

BIDDING DOCUMENTS



MUMBAI METRO LINE 3 (COLABA-BANDRA-SEEPZ)

CONTRACT MM3-CBS-DEQ-9-03B

Design, Manufacture, Supply, Installation, Testing
& Commissioning of Catenary Maintenance Vehicle
for Project "Mumbai Metro Line-3"

JICA Loan Agreement No ID- P 268 dated 29/03/2018.

Bidding Documents

PART 1- Bidding Procedures

PART 2- Employer's Requirements

PART 3- Conditions of Contract and Contract Forms

PART 4- Drawings

September – 2023

Mumbai Metro Rail Corporation Ltd
MMRC Line 3 Transit Office,
Wing 'A', 'E' Block,
Bandra-Kurla Complex,
Bandra (East), Mumbai 400 051, India



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PART 1 BIDDING PROCEDURES

Section I	Instructions to Bidders
Section II	Bid Data Sheet
Section III	Evaluation and Qualification Criteria
Section IV-A	Bidding Forms
Section IV-B	Pricing Document
Section V	Eligible Source Countries of Japanese ODA Loans

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Part 2	Employer's Requirements
Section VI-A	Employers Requirements – General Specifications
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Part 3	Conditions of Contract and Contract Forms
Section VII	General Conditions of Contract (GC)
Section VIII	Particular Conditions of Contract (PC)
Section IX	Contract Forms
Part 4	Drawings
Section X	Drawings



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Part 1

Bidding Procedures

Section I

Instructions to Bidders

September – 2023

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A. General

- 1. Scope of Bid**
- 1.1 In connection with the Invitation for Bids **specified in the Bid Data Sheet (BDS)**, the Employer, as **specified in the BDS**, issues these Bidding Documents (hereinafter referred to as “Bidding Documents”) for the procurement of Plant and Installation Services as specified in Section VI, Employer’s Requirements. The name, identification, and number of the lot(s) (contract(s)) comprising this International Competitive Bidding (ICB) are **specified in the BDS**.
- 1.2 Throughout these Bidding Documents:
- (a) the term “in writing” means communicated in written form and delivered against receipt;
 - (b) except where the context requires otherwise, words indicating the singular also include the plural and words indicating the plural also include the singular; and
 - (c) “day” means calendar day.
- 2. Source of Funds**
- 2.1 The Borrower **specified in the BDS** has applied for or received a Japanese ODA Loans from Japan International Cooperation Agency (hereinafter referred to as “JICA”), with the number, in the amount and on the signed date of the Loan Agreement **specified in the BDS**, toward the cost of the project **specified in the BDS**. The Borrower intends to apply a portion of the proceeds of the Loan to eligible payments under the Contract(s) for which these Bidding Documents are issued.
- 2.2 Disbursement of a Japanese ODA Loans by JICA will be subject, in all respects, to the terms and conditions of the Loan Agreement, including the disbursement procedures and the applicable Guidelines for Procurement under Japanese ODA Loans **specified in the BDS**. No party other than the Borrower shall derive any rights from the Loan Agreement or have any claim to the Loan proceeds.
- 2.3 The above Loan Agreement will cover only part of the project cost. As for the remaining portion, the Borrower will take appropriate measures for finance.
- 3. Corrupt and Fraudulent Practices**
- 3.1 It is JICA’s policy to require that Bidders and Contractors, as well as Borrowers, under contracts funded with Japanese ODA Loans and other Japanese ODA, observe the highest standard



of ethics during the procurement and execution of such contracts. In pursuance of this policy, JICA:

- (a) will reject a proposal for award if it determines that the Bidder recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question;
- (b) will recognize a Bidder or Contractor as ineligible, for a period determined by JICA, to be awarded a contract funded with Japanese ODA Loans if it, at any time, determines that the Bidder or the Contractor has engaged in corrupt or fraudulent practices in competing for, or in executing, another contract funded with Japanese ODA Loans or other Japanese ODA; and
- (c) will recognize a Contractor as ineligible to be awarded a contract funded with Japanese ODA Loans if the Contractor or a Subcontractor, who has a direct contract with the Contractor, is debarred under the cross debarment decisions by the Multilateral Development Banks. Such period of ineligibility shall not exceed three (3) years from (and including) the date on which the cross debarment is imposed.

“Cross debarment decisions by the Multilateral development Banks” is a corporate sanction in accordance with the agreement among the African Development Bank Group, Asian Development Bank, European Bank for Reconstruction and Development, Inter-American Development Bank Group and the World Bank Group signed on 9 April, 2010 (as amended from time to time). JICA will recognize the World Bank Group’s debarment of which period exceeds one year, imposed after 19 July, 2010, the date on which the World Bank Group started cross debarment, as “cross debarment decisions by the Multilateral Development Banks.”

The list of debarred firms and individuals is available at the electronic address **specified in the BDS**.

JICA will recognize a Bidder or Contractor as ineligible to be awarded a contract funded with Japanese ODA Loans if the Bidder or Contractor is debarred by the World Bank Group for the period starting from the date of the Invitation for Bid, if prequalification has not been conducted; or the date of Advertisements for Prequalification, if prequalification has been conducted, up to the signing of the contract, unless (i) such debarment period does not exceed one year, or (ii) three



(3) years have passed since such debarment decision.

If it is revealed that the Contractor was ineligible to be awarded a contract according to the above, JICA will, in principle, impose sanctions against the Contractor.

If it is revealed that a Subcontractor, who has a direct contract with the Contractor, was debarred by the World Bank Group on the subcontract date, JICA will, in principle, require the Borrower to have the Contractor cancel the subcontract immediately, unless (i) such debarment period does not exceed one year, or (ii) three (3) years have passed since such debarment decision. If the Contractor refuses, JICA will require the Borrower to declare invalidity or cancellation of the contract and demand the refund of the relevant proceeds of the Loan or any other remedies on the grounds of contractual violation.

3.2 Furthermore, Bidders shall be aware of the provision stated in Sub-Clause 42.2.1 (c) of Section VII. General Conditions.

