all of the obligations, duties and undertakings of the Sub-contractor/Vendor under the Sub-contract when and if such obligations, duties and undertakings shall become due and performable, in accordance with the terms of the Sub-contract (as the same may from time to time be varied or amended with the consent of the Employer); and
 - b) he will supply to the Contractor and in specific cases wherever required to the Employer's Representative with all information as may be required from time to time in relation to progress of the Sub-contract works/supply.
- 2. The Sub-contractor/Vendor undertakes to indemnify the Employer against each and every liability which the Employer may have to any person whatsoever and against any claims, demands, proceedings, loss, damages, costs and expenses sustained, incurred or payable by the Employer provided that the Sub-contractor/Vendor shall have no greater liability to the Employer by virtue of this Warranty than the liability of the Contractor to the Employer under the Contract insofar as and to the extent that the same has arisen by reason of any breach by the Sub-contractor/Vendor of his obligations under the Sub-contract.
- 3. No allowance of time by the Employer hereunder or by the Contractor under the Sub-contract nor any forbearance or forgiveness in or in respect of any matter or thing concerning this Warranty or the Sub-contract on the part of the Employer or the Contractor, nor anything that the Employer or the Contractor may do or omit or neglect to do, shall in any way release the Sub-contractor/Vendor from any liability under this Warranty.
- 4. The Sub-contractor/Vendor agrees that he will not without first giving the Employer not less than 21 day's prior notice in writing exercise any right he may have to terminate the Sub-contract or treat the same as having been repudiated by the Contractor or withhold performance of his obligations under the Sub-contract.
- 5. (1) In the event that the Contract or the employment of the Contractor under the Contract is terminated for any reason whatsoever and if so requested by the Employer in writing within 21 days of such termination, the Sub-contractor/Vendor shall carry out and complete his obligations under this Warranty and shall enter into a novation agreement with the Employer and the Contractor in which the Sub-contractor/Vendor will undertake inter alia to perform the Sub-contract and be bound by its terms and conditions as if the Employer had originally been named as a contracting party in place of the Contractor. The said novation agreement will be in such form as the Employer may reasonably require.
 - (2) In the event that the Employer does not require the Sub-contractor/Vendor to enter into a novation agreement as required by Sub-clause 5(1), the Sub-contractor/Vendor shall have no claim whatsoever against the Employer for any damage, loss or expense howsoever arising out of or in connection with this Warranty.
- 6. Insofar as the copyright or other intellectual property rights, in any plans, calculations, drawings, documents, materials, know-how and information relating to the Sub-contract works/supply shall be vested in the Sub-contractor/Vendor, the Sub-contractor/Vendor grants to the Employer, his successors and assignees a royalty free, non-exclusive and irrevocable licence (carrying the right to grant sub-licences) to use and reproduce any of the works designs or inventions incorporated and

referred to in such documents or materials and any such know-how and information for all purposes relating to the works of the Mass Rapid Transport System – Jaipur Metro, without limitation the design, manufacture, installation, reconstruction, completion, reinstatement, extension, remedy of any defect of the works. To the extent beneficial ownership of any such copyright or other intellectual property right is vested in anyone other than the Sub-contractor/Vendor, the Sub-contractor/Vendor shall use best endeavours to procure that the beneficial owner thereof shall grant a like licence to the Employer. For the avoidance of doubt, any such licence granted shall not be determined if the Sub-contractor/Vendor shall for any reason cease to be employed in connection with the Sub-contract Works.

7. In the event of any ambiguity or conflict between the terms of the Sub-contract and this Warranty, the terms of this Warranty shall prevail.
8. The provisions of this Warranty shall be without prejudice to and shall not be deemed or construed so as to limit or exclude any rights or remedies which the Employer may have against the Sub-contractor/Vendor whether in tort or otherwise.
9. Nothing contained in this Warranty shall vary or affect the Sub-contractor's/Vendor's rights and obligations under the Sub-contract.
10. The Employer shall be entitled to assign the benefit of this Warranty at any time without the consent of the Sub-contractor/Vendor being required.
11. All documents arising out of or in connection with this Warranty shall be served:
 - (1) upon the Employer at [], marked for the attention of [];
 - (2) upon the Sub-contractor/Vendor, at [] India.
12. The Employer and the Sub-contractor/Vendor may change their respective nominated addresses for service of documents to another address in India but only by prior written notice to each other. All demands and notices must be in writing.
13. This Warranty shall be governed by and construed according to the laws for the time being in force in India.
14.
 - (1) Any dispute or difference of any kind whatsoever between the Employer and the Sub-contractor/Vendor arising under out of or in connection with this Warranty shall be referred to arbitration in accordance with the Arbitration as described in the Contract.
 - (2) In the event that the Employer is of the opinion that the issues in such a dispute or difference will or may touch upon or concern a dispute or difference arising under out of or in connection with the Contract ("the Contract Dispute") then provided that an arbitrator has not already been appointed pursuant to Clause 14(1), the Employer may by notice in writing to the Sub-contractor/Vendor require and the Sub-contractor/Vendor shall be deemed to have consented to the referral of such dispute or difference to the arbitrator to whom the Contract Dispute has been or will be referred.
 - (3) Save as expressly otherwise provided, the arbitrator shall have full power to open up, review and revise any decision, opinion, instruction, notice, order, direction, withholding of approval or consent, determination, certificate, statement of objection, assessment or valuation by the Employer's Representative or the Contractor relating to the dispute or difference.

IN WITNESS whereof this Warranty has been executed as a deed on the date first before written.

THE COMMON SEAL of)

[])

was affixed hereto in)

the presence of:-)

Annexure-V**FORM OF DESIGNER'S WARRANTY**

(On Non-Judicial Stamp Paper)

(Refer Clause 16 of the SCC)

THIS AGREEMENT is made the _____ day of _____**BETWEEN:**

- (1) [_____] [whose registered office is at]/[of] [_____] ("the Designer"); and
- (2) The Jaipur Metro Rail Corporation Limited (together with its successors and assigns, "the Employer")
of
RAJSICO Building
3rd Floor,
Udhyog Bhawan Premises ,
C-Scheme, Jaipur ,
India.

WHEREAS:

- (a) By a contract _____ dated [_____] ("the Contract") made between (1) Jaipur Metro Rail Corporation Limited ("the Employer") and (2) [_____] ("the Contractor"), the Contractor has agreed to design, execute, complete, test and commission (including Integrated Testing and Commissioning) and remedy any defect in the Works upon the terms and conditions contained in the Contract.
- (b) The Designer has had an opportunity of reading and noting the provisions of the Contract (other than details of the Contractor's prices and rates).
- (c) Pursuant to the Contract, the Contractor wishes to enter into an agreement with the Designer and Designer agrees to the wishes of the Contractor (the Consultancy agreement) to carry out the Contractor's obligations under the Contract in relation to the design and functions ascribed to the Designer in the Contract.
- (d) The Contract stipulates that the Contractor shall ensure that the Designer executes a warranty agreement in favour of the Employer.

NOW IT IS HEREBY AGREED as follows:

1. In consideration of the Employer not objecting to the Contractor and the Designer entering into the Consultancy Agreement, the Designer warrants and undertakes to the Employer that he has exercised and will continue to exercise all the skill and care to be expected of a professionally qualified and competent designer experienced in work of similar nature and scope as the Works in carrying out the design of the Works and in performing the other duties and functions ascribed to him in the Contract.
2. The Designer agrees that, in the event of the termination of the Contract by the Employer, the Designer will, if so required by notice in writing given by the Employer, accept subject to Clause 4 the instructions of the Employer or his appointee to the exclusion of the Contractor in respect of the

carrying out and completion of the Works upon the terms and conditions of the Consultancy Agreement.