4. Eligible Bidders

4.1 A Bidder may be a firm that is a single entity or any combination of such entities in the form of a joint venture (JV) under an existing agreement or with the intent to enter into such an agreement supported by a letter of intent. In the case of a JV:

- (a) all members shall be jointly and severally liable for the execution of the Contract in accordance with the Contract terms, and
- (b) the JV shall nominate a Representative who shall have the authority to conduct all business for and on behalf of any and all the members of the JV during the bidding process and, in the event the JV is awarded the Contract, during Contract execution.

4.2 A Bidder shall not have a conflict of interest. A Bidder shall not be employed under any of the circumstances set forth below throughout the bidding/selection process and/or the execution of the Contract unless the conflict has been resolved in a manner acceptable to JICA.

- (a) A firm shall be disqualified from providing goods or non-consulting services resulting from or directly related to consulting services for the preparation or implementation of a project that it provided or were provided by any



affiliate that directly or indirectly controls, is controlled by, or is under common control with that firm. This provision does not apply to the various firms (consultants, contractors, or suppliers) only due to the reason that those firms together are performing the Contractor's obligations under a turnkey or design and build contract.

- (b) A firm that has a close business relationship with the Borrower's professional personnel, who are directly or indirectly involved in any part of: (i) the preparation of the prequalification and Bidding Documents for the Contract, (ii) the prequalification and Bid evaluation, or (iii) the supervision of such Contract, shall be disqualified.
- (c) Based on the "One Bid Per Bidder" principle, which is to ensure fair competition, a firm and any affiliate that directly or indirectly controls, is controlled by, or is under common control with that firm shall not be allowed to submit more than one Bid, either individually or as a member in a JV. A firm (including its affiliate), if acting in the capacity of a Subcontractor in one Bid, may participate in other Bids, only in that capacity.
- (d) A firm having any other form of conflict of interest other than (a) through (c) above shall be disqualified.

4.3 A Bidder shall be from any of the eligible source countries indicated in Section V, Eligible Source Countries of Japanese ODA Loans.

4.4 A Bidder that has been determined to be ineligible by JICA in accordance with ITB 3.1 shall not be eligible to be awarded a Contract.

4.5 This bidding is open only to prequalified Bidders unless **specified in the BDS.**

4.6 A Bidder shall provide such evidence of its continued eligibility satisfactory to the Employer, as the Employer shall reasonably request.

5. Eligible Plant and Installation Services

5.1 The Plant and Installation Services to be supplied under the Contract shall have their origin in any of the eligible source countries indicated in Section V, Eligible Source Countries of Japanese ODA Loans, and all expenditures under the Contract will be limited to such Plant and Installation 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 different in its basic characteristics or in purpose or utility from its components.

B. Contents of Bidding Documents

6. Sections of Bidding Documents

- 6.1 The Bidding Documents consist of Parts 1, 2, and 3, which include all the Sections indicated below, and should be read in conjunction with any Addenda issued in accordance with ITB 8.

PART 1 Bidding Procedures

- Section I. Instructions to Bidders (ITB)
- Section II. Bid Data Sheet (BDS)
- Section III. Evaluation and Qualification Criteria (EQC)
- Section IV. Bidding Forms
- Section V. Eligible Source Countries of Japanese ODA Loans

PART 2 Employer’s Requirements

- Section VI. Employer’s Requirements

PART 3 Conditions of Contract and Contract Forms

- Section VII. General Conditions (GC)
- Section VIII. Particular Conditions (PC)
- Section IX. Contract Forms

- 6.2 The Invitation for Bids issued by the Employer is not part of the Bidding Documents.

- 6.3 Unless obtained directly from the Employer, the Employer is not responsible for the completeness of the Bidding Documents, responses to requests for clarification, the minutes of the pre-bid meeting (if any), or Addenda to the Bidding Documents in accordance with ITB 8. In case of any contradiction, documents obtained directly from the Employer



shall prevail.

- 6.4 The Bidder is expected to examine all instructions, forms, terms, and specifications in the Bidding Documents, and to furnish with its Bid all information and documentation as is required by the Bidding Documents.
7. **Clarification of Bidding Documents, Site Visit, Pre-Bid Meeting**
- 7.1 A Bidder requiring any clarification of the Bidding Documents shall contact the Employer in writing at the Employer's address **specified in the BDS** or raise his enquiries during the pre-bid meeting if provided for in accordance with ITB 7.4. The Employer will respond in writing to any request for clarification, provided that such request is received no later than fourteen (14) days prior to the deadline for submission of Bids. The Employer shall forward copies of its response to all Bidders who have acquired the Bidding Documents in accordance with ITB 6.3, including a description of the inquiry but without identifying its source. If so **specified in the BDS**, the Employer shall also promptly publish its response at the web page **identified in the BDS**. Should the clarification result in changes to the essential elements of the Bidding Documents, the Employer shall amend the Bidding Documents following the procedure under ITB 8 and ITB 24.2.
- 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 Installation 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 upon 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 **so specified 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. A site visit will be conducted by the Employer at the time of the pre-bid meeting, if **so specified in the BDS**.
- 7.5 The Bidder is requested to submit any questions in writing, to reach the Employer not later than one (1) week before the meeting.
- 7.6 Minutes of the pre-bid meeting, if applicable, including the text of the questions asked by Bidders, 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 Documents in accordance with ITB 6.3. Any modification to the Bidding Documents 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. Nonattendance at the pre-bid meeting will not be a cause for disqualification of a Bidder.
- 8. Amendment of Bidding Documents**
- 8.1 At any time prior to the deadline for submission of Bids, the Employer may amend the Bidding Documents by issuing addenda.
- 8.2 Any addendum issued shall be part of the Bidding Documents and shall be communicated in writing to all who have obtained the Bidding Documents from the Employer in accordance with ITB 6.3. If **so specified in the BDS**, the Employer shall also promptly publish the addendum on the Employer's web page in accordance with ITB 7.1.
- 8.3 To give Bidders reasonable time in which to take an addendum into account in preparing their Bids, the Employer may 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 not 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 language **specified in the BDS**. 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 in the language of Bid, 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 called the Technical Bid containing the documents listed in ITB 11.2 and the other the Price Bid containing the documents listed in ITB 11.3, 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, in accordance with ITB 21;
 - (c) Acknowledgment of Compliance with the Guidelines for Procurement under Japanese ODA Loans (Form ACK), which shall be signed and dated by the Bidder's authorized representative;
 - (d) written confirmation authorizing the signatory of the Bid to commit the Bidder, in accordance with ITB 22.2;
 - (e) in the case of a Bid submitted by a JV, a copy of the JV agreement, or letter of intent, signed by all members, to enter into a JV including a draft agreement, indicating at least the parts of the Plant to be executed by the respective members;
 - (f) documentary evidence establishing in accordance with ITB 14 that the Plant and Installation Services offered by the Bidder in its Bid or in any alternative Bid, if permitted, are eligible;
 - (g) documentary evidence in accordance with ITB 15 establishing the Bidder's eligibility and qualifications to perform the Contract if its Bid is accepted;
 - (h) Technical Proposal in accordance with ITB 17;
 - (i) documentary evidence establishing in accordance with ITB 16 that the Plant and Installation Services offered by



the Bidder conform to the Bidding Documents;

- (j) alternative Bids, if permissible, in accordance with ITB 13;
- (k) list of Subcontractors, in accordance with ITB 17.2 and 17.3; and
- (l) 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 Price Schedules, in accordance with ITB 12 and 18;
- (c) alternative Price Bids, at the Bidder's option and if permissible, in accordance with ITB 13; and
- (d) any other document **required in the BDS**.

12. Letters of Bid and Schedules

12.1 The Bidder shall complete the Letters of Technical Bid and Price Bid, including the appropriate Technical and Price Schedules, using the relevant forms furnished in Section IV, Bidding Forms. The forms must be completed without any alterations to the text, and no substitutes shall be accepted except as provided under ITB 22.2. All blank spaces shall be filled in with the information requested.

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 III, 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 Documents 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 VI, Employer's Requirements. Technical alternatives that comply with the performance and technical criteria specified for the Plant and Installation Services shall be considered by the Employer on their own merits, pursuant to ITB 35.2.
- 14. Documents Establishing the Eligibility of the Plant and Installation Services**
- 14.1 To establish the eligibility of the Plant and Installation Services in accordance with ITB 5, Bidders shall complete the country of origin declarations in the Price Schedule Forms, included in Section IV, Bidding Forms.
- 15. Documents Establishing the Eligibility and Qualifications of the Bidder**
- 15.1 In accordance with Section III, Evaluation and Qualification Criteria, if the prequalification process was conducted prior to the bidding process, the Bidder shall provide in the corresponding information sheets included in Section IV, Bidding Forms, (i) updated information on any assessed aspect that changed from that time to establish that the Bidder continues to meet the criteria used at the time of prequalification and (ii) the requested information on the additional qualification criteria stated in Section III, Evaluation and Qualification Criteria, or if the assessment of qualification criteria was not conducted prior to the bidding process, the Bidder shall provide the information requested in the corresponding information sheets included in Section IV, Bidding Forms.
- 15.2 Any change in the structure or formation of a Bidder after being prequalified and invited to bid (including, in the case of a JV, any change in the structure or formation of any member thereto) shall be subject to the written approval of the Employer prior to the deadline for submission of Bids. Such approval shall be denied if (i) such change has not taken place by the free choice of the firms involved; (ii) as a consequence of the change, the Bidder no longer substantially meets the qualification criteria set forth in the Prequalification Documents; or (iii) in the opinion of the Employer, the change may result in a substantial reduction in competition. Any such change should be submitted to the Employer not later than fourteen (14) days after the date of the Invitation for Bids.



16. Documents establishing conformity of the Plant and Installation Services

16.1 The documentary evidence of the conformity of the Plant and Installation Services with the Bidding Documents may be in the form of literature, drawings and data, and shall include:

- (a) a detailed description of the essential technical and performance characteristics of the Plant and Installation Services, including the functional guarantees of the proposed Plant and Installation Services, in response to the Specifications. The functional guarantees of the proposed Plant and Installation Services shall be stated in the applicable form in Section IV, Bidding Forms;
- (b) a list giving full particulars, including available sources, of all spare parts, special tools, etc., necessary for the proper and continuing functioning of the plant for the period **specified in the BDS**, following completion of Plant and Installation Services in accordance with the provisions of Contract; and
- (c) adequate evidence demonstrating the substantial responsiveness of the Plant and Installation Services to those Specifications. Bidders shall note that standards for workmanship, materials and equipment designated by the Employer in the Bidding Documents 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 Technical Proposal, 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, safety plan, and any other information as stipulated in Section IV, Bidding Forms in sufficient detail to demonstrate substantial responsiveness of the Bidder's proposal to the Employer's Requirements and the completion time.

17.2 For major items of Plant and Installation Services as listed by the Employer in Section III, 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 Technical Proposals 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 Installation 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 Installation Services to be provided by the Subcontractor comply with the requirements of ITB 5 and ITB 16.1.

18. Bid Prices and Discounts

18.1 **Unless otherwise specified in the BDS,** Bidders shall quote for the entire Plant and Installation 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 Documents 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 Documents, 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 Documents, 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 Documents.

18.3 Bidders shall give a breakdown of the prices in the manner and detail called for in the Price Schedules included in Section IV, Bidding Forms.

18.4 Depending on the scope of the Contract, the Price Schedules may comprise up to the seven (7) schedules listed below. Separate numbered Schedules included in Section IV, Bidding Forms, from those numbered 1-4 below, shall be used for each of the elements of the Plant and Installation Services. The total amount from each Schedule corresponding to an element of the Plant and Installation Services shall be summarized in the schedule titled Grand Summary (Schedule 6) giving the



total Bid Price(s) to be entered in the Letter of Price Bid.

Schedule No. 1 Plant (including Mandatory Spare Parts)
Supplied from Abroad

Schedule No. 2 Plant (including Mandatory Spare Parts)
Supplied from within the Employer's
Country

Schedule No. 3 Design Services

Schedule No. 4 Installation Services

Schedule No. 5 Provisional Sums

Schedule No. 6 Grand Summary (Schedule Nos. 1 to 5)

Schedule No. 7 Recommended Spare Parts (Spare Parts for
Operation and Maintenance)

Bidders shall note that the Plant and equipment 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 Services.