3. The Designer further agrees that he will not, without first giving the Employer not less than 21 days' previous notice in writing, exercise any rights it may have to terminate the Consultancy Agreement or to treat the same as having been repudiated by the Contractor or to discontinue the performance of any duties to be performed by the Designer pursuant thereto. The Designer's right to terminate the Consultancy Agreement or to treat the same as having been repudiated or to discontinue the performance thereof shall cease if, within such period of notice and subject to Clause 4, the Employer shall give notice in writing to the Designer requiring the Designer to accept the instructions of the Employer or his appointee to the exclusion of the Contractor in respect of the carrying out and completion of the Contract Works upon the terms and conditions of the Consultancy Agreement.
4. Any notice given by the Employer under Clause 2 or 3 shall state that the Employer or his appointee accepts liability for payment of the fees payable to the Designer under the Consultancy Agreement and for performance of the Contractor's obligations under the Consultancy Agreement, including payment of any fees outstanding at the date of such notice.
5. The Employer shall be entitled to assign the benefit of this Warranty at any time without the consent of the Designer being required.
6. All documents arising out of or in connection with this Warranty shall be served:
 - (1) upon the Employer at [] marked for the attention of [];
 - (2) upon the Designer at [].
7. The Employer and the Designer may change their respective nominated addresses for service of documents to another address in India but only by prior written notice to each other. All demands and notices must be in writing.
8. This Warranty shall be governed by and construed according to the laws for the time being in force in India.
9. Except to the extent (if any) expressly permitted by the Consultancy Agreement, the Designer shall not sub-contract any of the Designer's obligations under the Consultancy Agreement without the prior written consent of the Employer's Representative.
10. Without prejudice to its obligations under this Warranty, the Designer shall maintain with well established underwriters of repute and on terms and conditions reasonably acceptable to the Employer, professional indemnity insurance (as per Clause 41 of the Special Conditions of Contract) in respect of the Designer and its sub-consultants for Indian Rupees One Million ~~two hundred fifty thousand~~ (11,250,000 10,00,000 Rupees) in relation to his design of the Works for any one occurrence or series of occurrences arising out of any one event from the date of notification of acceptance until 5 years after the issue of Performance Certificate for the whole of works. The Designer shall immediately inform the Employer if for

any reason professional indemnity insurance is not maintained in accordance with this Warranty or becomes void or unenforceable.

11. Insofar as the patent, copyright or other intellectual property rights in any Design Data (as defined in the Contract), plans, calculations, drawings, documents, materials, computer software, know-how and information relating to the Works shall be vested in the Designer, the Designer grants to the Employer his successors and assigns a royalty-free, non-exclusive and irrevocable licence (carrying the right to grant sub-licences) to use and reproduce any of the works designs or inventions incorporated and referred to in such documents or materials and any such know-how and information for all purposes relating to the Works (including without limitation the design, construction, reconstruction, completion, reinstatement, extension, repair and operation of the Works). To the extent beneficial ownership of any such patent, copyright or other intellectual property right is vested in anyone other than the Designer or the Contractor, the Designer shall use his best endeavours to procure that the beneficial owner thereof shall grant a like licence to the Employer. Any such licence granted shall not be determined if the Designer shall for any reason cease to be employed in connection with the Works.
12. (1) Any dispute or difference of any kind whatsoever between the Employer and the Designer arising under out of or in connection with this Warranty shall be referred to arbitration in accordance with Clause 45 of GCC . "Dispute" as defined in the Contract shall be deemed to include any such dispute or difference between the Employer and the Designer.
- (2) In the event that the Employer is of the opinion that the issues in such a dispute or difference will or may touch upon or concern a dispute or difference arising under out of or in connection with the Contract ("the Contract Dispute") then provided that an arbitrator has not already been appointed, the Employer may by notice in writing to the Designer require and the Designer shall be deemed to have consented to the referral of such dispute or difference to the arbitrator to whom the Contract Dispute has been or will be referred.
- (3) Save as expressly otherwise provided, the arbitrator shall have full power to open up, review and revise any decision, opinion, instruction, notice, order, direction, withholding of approval or consent, statement of objection, determination, certificate, assessment or valuation by the Employer's Representative or the Contractor, relating to the dispute or difference.

IN WITNESS whereof this Warranty has been executed as a deed on the date first before written.

THE COMMON SEAL of)
 [Designer])
 was affixed hereto in)
 the presence of:-)

Annexure-VI

PARENT COMPANY UNDERTAKING

(On Non-Judicial Stamp Paper)

(Refer Clause 9 of SCC)

THIS UNDERTAKING is made the day of

BY [] [whose registered office is at]/[of] [] ("the Parent Company").

TO The JAIPUR METRO RAIL CORPORATION LIMITED together with its successors and assigns, "the Employer") of:

RAJSICO Building
3rd Floor,
Udhyog Bhawan Premises ,
C-Scheme, Jaipur ,
India.

1.1.a.c.1.1.1 WHEREAS

(A) By a contract _____ dated [] ("the Contract") made between (1) the Jaipur Metro Rail Corporation Limited (" the Employer") and

(2) [] ("the Contractor") the Contractor has agreed to design, execute, complete and remedy any defects in the works ("the Works") upon the terms and conditions contained in the Contract.

(B) Pursuant to the terms of the Contract, the Contractor has agreed to procure the provision of an undertaking in the terms hereof.

(C) The Parent Company is the beneficial owner of []% [see Note 1] of the issued share capital of [the Contractor] [see Note 2].

(D) At the request of the Contractor, the Parent Company has agreed to provide this undertaking.

NOW IT IS HEREBY UNDERTAKEN AND AGREED as follows:

1. In consideration of the Employer entering into the Contract with the Contractor, the Parent Company hereby undertakes to the Employer that, without the written consent of the Employer, it will not [and will ensure that none of the companies referred to in Recital (C) will] [see Note 5]:-

(a) sell transfer assign or otherwise dispose of or deal with ownership of the whole or any part of EITHER [the share holding or other interest in the [Contractor] [see Note 3] OR [the share holdings or other interests] [see Note 4] referred to in Recital (C) in any way which will affect

the beneficial ownership and control in [the Contractor] [see Note 3] of the Parent Company [and the other companies referred to in Recital (C)] [see Note 5]; and

- (b) take any action which may result in the Contractor being unable to comply with his obligations or perform in any way his duties under the Contract [or take any action which may result in [the subsidiary forming part of the Contractor] [see Note 3] being unable to comply with his obligations or perform in any way his duties under the [joint venture or other relevant] agreement] [see Note 6]

until such time as the Works shall have been completed, all the Contractor's obligations under the Contract shall have been performed and the Maintenance and Defects Liability Period (as defined in the Contract) for the whole and every part of the Works shall have elapsed and further that it will ensure [that the subsidiary forming part of the Contractor will take all steps necessary to ensure [see Note 6]] compliance by the Contractor with the provisions of the Contract.

2. The obligations of the Parent Company under this Undertaking shall remain in full force and effect and shall not be affected or discharged in any way and the Parent Company hereby waives notice of:-
 - (a) any suspension of the Works, variation or amendment to the Contract (including without limitation extension of time for performance) or any concession or waiver by the Employer in respect of the Contractor's obligations [and/or the obligations of [] [see Note 7];
 - (b) any provision of the Contract being or becoming illegal, invalid, void, voidable or unenforceable;
 - (b) the termination of the Contract or of the employment of the Contractor [and/or [] [see Note 7] under the Contract for any reason;
 - (d) any forbearance or waiver of any right of action or remedy the Employer may have against the Contractor [and/or [] [see Note 7] or negligence by the Employer in enforcing any such right of action or remedy;
 - (e) any bond, undertaking, security or other guarantee held or obtained by the Employer for any of the obligations of the Contractor [and/or [] [see Note 7] under the Contract or any release or waiver thereof.
3. This Undertaking shall extend to any variation of or amendment to the Contract and to any agreement supplemental thereto agreed between the Employer and the Contractor [and/or [] [see Note 7] and for the avoidance of doubt the Parent Company hereby authorises the Employer and the Contractor [and/or [] [see Note 7] to make any such amendment, variation or supplemental agreement.
4. All documents arising out of or in connection with this Undertaking shall be served:
 - (a) upon the Employer, at [] marked for the attention of [];
 - (b) upon the Parent Company, at [] India. [Note 8]
5. The Employer and the Parent Company may change their respective nominated addresses for service of documents to another address in India but only by prior written notice to each other. All demands and notices must be in writing.