18.5 In the Schedules, Bidders shall give the required details and a breakdown of their prices as follows, **unless otherwise provided in the BDS** as for tax liabilities in the Employer's country:

(a) Plant to be supplied from abroad (Schedule No. 1):

The price of the plant shall be quoted on CIP-named place of destination basis as **specified in the BDS**.

(b) Plant manufactured within the Employer's country (Schedule No. 2):

The price of the Plant shall be quoted on an EXW Incoterm basis (such as "ex-works," "ex-factory," "ex-warehouse" or "off-the-shelf," as applicable), and includes sales tax and all other taxes payable in the Employer's country on the Plant, as of twenty-eight (28) days prior to the deadline for submission of Bids, if the Contract is awarded to the Bidder.

(c) Design Services (Schedule No. 3).

(d) Installation Services shall be quoted separately (Schedule



- No. 4) and shall include rates or prices for local transportation to named place of final destination as **specified in the BDS**, 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 Documents, 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 twenty-eight (28) days prior to the deadline for submission of Bids.
- (e) Recommended spare parts shall be quoted separately (Schedule 7) as specified in either subparagraph (a) or (b) above in accordance with the origin of the spare parts.
- 18.6 The latest edition (as of the Base Date) of Incoterms, published by the International Chamber of Commerce shall govern.
- 18.7 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 non-responsive 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 indices in the corresponding Form in Section IV, Bidding Forms.
- 18.8 If so indicated in ITB 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.

18.9 Bidders wishing to offer any unconditional discount shall specify in their Letter of Price Bid the offered discounts and the manner in which price discounts will apply.

19. Currencies of Bid and Payment

19.1 The currency(ies) of the Bid shall be, as **specified in the BDS**. Payment of the Contract Price shall be made in the currency or currencies in which the Bid Price is expressed in the Bid of the successful Bidder.

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 pursuant to ITB 24.1. A Bid valid for a shorter period shall be rejected by the Employer as non-responsive.

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. The Bid Security shall also be extended for twenty-eight (28) days beyond the deadline of the extended 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, except as provided in ITB 20.3.

20.3 If the award is delayed by a period exceeding fifty-six (56) days beyond the expiry of the initial Bid validity, the Contract Price shall be determined as follows:

(a) In the case of Fixed Price Contracts, the Contract Price shall be the Bid Price adjusted by the factor **specified in the BDS**.

(b) In the case of Adjustable Price Contracts, to determine the Contract Price, the fixed portion of the Bid Price shall be adjusted by the factor **specified in the BDS**.

(c) In any case, Bid evaluation shall be based on the Bid Price without taking into consideration the effect of the corrections indicated above.

21. Bid Security

21.1 The Bidder shall furnish as part of its Bid a Bid Security in the



amount and currency **specified in the BDS.**

21.2 The Bid Security shall be a demand guarantee in any of the following forms at the Bidder's option:

- (a) an unconditional guarantee issued by a bank or financial institution (such as an insurance, bonding or surety company);
- (b) an irrevocable letter of credit;
- (c) a cashier's or certified check; or
- (d) another security **specified in the BDS**

from a reputable source from an eligible source country. If the unconditional guarantee is issued by an insurance company or a bonding company located outside the Employer's Country, the issuer shall have a correspondent financial institution located in the Employer's Country to make it enforceable. In the case of a bank guarantee, the Bid Security shall be submitted either using the Bid Security Form included in Section IV, Bidding Forms or in another substantially similar format approved by the Employer prior to Bid submission. In either case, the form must include the complete name of the Bidder. The Bid Security shall be valid for twenty-eight (28) days beyond the original validity period of the Bid, or beyond any period of extension if requested under ITB 20.2.

21.3 Any Bid not accompanied by a substantially responsive Bid Security shall be rejected by the Employer as non-responsive.

21.4 The Bid Security of unsuccessful Bidders shall be returned as promptly as possible upon the successful Bidder's signing of the Contract and furnishing of the Performance Security pursuant to ITB 44.

21.5 The Bid Security of the successful Bidder shall be returned as promptly as possible once the successful Bidder has signed the Contract and furnished the required Performance Security.



- 21.6 The Bid Security may be forfeited:
- (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, or any extension thereto provided by the Bidder; or
 - (b) if the successful Bidder fails to:
 - (i) sign the Contract in accordance with ITB 43; or
 - (ii) furnish a Performance Security in accordance with ITB 44.

21.7 The Bid Security of a JV shall be in the name of the JV that submits the Bid. If the JV has not been legally constituted into a legally enforceable JV at the time of bidding, the Bid Security shall be in the names of all future members as named in the letter of intent referred to in ITB 4.1 and ITB 11.2.

22. Format and Signing of Bid

- 22.1 The Bidder shall prepare one original of the Technical Bid and one original of the Price Bid as described in ITB 11 and clearly mark it “TECHNICAL BID - ORIGINAL” and “PRICE BID - ORIGINAL.” Alternative Bids, if permitted in accordance with ITB 13, shall be clearly marked “ALTERNATIVE”. In addition, the Bidder shall submit copies of the Technical and Price Bids, in the number **specified in the BDS** and clearly mark 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 where entries or amendments have been made shall be signed or initialed by the person signing the Bid.
- 22.3 In case the Bidder is a JV, the Bid shall be signed by an authorized representative of the JV on behalf of the JV, and so as to be legally binding on all the members as evidenced by a power of attorney signed by their legally authorized representatives.
- 22.4 Any 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. Procedures for submission, sealing and marking are as follows:

Bidders shall enclose the original of the Technical Bid, the original of the Price Bid, and each copy of the Technical Bid and of the Price Bid, including alternative Bids, if permitted in accordance with ITB 13, in separate sealed envelopes, duly marking the envelopes as “TECHNICAL BID – ORIGINAL,” “PRICE BID – ORIGINAL,” “TECHNICAL BID – COPY,” “PRICE BID – COPY,” and “ALTERNATIVE,” as appropriate. These envelopes containing the original, the copies and the alternative(s), if any, shall then be enclosed in one single envelope. The rest of the procedure shall be in accordance with ITB 23.2 through 23.5.