6. This Undertaking shall be governed by and construed according to the laws for the time being in force in India and the Parent Company agrees to submit to the jurisdiction of the courts of India.

IN WITNESS whereof this Undertaking has been executed as a deed on the date first before written.

THE COMMON SEAL of)
 [])
 was affixed hereto)
 in the presence of:-)

Notes: (for preparation of but not for inclusion in the engrossment of this Undertaking)

1. If the Parent Company is not the immediate parent company, the chain of ownership must be recited, identifying each company in the chain and the shareholdings or other interests in each subsidiary.
2. If the Contractor comprises more than one company, that fact and the joint venture or other relevant agreement must be recited. In such case, insert the name of the subsidiary forming part of the joint venture, partnership or consortium, and in respect of which the parent company undertaking is being given.
3. If Note 2 applies, refer to the subsidiary of the Parent Company and not the Contractor.
4. If Note 1 applies, use this alternative.
5. If Note 1 applies, add this provision.
6. If Note 2 applies, add this provision.
7. If Note 2 applies, add this provision and insert the name of the subsidiary.
8. The address for service shall be in India.

Annexure-VII**PARENT COMPANY GUARANTEE**

(On Non-Judicial Stamp Paper)

(Refer Clause 9 of SCC)THIS GUARANTEE is made the day of**BETWEEN:-**

- (1) [] whose registered office is at [] [and [] whose registered office is at [] ("the Guarantor").
- (2) The Jaipur Metro Rail Corporation Limited (together with its successors and assigns, "the Employer") of:

RAJSICO Building
3rd Floor,
Udhyog Bhawan Premises,
C-Scheme, Jaipur ,
India.

WHEREAS

- (A) By a contract _____ dated [] ("the Contract") made between (1) the Jaipur Metro Rail Corporation Limited ("the Employer") and
- (2) [] ("the Contractor"), the Contractor has agreed to design, execute, complete and remedy any defects in the Works upon the terms and conditions contained in the Contract.
- (B) Pursuant to the terms of the Contract, the Contractor has agreed to procure the provision of a guarantee in the terms hereof. [see Note 1].
- (C) At the request of the Contractor, the Guarantor has agreed to guarantee performance of the Contract by the [Contractor] [see Note 2] as set out herein.

IT IS HEREBY AGREED AS FOLLOWS:

1. In consideration of the Employer entering into the Contract with the Contractor, the Guarantor irrevocably and unconditionally guarantees to the Employer as a primary obligation and not as a surety due performance by the [Contractor] [see Note 2] of all of its obligations and liabilities under and in accordance with the Contract save that nothing herein shall be construed as imposing greater obligations or liabilities on the Guarantor than are imposed on the [Contractor] [see Note 2] in the Contract.

2. The obligations of the Guarantor under this Guarantee shall remain in full force and effect and shall not be affected or discharged in any way by and the Guarantor hereby waives notice of:-
 - (a) any suspension of the Works, variation to or amendment of the Contract (including without limitation extension of time for performance) or any concession or waiver by the Employer in respect of the Contractor's obligations [and/or the obligations of [] [see Note 3] under the Contract;
 - (b) any provision of the Contract being or becoming illegal, invalid, void, voidable or unenforceable;
 - (c) the termination of the Contract or of the engagement of the Contractor [and / or [...]] [see Note 3] under the Contract for any reason;
 - (d) any forbearance or waiver of any right of action or remedy the Employer may have against the Contractor [and / or [...]] [see Note 3] or negligence by the Employer in enforcing any such right of action or remedy;
 - (e) any bond, undertaking, security or other guarantee held or obtained by the Employer for any of the obligations of the Contractor [and / or [...]] [see Note 3] under the Contract or any release or waiver thereof.
3. This Guarantee shall extend to any variation of or amendment to the Contract and to any agreement supplemental thereto agreed between the Employer and the Contractor [and/or [] [see Note 3]] and for the avoidance of doubt the Guarantor hereby authorises the Employer and the Contractor [and/or [] [see Note 3]] to make any such amendment, variation or supplemental agreement.
4. This Guarantee is a continuing guarantee and accordingly shall cover all of the obligations and liabilities of the [Contractor] [see Note 2] under the Contract and remain in full force and effect until all the said obligations and liabilities of the Contractor shall have been carried out, completed and discharged in accordance with the Contract. This Guarantee is in addition to any other security which the Employer may at any time hold and may be enforced without first having recourse to any such security or taking any steps or proceedings against the Contractor.
5. Until expiry of the Maintenance and Defects Liability Period (as defined in the Contract) for the whole and every part of the Works, the Guarantor shall not on any ground whatsoever make any claim or threaten to make any claim whether by proceedings or otherwise against the Contractor [and/or [] [see Note 3]] for the recovery of any sum paid by the Guarantor pursuant to this Guarantee. Any such claim shall be subordinate to any claims (contingent or otherwise) which the Employer may have against the Contractor [and/or [] [see Note 3]] arising out of or in connection with the Contract until such time as such claims shall be satisfied by the Contractor [and/or [] [see Note 3]] or the Guarantor as the case may be. To that intent the Guarantor shall not claim or have the benefit of any security which the Employer holds or may hold for any monies or liabilities due or incurred by the Contractor [and/or [] [see Note 3]] to the Employer and, in case the Guarantor receives any sum from the Contractor [and/or [] [see Note 3]] in respect of any payment by the Guarantor hereunder, the Guarantor shall hold such sum in trust for the Employer for so long as any sum is payable (contingently or otherwise) under this Guarantee.

6. The Employer shall be entitled to assign the benefit of this Guarantee at any time without the consent of the Guarantor or the [Contractor] [see Note 2] being required.
7. All documents arising out of or in connection with this Guarantee shall be served:
 - (a) upon the Employer, at [], marked for the attention of [];
 - (b) upon the Guarantor, at [] India [Note 4]
8. The Employer and the Guarantor may change their respective nominated addresses for service of documents to another address in India but only by prior written notice to each other. All demands and notices must be in writing.
9. This Guarantee shall be governed by and construed according to the laws for the time being in force in India and the Contractor agrees to submit to the jurisdiction of the courts of India.

IN WITNESS whereof this Guarantee has been executed as a deed on the date first before written.

THE COMMON SEAL of)

[])

was affixed hereto in)

the presence of:-)

Notes (for preparation of but not inclusion in the engrossment of this Guarantee)

1. If the Contractor comprises more than one company, that fact, the joint venture or other relevant agreement and the relationship of the Guarantor to its subsidiary forming part of the Contractor must be recited.
2. If Note 1 applies, replace the word "Contractor" with name of the subsidiary being guaranteed.
3. If Note 1 applies, add additional wording and insert the name of the subsidiary being guaranteed.
4. The address for service shall be in India

Annexure-VIII**CONTRACTOR'S WARRANTY**
(On Non-Judicial Stamp Paper)**(Refer Clause 9 of SCC)****THIS AGREEMENT** is made the _____ day of _____**BETWEEN:**

1. [_____] of [_____] [and [see Note 1]] ([jointly] "the Contractor")
2. [_____] [of]/[whose registered office is at] [_____] (together with its successors and assigns, "the Employer")

(d) WHEREAS

- (A) By a contract _____ dated [_____] ("the Contract") made between (1) the Jaipur Metro Rail Corporation Limited ("the Employer") and (2) the Contractor, the Contractor has agreed to design, execute, complete, test and commission (including Integrated Testing and Commissioning) and remedy any defect in the Works upon the terms and conditions contained in the Contract.
- (B) [See Note 3].
- (C) At the request of the Employer and pursuant to the terms of the Contract the Contractor has agreed to enter into this Warranty.