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 specified in 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 Bids, 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 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 Bids

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

24.2 The Employer may, at its discretion, extend the deadline for the submission of Bids by amending the Bidding Documents 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 – Technical or Price – 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 withdrawals 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 and on the Letter of Price Bid or any extension thereof.

27. Bid Opening

27.1 Except in the cases specified in ITB 25 and ITB 26, the Employer shall publicly open and read out in accordance with ITB 27.5 all Technical Bids received by the deadline, at the date, time and place **specified in the BDS**, in the presence of Bidders’ designated representatives and anyone who choose to attend. The Price Bids will remain unopened and will be held in custody of the Employer until the time of their opening to be specified in accordance with ITB 27.7.

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 opening of the Technical Bids.

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 and read out. 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 at opening of the Technical Bids.

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 at the opening of Technical Bids. Only the Technical Bids, both Original as well as Modification, are to be opened and read out 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, reading out:

- (a) the name of the Bidder;
- (b) whether there is a modification;
- (c) the presence or absence of the Bid Security; and
- (d) any other details as the Employer may consider appropriate.

Only Technical Bids and alternative Technical Bids read out at Bid opening shall be considered for evaluation. The Employer shall neither discuss the merits of any Bid nor reject any Bid (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; alternative proposals; and the presence or absence of a Bid Security. 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.

- 27.7 At the end of the evaluation of 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. The opening date should allow Bidders sufficient time to make arrangements for attending the opening.
- 27.8 The Employer will notify, in writing, Bidders who have been rejected on the grounds of their Technical Bids being substantially non-responsive to the requirements of the Bidding Documents 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, 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, reading out:
- (a) the name of the Bidder;
 - (b) whether there is a modification;
 - (c) the Bid Price(s), including any discounts and alternative Bids; and
 - (d) any other details as the Employer may consider appropriate.

Only Price Bids discounts, and alternative Bids read out and recorded during the opening of Price Bids shall be considered for evaluation. 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), including any discounts, and alternative Bids. 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.

E. Evaluation and Comparison of Bids

- 28. Confidentiality**
- 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 Contract award is communicated to all Bidders in accordance with ITB 42.
- 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.
- 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 shall do so in writing.
- 29. Clarification of Bids**
- 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, giving a reasonable time for a response. 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, including any voluntary increase or decrease in the prices, 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.
- 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.
- 30. Deviations, Reservations, and Omissions**
- 30.1 During the evaluation of Bids, the following definitions apply:
- (a) "Deviation" is a departure from the requirements specified in the Bidding Documents;
- (b) "Reservation" is the setting of limiting conditions or withholding from complete acceptance of the requirements specified in the Bidding Documents; and



- (c) "Omission" is the failure to submit part or all of the information or documentation required in the Bidding Documents.

31. Preliminary Examination of Technical Bids

- 31.1 The Employer shall examine Technical Bids 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.
- 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 Bid shall be rejected.
- (a) Letter of Technical Bid;
 - (b) written confirmation of authorization to commit the Bidder;
 - (c) Bid Security; and
 - (d) Technical Proposal.

32. Qualification of the Bidders

- 32.1 The Employer shall determine to its satisfaction whether Bidders meet the qualification criteria specified in Section III, Evaluation and Qualification Criteria, during the evaluation of Technical Bids. However, if prequalification was carried out prior to the bidding process, the Employer may carry out the assessment of the qualification criteria specified in Section III, Evaluation and Qualification Criteria, for the Bidder who submitted the lowest evaluated and substantially responsive Bid only.
- 32.2 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.
- 32.3 An affirmative determination shall be a prerequisite for award of the Contract to the Bidder. A negative determination shall result in disqualification of the Bid, in which event the Employer shall return the unopened Price Bid to the Bidder.
- If the assessment of the Bidder's qualification is conducted for the lowest evaluated Bidder only, in accordance with ITB 32.1, and the result of such assessment is negative, the Employer shall proceed to the next lowest evaluated Bid to make a similar determination.
- 32.4 The capabilities of the manufacturers and Subcontractors



proposed in its Bid to be used by the Bidder will also be evaluated for acceptability in accordance with Section III, 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 substitute an acceptable manufacturer or Subcontractor without any change to the Bid Price. 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.

- 33. Determination of Responsiveness of Technical Bids**
- 33.1 The Employer's determination of a Technical Bid's responsiveness is to be based on the contents of the Bid itself, as defined in ITB 11.2.
- 33.2 A substantially responsive Technical Bid is one that meets the requirements of the Bidding Documents 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 Installation Services specified in the Contract; or
 - (ii) limit in any substantial way, inconsistent with the Bidding Documents, 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.
- 33.3 The Employer shall examine the technical aspects of the Technical Bid submitted in accordance with ITB 17, in particular, to confirm that all requirements of Section VI, Employer's Requirements have been met without any material deviation, reservation, or omission.
- 33.4 If a Technical Bid is not substantially responsive to the requirements of the Bidding Documents, it shall be rejected by the Employer and may not subsequently be made responsive by correction of the material deviation, reservation, or omission.
- 34. Nonmaterial**
- 34.1 Provided that a Technical Bid is substantially responsive, the



Nonconformities

Employer may waive any nonconformity in the Technical Bid that does not constitute a material deviation, reservation or omission.

34.2 Provided that a Technical 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 Technical Bid related to documentation requirements. Requesting information or documentation on such nonconformities shall not be related to any aspect of the price of the Price Bid. Failure of the Bidder to comply with the request may result in the rejection of its Bid.

34.3 Provided that a Technical 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 III, Evaluation and Qualification Criteria.

**35. Detailed
Evaluation of
Technical Bids**

35.1 The Employer will carry out a detailed technical evaluation of the Bids not previously rejected as being substantially non-responsive, in order to determine whether the technical aspects are in compliance with the Bidding Documents. The Bid that does not meet minimum acceptable standards of completeness, consistency and detail, and the specified minimum (or maximum, as the case may be) requirements for specified functional guarantees, will be rejected for non-responsiveness. In order 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; conformity of the Plant and Installation Services offered with specified performance criteria, including conformity with the specified minimum (or maximum, as the case may be) requirement corresponding to each functional guarantee, as indicated in the Specification and in Section III, Evaluation and Qualification Criteria; suitability of the Plant and Installation 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;



- (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 III, Evaluation and Qualification Criteria.
- 35.2 Where alternative technical solutions have been allowed in accordance with ITB 13.4, 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.
- 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 former shall prevail and the latter will be corrected accordingly;
- (b) where there are errors between the total of the amounts of Schedule Nos. 1 to 5 and the amount given in Schedule No. 6 (Grand Summary), the former shall prevail and the latter will be corrected accordingly; and
- (c) 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 arithmetic error, in which case the amount in figures shall prevail subject to (a) and (b) above.
- 36.2 Bidders shall be requested to accept correction of arithmetical errors. Failure to accept the correction, in accordance with ITB 36.1, shall result in the rejection of the Bid.
- 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. Evaluation of Price Bids**
- 38.1 The Employer shall use the criteria and methodologies indicated in this Clause. No other evaluation criteria or methodologies shall be permitted.
- 38.2 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 arithmetic errors in accordance with ITB 36.1;
 - (c) price adjustment due to discounts offered in accordance with ITB 18.8 or ITB18.9;
 - (d) price adjustment due to quantifiable nonmaterial nonconformities in accordance with ITB 34.3;
 - (e) converting the amount resulting from applying (a) to (d) above, if relevant, to a single currency in accordance with ITB 37; and
 - (f) the evaluation factors indicated in Section III, Evaluation and Qualification Criteria.
- 38.3 If price adjustment is allowed in accordance with ITB 18.7, 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.
- 38.4 If these Bidding Documents allow 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 III, Evaluation and Qualification Criteria.
- 38.5 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.
- 39. Comparison of Bids** 39.1 The Employer shall compare the evaluated prices of all substantially responsive Bids in accordance with ITB 38.2 to determine the lowest evaluated Bid.
- 40. Employer's Right to Accept Any Bid, and to** 40.1 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



Reject Any or All Bids

to Bidders. In case of annulment, all Bids submitted and specifically, Bid Securities, shall be promptly returned to the Bidders.

F. Award of Contract

- 41. Award Criteria** 41.1 Subject to ITB 40.1, 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 Documents, provided further that the Bidder is determined to be eligible and qualified to perform the Contract satisfactorily.
- 42. Notification of Award** 42.1 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. The notification letter (hereinafter and in the Conditions of Contract and Contract Forms called the “Letter of Acceptance”) shall specify the sum that the Employer will pay the Contractor in consideration of the execution and completion of the Plant and Installation Services (hereinafter and in the Conditions of Contract and Contract Forms called “the Contract Price”).
- 42.2 At the same time, the Employer shall also notify all other Bidders of the results of the bidding.
- 42.3 After a Contract has been determined to be eligible for financing under Japanese ODA Loans, the following information may be made public by JICA:
- (a) name of each Bidder who has submitted a Bid;
 - (b) Bid Prices as read out at Bid opening;
 - (c) name and address of the successful Bidder; and
 - (d) award date and amount of the Contract.
- 42.4 Until a formal Contract is prepared and executed, the Letter of Acceptance shall constitute a binding Contract.
- 42.5 After notification of award, unsuccessful Bidders may request, in writing, to the Employer a debriefing seeking explanations on the grounds on which their Bids were not selected. The Employer shall promptly respond, in writing, to any unsuccessful Bidders who, after the notification of award in accordance with ITB 42.1, request a debriefing.
- 43. Signing of** 43.1 Promptly upon notification, the Employer shall send the



- Contract** successful Bidder the Contract Agreement.
- 43.2 Within twenty-eight (28) days of receipt of the Contract Agreement, the successful Bidder shall sign, date, and return it to the Employer.
- 44. Performance Security**
- 44.1 Within twenty-eight (28) days of the receipt of the Letter of Acceptance from the Employer, the successful Bidder shall furnish the Performance Security in accordance with the General Conditions of Contract, subject to ITB 38.5, using for that purpose the Performance Security Form included in Section IX, Contract Forms, or another form acceptable to the Employer. If the Performance Security furnished by the successful Bidder is in the form of a bond, it shall be issued by a bonding or insurance company that has been determined by the successful Bidder to be acceptable to the Employer. A foreign institution providing a bond shall have a correspondent financial institution located in the Employer's Country.
- 44.2 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. In that event the Employer may award the Contract to the next lowest evaluated Bidder whose Bid is substantially responsive and is determined by the Employer to be qualified to perform the Contract satisfactorily.



BIDDING DOCUMENTS



MUMBAI METRO LINE 3 (COLABA-BANDRA-SEEPZ)

CONTRACT MM3-CBS-DEQ-9-03B

Design, Manufacture, Supply, Installation, Testing &
Commissioning of Catenary Maintenance Vehicle
for Project “Mumbai Metro Line-3”

Part 1

Bidding Procedure

Section II

Bid Data Sheet

September – 2023

Mumbai Metro Rail Corporation Ltd
MMRC Line 3 Transit Office,
Wing A, Block E,
Bandra-Kurla Complex,
Bandra (East), Mumbai- 400 051, India.



Bidding Documents

Composition of Documents

Part 1	Bidding Procedure
Section I	Instructions to Bidders
Section II	Bid Data Sheet
Section III	Evaluation and Qualification Criteria
Section IV-A	Bidding Forms
Section IV-B	Pricing Document
Section V	Eligible Source Countries of Japanese ODA Loans
Part 2	Employer's Requirements
Section VI-A	Employers Requirements – General Specifications
Section VI-B	Employer's Requirements – Technical Specifications
Part 3	Conditions of Contract and Contract Forms
Section VII	General Conditions of Contract (GC)
Section VIII	Particular Conditions of Contract (PC)
Section IX	Contract Forms
Part 4	Drawings
Section X	Drawings



BID DATA SHEET (BDS)