(e) NOW IT IS AGREED AS FOLLOWS:

1. The Contractor hereby warrants and undertakes that:
 - (a) he will design, execute, complete, test and commission (including Integrated Testing and Commissioning) and remedy any defect in the Works in accordance with the terms of the Contract; and
 - (b) he owes a duty of care to the Employer in relation to the performance of its duties under the Contract; and
 - (c) he will replace free of cost to the Employer any defect or failure of equipment provided in the Works for a period of 24 months from the date of issue of Completion Certificate of the last Section of the Works; and
 - (d) he agrees that should any design modification be required to any equipment or component as a consequence of failure analysis, the period of 24 months shall re-commence from the date when the modified part is commissioned into service, and such modification shall be carried out free of cost to the Employer in all sub-systems and systems for all sections; and

- (e) he shall maintain the manufacture or spare of replacement parts for at least 10 years.
2. The liability of [the companies comprising [see Note 3]] the Contractor under this Warranty [shall be joint and several and [see Note 3]] shall not be released, diminished or in any way affected by any independent inquiry or investigation into the Works or any matter related to the Contract whether carried out by or on behalf of the Employer or any liability or right of action which may arise out of such inquiry or investigation.
3. Insofar as the copyright or other intellectual property rights in any plans, calculations, drawings, documents, materials, plant, know-how and other information relating to the Works shall be vested in the Contractor, the Contractor grants to the Employer his successors and assigns a royalty free, non-exclusive and irrevocable licence (carrying the right to grant sub-licences) to use and reproduce any of the works designs or inventions incorporated and referred to in such documents or materials and any such know-how and information for all purposes relating to the Works or the Mass Rapid Transport System – Phase Two including without limitation the design, manufacture, supply, installation, testing and commissioning (including Integrated Testing and Commissioning) reinstatement, extension and the remedy of any defect in the Works. To the extent that beneficial ownership of any such copyright or other intellectual property rights is vested in anyone other than the Contractor, the Contractor shall use best endeavours to procure that the beneficial owner thereof shall grant a like licence to the Employer. For the avoidance of doubt, any such licence granted shall not be determined if the Contractor shall for any reason cease to be employed in connection with the Works.
4. The provisions of this Warranty shall be without prejudice to and shall not be deemed or construed so as to limit or exclude any rights or remedies which the Employer may have against the Contractor, whether in tort or otherwise.
5. Nothing contained in this Warranty shall vary or affect the Contractor's rights and obligations under the Contract.
6. The address for service of all documents arising out of or in connection with this Warranty shall be:-
- (a) upon the Employer at [] India. [Note 4]
- (b) upon the Contractor at [] India. [Note 4]
7. The Employer and the Contractor may change their respective nominated addresses to another address in India but only by prior written notice to each other. All notices must be in writing.
8. This Warranty shall be governed by and construed according to the laws for the time being in force in India.
9. (1) Any dispute or difference of any kind whatsoever between the Employer and the Contractor arising under out of or in connection with this Warranty shall be referred to arbitration in accordance with the Conciliation and Arbitration rules set out in the General Conditions of Contract. "Dispute" as defined in the Contract shall be deemed to include any such dispute or difference between the Employer and Contractor.
- (2) In the event that the Employer is of the opinion that the issues in such a dispute or difference will or may touch upon or concern a dispute or difference arising under out of or in connection

with the Contract ("the Contract Dispute") then provided that an arbitrator has not already been appointed pursuant to Clause 9(1), the Employer may by notice in writing to the Contractor require and the Contractor shall be deemed to have consented to the referral of such dispute or difference to the arbitrator to whom the Contract Dispute has been or will be referred.

- (3) Save as expressly otherwise provided, the arbitrator shall have full power to open up, review and revise any decision, opinion, instruction, notice, order, direction, withholding of approval or consent, determination, certificate, statement of objections relating to the dispute.
- (4) Subject to the foregoing provisions of this clause 9, the Employer and the Contractor agree to submit to the jurisdiction of the Courts of India at Delhi.

IN WITNESS where of this Warranty has been executed as a deed on the date written at the head hereof.

THE COMMON SEAL of)

[])

was affixed hereto in)

the presence of:-)

Notes (for preparation of and not inclusion in the engrossment of this Warranty)

- (1) If the Contractor comprises more than one company, each such company shall be a party and liability under this warranty will be joint and several, with consequential grammatical changes.
- (2) If Note 1 applies, that fact and the joint venture or other relevant agreement must be recited.
- (3) Delete if Note 1 does not apply.
- (4) The address for service shall be in India.

Annexure-IX

59.0 ADB Environment Management Plan

SN	Project Activity	Potential Impact	Mitigation measures	Institutional Responsibilities	Cost Estimate
PRE-CONSTRUCTION					
PC1	Contractor Preparatory Works (Upon issuance of Notice to Proceed)	Nuisance from traffic congestion	The Contractor will complete the following activities no later than 30 days upon issuance of Notice to Proceed 1.) Submit appointment letter and resume of the Contractor's Health and Safety Officer (HSO) and environmental focal person to CSC 2.) HSO will engage CSC-Environment Specialist to a meeting to discuss in detail the EMP, seek clarification and recommend corresponding revisions if necessary 3.) HSO will request CSC-ES copy of monthly monitoring forms and establish deadlines for submission. 4.) HSO will submit for CSC-ES approval an action plan to secure all permits and approvals needed to be secured during construction stage which include but not limited to: i) operation of crushers and hot mix plants, ii) transport and storage of hazardous materials (e.g. fuel, lubricants, explosives), iii) waste disposal sites and disposal management plan, iv) temporary storage location, v) water use, and vi) emission compliance of all vehicles. Arrangements to link with government health programs on hygiene, sanitation, and prevention of communicable diseases will also be included in the action plan 5) HSO will submit for approval of CSC-FS the construction camp layout before its establishment.	Contractor and CSC	Part of contractor's cost
PC2	Coordinate with the Jaipur Development Authority on Traffic Management Plan		The Contractors will discuss and coordinate the implementation of the traffic re-routing scheme particularly in Chhoti Chaupad and Badi Chaupad when it starts the cut and cover activities and the hauling and disposal of excavated materials to the Ambabari village. At the minimum, the traffic management plan will have the following components: construction traffic, ensuring access to properties, accommodating pedestrians, parking, access by construction vehicles, faulty traffic lights and problem interchanges, use of public roads, parking provision during construction, use of residential streets and traffic diversion due to temporary road closures, and construction and use of temporary access roads.	Contractor and CSC	Part of Contractor's cost

SN	Project Activity	Potential Impact	Mitigation measures	Institutional Responsibilities	Cost Estimate
PC3	Community Liaison	Complaints	To ensure that ongoing feedback is provided on the progress of the JMPP together with feedback on the environmental management performance of the project. Contractor will provide provide a minimum of two (2) weeks notification to directly affected residents, businesses and other relevant groups of the intended construction commencement date. In providing a mechanism for communication between the contractor and the community and informing the public of construction details (timing, expected impacts), the concessionaire will undertake consultation and information activities. At least 30 days before the start of tunneling, the Contractor with supervision from the Archeology Department will employ a ground penetrating radar (GPR), detect the presence of buried artifacts along the tunnel alignment.	Contractor, CSC and JMRC Safeguards cell	Part of Contractor's cost
PC4	Ground staking	Chance find of artifacts	The Contractor, on behalf of the JMRC, will coordinate with the Archeology Department to designate an on-site representative during the entire duration of the project.	Contractor, CSC	Part of construction cost
PC5	Briefing on working near heritage resource.	Damage to heritage resource. Cultural conflicts	All workers will undergo a briefing with the Archeology Department to ensure safeguarding of heritage resource and cultural/religious practices. A proof of compliance to this requirement to include the name of participants and date and location of briefing will form part of the monthly report to the CSC.	Contractor, CSC	Part of construction cost
CONSTRUCTION					
C1.0	Tunnel boring and cut and fill	Damage to heritage resources. Tunnel boring namely Chandpole Gale, Krishna Temple, Isar Lat, Jantar Mantar, Hawa Mahal, Chhoti Chaupad, and Badi Chaupad.	No heritage resources are inadvertently damaged during construction.		

SN	Project Activity	Potential Impact	Mitigation measures	Institutional Responsibilities	Cost Estimate
C1.1			<p>The contractor will ensure that no inadvertent damage is incurred to the Chandpole gate.</p> <p>Ground settlement cannot be avoided in tunneling works due to the loss of volume loss, which is estimated at 0.45% for the JMRP. Estimated settlement under the Chandpole gate is less than 5mm. The contractor will ensure that the design value is not exceed and the trigger value = 3.5mm and Allowable value = 4.2 meters are implemented.</p> <p>Tilt meters will be installed at key positions on the gate to ensure the 2/1000 design value is observed with trigger and allowable values of 1.4/1000 and 1.7/1000, respectively</p> <p>Crack meters will be installed at key positions to ensure design value of 3.0mm is not exceeded with 2.1mm trigger value and 2.5 mm allowable value</p> <p>The contractor will immediately cease all operation if any of the trigger values are breached. The CSC will advise the contractor mitigation measures and practices to control settlement, tilt, and cracks to include but not limited to structural reinforcement and operation parameters of the TEM.</p> <p>The contractor will ensure that no structural damage is incurred and cosmetic damages are repaired under the supervision and control of the Jalpur Archeology Department.</p>		
	Ground Settlement under the Chandpole Gate	Ground settlement		Contractor and CSC	Part of Contractor's cost
C1.2	Vibration from the tunnel boring machine	Cosmetic and Structural damages to the structures along the underground metro alignment along Chandpole Bazar and Tripolia Bazar. Most notable are	Expected vibration at the Chandpole Gate during tunneling is 0.682 mm/s which is lower than internationally accepted 5mm/s. However, to be on the safe side and as practice in DMRC the Contractor is to ensure that vibration levels at the Chandpole Gate foundation will not exceed 2.0 mm/s	Contractor and CSC	Part of Contractors Cost

SN	Project Activity	Potential Impact	Mitigation measures	Institutional Responsibilities	Cost Estimate
C1.3	Surface noise from excavating equipment in Chhoti and Badi Choupad	Damage and nuisance to Krishna Temple, Jantar Mantar, and Hawa Mahal Disturbance of patients in the Pink City Hospital near Chanpole, Chaudary Hospital, Maharaja School at the corner of Chhoti Choupad.	The contractor will ensure that noise from construction activities does not result to exceedances of relevant limits prescribed in the Indian Ambient Air Quality Standards for Commercial Area and Silence Zone. Mitigation measures to be implemented by the Contractors are: 1) liaise with local residents on how to best minimize construction noise along the Chhoti and Badi Choupads. 2) local residents and shop owners should be informed of the nature and duration of intended activities prior to commencement and kept updated as to changes in the management and mitigation plan 3) equipment compounds will be located off-site 4) noise barriers will be installed at critical work areas particularly around the Choupads 5) enclose especially noisy activities if above the noise limits 6) employ transportable noise screens between noise sources and identified noise sensitive areas for the duration of noisy construction activities 7) maximize the possibility of scheduling noisy activities at the same time to minimize the duration of exposure Noise from vehicles particularly for hauling of excavated materials to the dump site will be controlled through strict adherence to operating and maintenance instructions, routing of heavy vehicles away from noise sensitive areas whenever possible, conform with speed limits, and construction vehicles will only use routes specified in the traffic management plan.		
C1.4	Demolition of Chhoti and Badi Choupads	Loss of heritage structures	The project calls for the demolition of the Chhoti and Badi Choupads and its restoration to its original condition as a requirement from Jaipur Development Authority. The demolition and restoration will be under the supervision and control of these agencies.	Contractor, CSC	Part of construction cost

SN	Project Activity	Potential Impact	Mitigation measures	Institutional Responsibilities	Cost Estimate
C1.4.1		Chance heritage finds during the cut and fill operations	Please refer to FIDIC Sec. 4.24 Fossils. Recording (including chain of custody) will be made by the contractor to be validate by the CSC, and expert verification will be made by the Jaipur Archeology Department. Temporary work stoppage in the immediate area of the chance find for up to 72 hours to allow for the on-site representative of Archeology Department to visit the site to make an assessment and provide instructions. Work in the areas adjacent to the chance find will continue as provided in the detailed design.	Contractor and CSC	
C2	Spoil Disposal (Ambabari Village)	Generate sediment laden runoff from the work site during monsoon. Contamination of disposal sites from construction debris. Community hazard of uncollected and improperly disposed materials.	A spoil management plan will be implemented that details the location of spoil disposal sites, transporting soil, and disposing of soil. The Contractor will perform the following: 1) disposed spoils on permitted sites as instructed by the JMRC 2) ensure the adequacy of the disposal site to handle the volume of spoils that will be generated 3) Prepare, submit, and seek approval from the CSC a spoil dump plan that provides the: i) dump size, layout, and form, ii) means of controlling water and wind erosion, iii) measures to prevent spoil dump contamination, vehicular, and public access. 4) Explore the possibility of using spoil materials to rehabilitate borrow pits to 5) All hauling vehicles should be maintained at an acceptable working order and serviced regularly 6) Haul vehicles should be routed away from noise sensitive areas 7) Speed limit in built up areas is 40 km/h 8) All haul vehicles should be covered or soil sprayed with water before leaving the site specially during windy condition 9) Spoil dumps shall have slopes no steeper than 1V:2.5H 10) Final shaping, topsoiling, and immediate revegetation 11) No vehicles are to be allowed to enter a revegetated spoils dump The Contractor shall secure necessary permits from pertinent groundwater authorities before establishing borewells.		
C3	Groundwater Extraction	Depletion of groundwater Compete with existing groundwater users	Water conservation and recycling will be observed in all aspects of constructions to include water main breaks, watering roads for dust control, spraying concrete, equipment cleaning and site clean-up.	Contractor and CSC	Part of Construction Cost

SN	Project Activity	Potential Impact	Mitigation measures	Institutional Responsibilities	Cost Estimate
C4	Disruption of essential services	Nuisance from temporary damage or shifting in utilities particularly buried water pipes and electrical lines	<p>The Contractor will ensure that the public will be minimally affected when constructing in close proximity to essential services through:</p> <ol style="list-style-type: none"> 1) coordinate and secure necessary permits for utility shifting with the Jaipur Development Authority and other service utility agencies to locate all services prior to construction in any particular area 2) inform residents of planned interruptions through local media, fliers, and public address system 3) all planned interruptions schedules will be submitted to the safeguards cell JMRC no later than 10 working days before the interruption 4) all affected architects, tenants, institutions, and businesses to be notified in writing prior to commencement and kept updated in changes of schedule 5) in the event of unforeseen disruptions, the contractor will take all reasonable actions to have the service promptly restored 6) relevant utility agencies will be informed of the construction proximity to essential service line and be kept on standby in the event of unforeseen disruption <p>All unplanned interruption will be immediately reported to the safeguards cell within 24 hour through an incident report.</p>		
C5	Construction camp, Batching plant, and casting yard operators, and occupational safety	<p>Solid and liquid waste generation, Communicable diseases Hazardous materials storage Re-fueling Lighting Emergency preparedness Excavation and tunneling Personal protective equipment Energy management</p>	Please refer to SHE.	Contractor and CSC	Part of construction cost