A. General	
ITB 1.1	The number of the Invitation for Bids is MM3-CBS-DEQ-9-03B . The Employer is Mumbai Metro Rail Corporation Ltd. (MMRC) . The name, identification and number of the Contract comprising this International Competitive Bidding (ICB) is Design, Manufacture, Supply, Installation, Testing & Commissioning of Catenary Maintenance Vehicle , (hereinafter termed as CMV) for Project as per the Employer's Requirements, Section VI-A and Section VI-B, Part 2.
ITB 1.2	Add the following sentences at the end of the design ITB 1.2 (d) ' Plant and Installation Services ' shall mean the design, Manufacture, Supply, Installation, Testing & Commissioning of CMV .
ITB 2.1	The Borrower is Government of India . The number of the Loan Agreement is ID-P268 . The amount of a Japanese ODA Loan is One hundred (100) billion Japanese Yen for Mumbai Metro Line 3 Project . The signed date of the Loan Agreement is 29th March 2018 .
ITB 2.2	The applicable Guidelines for Procurement under Japanese ODA Loans are those published in April 2012 .
ITB 3.1 (c)	A list of debarred firms and individuals is available at the World Bank's website: www.worldbank.org/debarr
ITB 3.1(d)	Add new Sub-Clause ITB 3.1(d) Will recognize a Contractor as ineligible to be awarded a Contract if the Contractor or Sub Contractor has been debarred by Multilateral and bilateral funding agencies/ Government of India/ Railway Administration/ any State Government undertaking, as on the due date of submission of Bid.
ITB 4.1(c)	Add new Sub-clause ITB 4.1 (c) "Joint Venture (JV) also implies Consortium."
ITB 4.1(d)	Add new Sub-clause ITB 4.1 (d) "Joint Venture (JV) shall have maximum of 3 members."
ITB 4.5	This bidding is not subject to prequalification.
ITB 4.7	Add New Clause ITB 4.7: Local Bidders who are specifically registered for the Equipment in this Bidding Document under MSMED Act 2006 shall submit a certificate of their registration along with the Bid for availing the benefits as applicable in the relevant Act on submission of an application requesting the grant of the said benefits. The Bidder shall also self-certify that his company/ enterprise's registration is valid on the date of submission of the Bid and on the date of application requesting the grant of benefits as applicable under the MSMED Act 2006. The valid supporting documents shall also be attached along with the application for grant of benefits.



B. Bidding Documents	
ITB 6.1	<p>Replace Clause 6.1 with the following: The Bidding Documents consist of Parts 1, 2, 3 & 4 which include all the Sections indicated below and shall be read in conjunction with any Addenda issued in accordance with ITB 8.</p> <p>Part 1 - Bidding Procedures Section I: Instructions to Bidders (ITB) Section II: Bid Data Sheet (BDS) Section III: Evaluation and Qualification Criteria (EQC) Section IV-A: Bidding Forms Section IV-B: Pricing Document Section V: Eligible Source Countries of Japanese ODA Loan</p> <p>Part 2 - Employer's Requirements Section VI-A: Employer's Requirements – General Specifications Section VI-B: Employer's Requirements – Technical Specifications.</p> <p>Part 3 - Conditions of Contract and Contract Forms Section VII: General Conditions (GC) Section VIII: Particular Conditions (PC) Section IX: Contract Forms</p> <p>Part 4 - Drawings Section X: Drawings</p> <p>The Bidder shall check the pages of all documents against page numbers given in the Contents Page to each Part/Section, and in the event of any discrepancy, the Bidder shall inform the Employer forthwith.</p>
ITB 7.1	<p>The Employer's address (for clarification purposes only) is: Attention: (Mr.) Rajeev Kumar, Principal Executive Director (S&T and IT) Mailing Address: Mumbai Metro Rail Corporation Ltd, MMRCL Line 3 Transit Office, Wing 'A', 'E' Block, Bandra-Kurla Complex, Bandra (East), Mumbai 400 051, India. Email Id: rajeev@mmrcl.com Telephone: +91 22 2657 5109</p>
ITB 7.1	<p>Replace the second sentence in ITB 7.1 with the following: The Employer will respond in writing to any request for clarification, provided that such request is received not later than thirty (30) days from the date of publication of Bidding Documents.</p> <p>Responses to any request for clarification, if any, will be published on the Employer's web page: www.mmrcl.com</p>
ITB 7.4	<p>A pre-bid meeting will take place at the following date, time and place: Date: 18/09/2023 Time: 15:00 hrs. Mumbai Metro Rail Corporation Ltd, MMRCL Line 3 Transit Office, Wing 'A', 'E' Block, Bandra-Kurla Complex, Bandra (East), Mumbai 400 051, India.</p>



	No site visit will be conducted by the Employer.
ITB 8.2	Addenda, if any, will be published on the Employer's web page: www.mmrc.com
C. Preparation of Bids	
ITB 10.1	The language of the Bid as well as of all correspondence is English .
ITB 11.1	Insert the following sentence at the end of ITB 11.1: All documents must be spiral/hard bound and numbered. No loose papers will be accepted. All pages in a document shall be serially numbered.
ITB 11.2(l)	The Bidder shall submit with its Technical Bid "Original Bidding Documents including all addenda (if any) duly stamped and signed at each page."
ITB 11.3(d)	The Bidder shall submit with its Price Bid the following additional documents: None.
ITB 13.1	Alternative Bids will not be permitted.
ITB 14.2	Add new Sub-Clause ITB 14.2: Purchase Preference to local suppliers: Definitions: 'Local Content' means the amount of value added in India which shall be the total value of the item procured (excluding net domestic indirect taxes, transportation, insurance, installation, Testing & Commissioning, training and after sales service support like AMC/ CMS etc.) minus the value of imported content in the item (including all customs duties) as a proportion of the total value, in percent. 'Class-I Local Supplier' means a supplier or service provider whose goods, services or works offered for procurement meets the minimum local content of 60% . 'Class-II Local Supplier' means a supplier or service provider whose goods, services or works offered for procurement meets the minimum local content of 20%. The Bidder who meets the requirements of Class-I Local Supplier shall be eligible for purchase preference. The Margin of Purchase Preference for Local Suppliers shall be 20%. There shall be no Purchase Preference to Class-II Local suppliers. Local Suppliers shall give undertaking for certifying Local Content per Bid Form 13, Certification of Minimum Local Content, Section IV-A, Part 1.
ITB 15.2	Not Applicable
ITB 16.1 (b)	The period following completion of Plant and Installation Services during which spare parts, special tools, etc. shall be available is 12 years from the date of Operational Acceptance.
ITB 18.1	Insert the following at the end of ITB 18.1: Bidder shall quote for the entire design, manufacture, supply, installation, testing & commissioning on single responsibility basis.
ITB 18.3	Replace ITB 18.3 with the following: Bidders shall give a breakdown of the prices in the manner and detail called for in the Pricing Document Section IV-B.