SN	Project Activity	Potential Impact	Mitigation measures	Institutional Responsibilities	Cost Estimate
C6	Cleanup Operations, Restoration and Rehabilitation		Contractor shall prepare site restoration plans, which shall be subject for review and approval by the CSC, JMRC Safeguard Cell, Jaipur Development Authority and the Archeology Department to ensure consistency with zoning and town plans. The clean-up and restoration operations are to be implemented by the Contractor prior to demobilization. All spaces excavated and not occupied by the foundation or other permanent works shall be refilled with earth up to surface of surrounding ground.	Contractor and CSC	Part of construction cost
OPERATION					
O1	Noise and Vibration	Vibration from train operation may cause structural or cosmetic damage to Chandpole Gate, Krishna Temple, Isar Lal, Jantar Mantar, and Hawa Mahal.	The JMRC will continue and maintain the monitoring sites established by the contractor for noise and vibration and will observe the same trigger values	JMRC	Operating cost
O2	Waste water from Depot	Contamination of groundwater by petroleum laden waste	JMRC will install wastewater treatment plant at the Mansarovar depot station capable for removing petroleum contaminants and will meet national standards before re-injection to the groundwater.	JMRC	Operating Cost
O3	Depletion of groundwater	Water requirement for train and facility cleaning, and water for commuters. Each station will require 18,000 liters per day, platform washing is 5 liters/square meter, 70,000 li/day for car washing, and plus passenger water requirement.	Rain water harvesting facilities will be installed at Mansarovar station. All stations will employ a cooling water recirculation system for air-conditioning. Only recycled water will be use for facility cleaning and landscape irrigation. All toilets will be equipped with low-flow fixtures.	JMRC	Operating Cost

ADB Environmental Monitoring Plan						
Envil Indicators	Parameters	Methods/Guidelines	Tentative Location	Frequency and duration	Standards	Approx. Cost
Construction Phase						
Air Quality	TSPM, PM ₁₀ , NO _x , SO _x , CO _x	Qualitative analysis of dust development at selected sites/sensitive spots through High Volume Sampler	2 locations at Chotti and Badi Chupad where cut and fill activities will be implemented	24 hours continuous every month until the stations are completed	National Ambient Air Quality Standards (NAAQS)	30@10,000 =Rs. 360,000
Water Quality	DO, Conductivity, pH, E.Coli, TSS, Oil and Grease and TDS	<ul style="list-style-type: none"> Collect and analyze sample from source Observation of blockage of waterways - extent and secondary impacts Water pollution incidents due to unsafe disposal of waste and spoil, analyzing effects on local fisheries Observations on vehicle and equipment washing practices in rivers 	Ground water at construction camps and	Quarterly	National Drinking Water Quality Standards (NDWQS) and Water Quality Guidelines	12@3,750 =Rs. 45,000
Noise Levels	(1 hr L _{eq} dB(A)) WHO Standards	<ul style="list-style-type: none"> Point source measurements in dB (A) at settlement sites/sensitive spots for noise level at 2, 5 and 15 m from road shoulder Traffic volume measurements 	Krishna Temple, Jantar Mantar, and Hawa Mahal Pink City Hospital near Chaudary Hospital, Maharaja School at the corner of Choti Chupad	Monthly	Indian Ambient Air Quality Standards for Noise	8x12x3@2,450 =Rs. 705,600
						Contractor
						SC, PD/DOR

Env'd Indicators	Parameters	Methods/Guidelines	Tentative Location	Frequency and duration	Standards	Approx. Cost	Implementation	Supervision
Vibration	PPV mm/s	Accelerometer	Krishna Temple, Jantar Mantar, and Hawa Mahal, Pink City Hospital near Charpote, Chaudary Hospital, Majaraa School at the corner of Chotti Chaupad	Monthly	Commercial: 10 mm/s (day). Archaeological structures: 2.5 mm/s	36*200,000 = Rs7,200,000	Contractor	CSC
Underground artifacts	Number and location	Ground Penetrating Radar	Along the entire tunnel length	Once 30 days before tunneling	None	Rs200,000	Contractor	CSC
Operation Phase								
Water Quality	DO, Turbidity, Conductivity, pH, E.Coli, TSS, Oil and Grease and TDS	<ul style="list-style-type: none"> Collect and analyze sample from source Observation of blockage of waterways - extent and secondary impacts Water pollution incidents due to unsafe disposal of waste and spoil, analyzing effects on local fisheries Observations on vehicle and equipment washing practices in rivers 	2 stations	Annual	National Drinking Water Quality Standards (NDWQS) and Water Quality Guidelines	Rs. 45,000	JMRC	SPOB
Vibration	PPV mm/s	Accelerometer	Krishna Temple, Jantar Mantar, and Hawa Mahal, Pink City Hospital near Charpote, Chaudary Hospital, Majaraa School at the corner of Chotti Chaupad	Annual	Commercial: 10 mm/s (day). Archaeological structures: 2.5 mm/s	Rs200,000	JMRC	Department of Archaeology



Procurement of Works

JAIPUR METRO RAIL CORPORATION LIMITED

BIDDING DOCUMENT

for

Procurement on International Competitive Bidding Mode

of

ICB No.- JP/JS 21 (Phase-1B)

**DESIGN, MANUFACTURE, SUPPLY, INSTALLATION, TESTING &
COMMISSIONING OF AUTOMATIC FARE COLLECTION SYSTEM
FOR JMRC PHASE 1B**

PART - III CONDITIONS OF CONTRACT AND CONTRACT FORMS

Section 9 – Contract Forms (COF)

**3rd Floor, RAJSICO Building, Udhog Bhawan, Tilak Marg,
C- Scheme, Jaipur (Rajasthan) PIN-302005
Country: India**

Section 9 - Contract Forms**Table of Forms**

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Notification of Award

[*Employer's letter head*]

Letter of Acceptance

[*date*]

To: [*Name and address of the contractor*]

1. This is to notify you that your Bid dated [*date*] for execution of the [*Design, Manufacture, Supply, Installation, Testing and Commissioning of AFC System*] for the Contract Price in the aggregate of [*amounts in numbers and words*] [*name of currency*], as corrected and modified in accordance with the Instructions to Bidders is hereby accepted by Jaipur Metro Rail Corporation.
2. The resulting Contract for JP/JS21 (1B) will consist of and be constituted by this Letter of Acceptance together with
 - a. Notice of Invitation for Bid and Instructions To Bidder
 - b. Employer's Requirements- General Specification
 - c. Employer's Requirements- Particular Specification
 - d. Employer's Requirements -Safety, Health and Environment
 - e. The Special Conditions of Contract
 - f. The General Conditions of Contract
 - g. Bid Drawings
3. All the works will be executed in accordance with conditions, specifications & standards stipulated in the Bid.
4. You shall furnish.
 - a. Power of Attorney, Board Resolution, MOU between the consortium members as per Contract conditions.
 - b. Performance Security/Bond, Parent Company Undertaking, Parent Company Guarantee, contractor's Warrantee, Designer's Warrantee as applicable.
5. You shall also undertake not to use information gained in the contract for any purpose without obtaining the prior approval of JMRC and shall not make any public announcement or divulge any material relating to project both in India & overseas without the prior written consent of JMRC.
6. The DLP is to be administrated by JMRC/O&M, however at any time during the DLP JMRC at its sole discretion may assign any of their nominated third party for administering the DLP obligation by [*Name of the contractor*]. Acceptance of assignment of any such party by JMRC shall be binding on [*Name of the contractor*]
7.
 - a). The date of issue of this "Letter of Acceptance" shall be treated as the "Notice to Proceed" for the purpose of this contract for the commencement of the works.
 - b). The completion period of contract will be as per key date.
8. This letter to acceptance shall form part of the Contract Agreement to be signed letter and shall be binding as Contract Agreement till dated agreement is signed.

9. The Letter of Acceptance is sent to you in duplicate. You are required to return one copy duly signed on all pages including your unconditional acceptance thereof so as to reach the undersigned within two days of issuance of this letter.

Thanking You.

Authorized Signature:

Name and Title of Signatory:

Name of Agency:

Attachment: Draft copy of Contract Agreement

Contract Agreement

THIS AGREEMENT made on the [*insert number*] day of [*insert month*], [*insert year*],

BETWEEN

(1) [*Jaipur Metro Rail Corporation*], a corporation incorporated under the laws of [*India*] and having its principal place of business at [*address of employer*] (hereinafter called “the Employer”), and (2) [*name of contractor*], a corporation incorporated under the laws of [*country of contractor*] and having its principal place of business at [*address of contractor*] (hereinafter called “the Contractor”).

WHEREAS the Employer desires to engage the Contractor to design, manufacture, test, deliver, install, complete and commission certain Facilities, viz. [*list of facilities*] (“the Facilities”) and the Contractor have agreed to such engagement upon and subject to the terms and conditions hereinafter appearing.

NOW IT IS HEREBY AGREED as follows:

Article 1 Contract Documents

- 1.1 **Contract Documents** (Reference GCC Clause 2)
The following documents shall constitute the Contract between the Employer and the Contractor, and each shall be read and construed as an integral part of the Contract:
 - (a) This Contract Agreement and the Appendixes hereto
 - (b) Letter of Acceptance.
 - (c) Post Bid Proceeds
 - (d) Letter of Bid and Price Schedules submitted by the Contractor
 - (e) Employer's Requirements
 - (f) List of eligible countries that was specified in section 5 of bidding document.
 - (g) Special Condition of Contract SCC
 - (h) General Condition of Contract GCC
 - (i) Other completed Bidding Forms submitted with the Letter of Bid
 - (j) Any other documents forming part of the Employer's Requirements
- 1.2 **Order of Precedence** (Reference GCC Clause 2)
In the event of any ambiguity or conflict between the Contract Documents listed above, the order of precedence shall be the order in which the Contract Documents are listed in Article 1.1 (Contract Documents) above.
- 1.3 **Definitions** (Reference GCC Clause 1)
Capitalized words and phrases used herein shall have the same meanings as are ascribed to them in the General Conditions.

Article 2 Contract Price and Terms of Payment

- 2.1 **Contract Price** (Reference GCC Clause 11 & SCC 7)
The Employer hereby agrees to pay to the Contractor the Contract Price in consideration of the performance by the Contractor of its obligations hereunder. The Contract Price shall be the aggregate of [. . . amounts of foreign currency in words . . .], [. . . amounts in figures. . .] as specified in Price Schedule No. 5 (Grand Summary), [. . . amounts of

local currency in words . . .], [. . . amounts in figures. . .], or such other sums as may be determined in accordance with the terms and conditions of the Contract.

- 2.2 **Terms of Payment** (Reference GCC Clause 12 & SCC Clause 8)
The terms and procedures of payment according to which the Employer will reimburse the Contractor are given in the Appendix (Terms and Procedures of Payment) hereto.

Payments shall be made into a bank account, nominated by the Contractor in Indian rupees in a bank in India unless otherwise permitted in Special Conditions of Contract. If payments are to be made in more than one currency, separate bank accounts may be nominated by the Contractor for each currency, and payments shall be made by the Employer accordingly.

In the event that the amount payable under Schedule No. 1 is adjusted in accordance with GCC 11.2 or with any of the other terms of the Contract, the Employer shall arrange for the documentary credit to be amended accordingly

**Article 3
Effective Date**

- 3.1 **Effective Date** (Reference GCC Clause 1& SCC Clause 5)
The Effective Date for this Contract for commencement of work shall be the date of issue of Letter of Acceptance(LOA)

**Article 4
Communications**

- 4.1 The address of the Employer for notice purposes, pursuant to GCC 4.1 is: [*Employer's address*].
- 4.2 The address of the Contractor for notice purposes, pursuant to GCC 4.1 is: [*Contractor's address*].

**Article 5.
Appendixes**

- 5.1 The Appendixes listed in the attached List of Appendixes shall be deemed to form an integral part of this Contract Agreement.
- 5.2 Reference in the Contract to any Appendix shall mean the Appendixes attached hereto, and the Contract shall be read and construed accordingly.

IN WITNESS WHEREOF the Employer and the Contractor have caused this Agreement to be duly executed by their duly authorized representatives the day and year first above written.

Signed by, for and on behalf of the Employer

[*Signature*]

[*Title*]

in the presence of

[*Signature*]

[*Title*]

Signed by, for and on behalf of the Contractor

[*Signature*]

[*Title*]

in the presence of

[*Signature*]

[*Title*]

APPENDIXES

Appendix 1 - Terms and Procedures of Payment

Appendix 2 - Price Adjustment

Appendix 3 - Insurance Requirements

Appendix 4 - Time Schedule

Appendix 5 - List of Major Items of Plant and Services and List of Approved Subcontractors

Appendix 6 - Scope of Works and Supply by the Employer

Appendix 7 - List of Documents for Approval or Review

Appendix 8 - Functional Guarantees

Appendix 1- Terms and Procedures of Payment

(A) Terms of Payment

The terms of payment shall be in accordance with provisions of SCC, Clause 8.

(B) Payment Procedures

The payment procedures shall be in accordance with provisions of SCC, Clause 8.

Employer's Default

In the event that the Employer fails to make any payment on its respective due date, the Employer shall pay to the Contractor interest on the amount of such delayed payment at the rate equal to State Bank of India prime lending rate plus 2% per annum or 10% per annum whichever is lower for period of delay until payment has been made in full.

Appendix 2 - Price Adjustment

Not used

Appendix 3 - Insurance Requirements

(A) Types of Insurance to Be Taken Out by the Contractor

In accordance with the provisions of GCC Clause 34, the Contractor shall at its expense take out and maintain in effect, or cause to be taken out and maintained in effect, during the performance of the Contract, the types of insurance set forth below in the sums and with the deductibles and other conditions specified. The identity of the insurers and the form of the policies shall be subject to the approval of the Employer, such approval not to be unreasonably withheld.

(a) Cargo Insurance

Covering loss or damage occurring, while in transit from the supplier's or manufacturer's works or stores until arrival at the Site, to the Facilities (including spare parts therefore) and to the construction equipment to be provided by the Contractor or its Subcontractors.

Amount [in currency(ies)]	Deductible limits [in currency(ies)]	Parties insured [names]	From [place]	To [place]

(b) Installation All Risks Insurance

Covering physical loss or damage to the Facilities at the Site, occurring prior to completion of the Facilities, with an extended maintenance coverage for the Contractor's liability in respect of any loss or damage occurring during the defect liability period while the Contractor is on the Site for the purpose of performing its obligations during the defect liability period.

Amount [in currency(ies)]	Deductible limits [in currency(ies)]	Parties insured [names]	From [place]	To [place]

(c) Third Party Liability Insurance

Covering bodily injury or death suffered by third parties (including the Employer's personnel) and loss of or damage to property (including the Employer's property and any parts of the Facilities that have been accepted by the Employer) occurring in connection with the supply and installation of the Facilities.

Amount [in currency(ies)]	Deductible limits [in currency(ies)]	Parties insured [names]	From [place]	To [place]

(d) Automobile Liability Insurance

Covering use of all vehicles used by the Contractor or its Subcontractors (whether owned by them or not) in connection with the supply and installation of the Facilities. Comprehensive insurance in accordance with statutory requirements.

(e) Workers' Compensation

In accordance with the statutory requirements applicable in any country where the Facilities or any part thereof is executed.

(f) Employer's Liability

In accordance with the statutory requirements applicable in any country where the Facilities or any part thereof is executed.

(g) Professional Indemnity

In accordance with SCC clause 52.

h) Other Insurance

The Contractor is also required to take out and maintain at its own cost the following types of insurance:

Details:

Amount [in currency(ies)]	Deductible limits [in currency(ies)]	Parties insured [names]	From [place]	To [place]

The Employer shall be named as co-insured under all insurance policies taken out by the Contractor pursuant to GCC Sub clause 34.1, except for the Third Party Liability, Workers' Compensation, and Employer's Liability Insurance, and the Contractor's Subcontractors shall be named as co-insureds under all insurance policies taken out by the Contractor pursuant to GCC Sub clause 34.1, except for the Cargo, Workers' Compensation and Employer's Liability Insurance. All insurer's rights of subrogation against such co-insureds for losses or claims arising out of the performance of the Contract shall be waived under such policies.

Appendix 4 - Time Schedule

1 KEY DATES

The work includes a number of stages. These stages, which are inter-related with, and essential to, the completion of the AFC SYSTEM, are to be achieved by the Key Dates.

If the identified stage is not achieved by the stated Key Date, liquidated damages may become applicable as set out in the Contract.

1.1 **STAGE 1 – Key Date 1 (KD1):** Preliminary Design and Application Engineering Finalization (Submission & approval by Employer)

Achievement: Submission to, and concurrence by, the Employer's Representative of the Preliminary System Design which consists of details as specified in the Employer's Requirements for this JP/JS21 (1B) Contract

1.2 **STAGE 2 – Key Date 2 (KD2):** Final Design and Application Engineering Finalization (Submission & approval by Employer)

Achievement: Submission to, and concurrence by, the Employer's Representative of the Final Design which consists of all the above documents as specified in the Employer's Requirements for this JP/JS21(1B) Contract

1.3 **STAGE 3 – Key Date 3 (KD3):** AFC Equipment Shipment

Achievement: Delivery of equipments for the AFC SYSTEM of the specified quantity at Contractor's Premises in Jaipur and their inspection by Employer's Representative.

1.4 **STAGE 4 – Key Date 4 (KD4):** Installation, Commissioning & Testing of AFC Equipment for Phase 1B.

Achievement: Putting into service the AFC SYSTEM after completion of Installation Test, PAT at all stations & OCC .These achievements shall also include the necessary PAT at OCC equipment.

1.5 **STAGE 5 – Key Date 5 (KD5):** Completion of System Acceptance Tests, Integrated testing including full integration of new stations with OCC AFC Network/System and Service Trials. This also includes delivery of As Built Drawings, O&M manuals to employer.

1.6 **STAGE 6 – Key Date 6 (KD6):** Completion of Contract

Achievement: Delivery of Contract Spares, Completion of DLP requirement to the satisfaction of Employer's Representative. Completion of Period of Supervision of Maintenance for Phase 1B section works, Issue of Performance Certificate in accordance with GCC/SCC.

Key Dates (tentative)**

Sr. No.	Key Date	Phase 1B {Choti Chouper- Badi Chouper}
1	KD1	Within 04 weeks from LOA
2	KD2	Within 08 weeks from LOA
3	KD3	Within 14 weeks from LOA
4	KD4	8 weeks prior to ROD
5	KD5	4 weeks prior to ROD
6	KD6	Two years after ROD & end of completion of DLP

** Tentative date for ROD is 30.09.2019.

Appendix 5 - List of Major Items of Plant and Services and List of Approved Subcontractors

A list of major items of plant and services is provided below.

The following Subcontractors and Manufacturers are approved for carrying out the item of the facilities indicated. Where more than one Subcontractor is listed, the Contractor is free to choose between them, but it must notify the Employer of its choice in good time prior to appointing any selected Subcontractor. In accordance with GCC Sub-clause 19.1, the Contractor is free to submit proposals for Subcontractors for additional items from time to time. No Subcontracts shall be placed with any such Subcontractors for additional items until the Subcontractors have been approved in writing by the Employer and their names have been added to this list of Approved Subcontractors.

Major Items of Plant and Services	Approved Subcontractors and Manufacturers	Nationality

Appendix 6 - Scope of Works and Supply by the Employer

Refer Section 6: Employer's Requirements

Appendix 7 - List of Documents for Approval or Review

Refer Section 6: Employer's Requirements

Appendix 8 - Functional Guarantees

Not used

Performance Security

..... *Bank's name, and address of issuing branch or office*¹

Beneficiary: *Name and address of employer*

Date:

Performance Guarantee No.:

We have been informed that *name of the contractor*. (hereinafter called "the Contractor") has entered into Contract No. *reference number of the contract*. dated with you, for the execution of *name of contract and brief description of plant and services*. (hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, a performance guarantee is required.

At the request of the Contractor, we *name of the bank*. hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of *name of the currency and amount in figures*². (*amount in words*.) such sum being payable in the types and proportions of currencies in which the Contract Price is payable, upon receipt by us of your first demand in writing without assigning any reason, unconditional / irrevocable in the JMRC's bank account as details mentioned herein

Jaipur Metro Rail Corporation Limited
State Bank of India, Jaipur
Tilak Marg Branch, Tilak Marg,
C-Scheme, Jaipur-302005.

Account No:- 61208185606
IFSC Code:- SBIN0031510

This guarantee shall expire no later than the ____ day of ____, 2____.

Consequently, any demand for payment under this guarantee must be received by us at this office on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 458 (*or ICC Publication No. 758 as applicable*), except that subparagraph (ii) of Sub-Article 20(a) is hereby excluded.⁴

¹ All italicized text is for guidance on how to prepare this demand guarantee and shall be deleted from the final document.

² The guarantor shall insert an amount representing the percentage of the contract price specified in the contract and denominated either in the currency(ies) of the contract or a freely convertible currency acceptable to the employer.

³ Or the same or similar to this clause specified in the Uniform Rules for Demand Guarantees, ICC Publication No. 758, where applicable.

⁴ Or the same or similar to this clause specified in the Uniform Rules for Demand Guarantees, ICC Publication No. 758, where applicable.

.....
Seal of bank and signature(s)

-- Note to Contractor --

If the institution issuing the performance security is located outside the country of the employer, it shall have a correspondent financial institution located in the country of the employer to make it enforceable.

Advance Payment Security

..... *Bank's name, and address of issuing branch or office*¹

Beneficiary: *Name and address of employer*

Date:

Advance Payment Guarantee No.:

We have been informed that *name of the contractor*. (hereinafter called "the Contractor") has entered into Contract No. *reference number of the contract*. dated with you, for the execution of *name of contract and brief description of works*. (hereinafter called "the Contract").

Furthermore, we understand that, according to the Conditions of the Contract, an advance payment in the sum *name of the currency and amount in figures*². (*amount in words*.) is to be made against an advance payment guarantee.

At the request of the Contractor, we *name of the bank*. hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of *name of the currency and amount in figures*³. (*amount in words*.) upon receipt by us of your first demand in writing without assigning any reason, unconditional / irrevocable in the JMRC's bank account as details mentioned herein-

Jaipur Metro Rail Corporation Limited
State Bank of India,
Jaipur Tilak Marg Branch, Tilak Marg,
C-Scheme, Jaipur-302005.

Account No:- 61208185606
IFSC Code:- SBIN0031510

This guarantee shall expire no later than the ____ day of ____, 2__.

It is a condition for any claim and payment under this guarantee to be made that the advance payment referred to above must have been received by the Contractor on its account number *contractor's account number*. at *name and address of the bank*.

This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 458 (or ICC Publication No. 758 as applicable).

¹ All italicized text serves as a guide for preparing this demand guarantee and shall be deleted from the final document.

² The guarantor shall insert an amount representing the amount of the advance payment denominated either in the currency(ies) of the advance payment as specified in the contract, or in a freely convertible currency acceptable to the employer.

³ Footnote 2.

.....
Seal of bank and signature(s)

-- Note to Contractor --

If the institution issuing the advance payment security is located outside the country of the employer, it shall have a correspondent financial institution located in the country of the employer to make it enforceable.