<p>ITB 18.4</p>	<p>Replace ITB 18.4 with the following: Pricing documents shall comprise of nine (09) schedules as given in Section IV-B and listed below:</p> <p>Schedule No.1: Plant, to be supplied from abroad including offshore manufacture, dispatch, completion of shipping to port in India, inland transportation, delivery and receipt at Mumbai Metro Line 3 site along with supply of DLP spares.</p> <p>Schedule No.2: Plant, to be supplied; from within India, including Indigenous manufacture dispatch inland transportation in India delivery and receipt at Mumbai Metro Line 3 site along with supply of DLP spares.</p> <p>Schedule No.3: Design Services</p> <p>Schedule No.4: Installation, Testing & Commissioning, and Other Services.</p> <p>Schedule No.5: Provisional Sums - Deleted</p> <p>Schedule No.6: Grand Summary comprised of Schedules 1 to 4</p> <p>Schedule No.7: Recommended Spare Parts</p> <p>Schedule No.8: Pricing for unqualified withdrawal of Nonmaterial Nonconformities, as submitted in Bid Form 2 "Statement of Nonmaterial Nonconformities", Section IV-A</p>
<p>ITB 18.5</p> <p>ITB18.5 (a)</p> <p>ITB18.5 (b)</p> <p>ITB18.5 (c)</p> <p>ITB18.5 (d)</p> <p>ITB18.5 (e)</p> <p>ITB18.5 (f)</p>	<p>The Bidder shall quote their prices in lump sum that is by including all kinds of tax liabilities and other associated costs. The prices for various schedules shall be quoted as under:</p> <p>Schedule No. 1 - Plant, to be supplied from abroad. The prices shall be quoted on DDP basis (Delivery Duty Paid including cost of carriage, unloading at Site, applicable taxes, customs duty and Insurance up to the destination) - Named place of destination is Mumbai Metro Line 3, Depot site, Mumbai, India. The scope of Contractor's works shall be as described in Schedule No. 1 of Pricing Document, Section IV-B.</p> <p>Schedule No. 2- Plant, to be supplied within the Employer's country. The prices shall be quoted on DDP basis (Delivery Duty Paid, including cost of carriage, unloading at Site, applicable taxes, and insurance up to destination) - Named place of destination is Mumbai Metro Line 3 depot site, Mumbai, India as described in Schedule No. 2 of Pricing Document Section IV-B.</p> <p>Schedule No.3 - The prices shall be quoted for Design Services as described in Schedule No.3 of Pricing Document Section IV-B.</p> <p>Schedule No.4 - The prices shall be quoted for Installation, Testing and Commissioning and Other Services as described in Schedule No.4 of Pricing Document Section IV-B. Named place of final destination is Mumbai Metro Line 3 depot site, Mumbai, India.</p> <p>Schedule No. 7 – Recommended Spares</p> <p>Schedule No. 8 - The prices shall be quoted for unqualified withdrawal of Nonmaterial Non-conformities, as submitted in Bid Form 2- "Statement of Nonmaterial Non-conformities", Section IV-A, Bidding Forms.</p>



ITB 18.7	The Contract for Plant & Installation Service (Schedule No. 1 to 4) is a fixed price contract and not adjustable for any price variation. The price of Spares in Schedule No.7 shall be adjustable for variation as per Appendix 2, Section IX, Contract Forms, Part 3.
ITB 19.1	The currency(ies) of the Bid shall be as follows: a) Plant and Equipment to be supplied from abroad (Schedule No. 1) shall be quoted in Japanese Yen (JPY) and/or USD and/or EURO and Indian Rupees (INR). b) Plant and Equipment to be supplied from within India (Schedule No. 2) shall be quoted in Indian Rupees (INR). c) Design (Schedule No. 3), Installation, Testing & Commissioning, and Other Services (Schedule No. 4) shall be quoted in Japanese Yen (JPY) and/or USD and/or EURO and Indian Rupees (INR), depending upon the currency in which the costs are to be incurred. d) The payment will be done in INR and maximum of two other currencies mentioned as above.
ITB 20.1	The Bid validity period shall be One hundred eighty (180) days.
ITB 20.3(a)	The Foreign currency portion of the Contract Price shall be adjusted by 2% per annum and local currency portion of the Contract Price by the percentage change in WPI, published by Economic Advisor, Ministry of Commerce & Industry, Govt of India (Commodity Code 1318000000 for "Manufacture of Machinery and Equipment") published at website http://eaindustry.nic.in from the month in which the 56th day after initial Bid validity falls to the month in which Contract is awarded.
ITB20.3 (b)	Clause Deleted
ITB 21.1	"The Bid Security amount shall be of INR 16,00,000/- (Indian Rupees Sixteen lakhs only) or USD 19,500/- (US Dollars Nineteen thousand five hundred EURO 18,000 (Euros Eighteen thousand only) JPY 27,00,000 (Japanese Yen Two million and seven hundred thousand only).
ITB21.2 (a)	Add the following at the end of 21.2 (a): The Bid Security should be in the form of a Bank Guarantee issued or confirmed by a Scheduled Commercial Bank in India.
ITB21.2 (d)	The Bid Security shall also be accepted in the form of Demand Draft drawn in favor of MMRCL payable at Mumbai, India.
ITB 22.1	In addition to the original of the Bid, the number of copies to be submitted is two (02) sets of hard copies and one soft/ electronic version of Technical Bid and Financial Bid separately in respective envelopes (PDF on CD/ Pen drive duly labelled).



ITB 22.2	The written confirmation of authorization to sign on behalf of the Bidder shall consist of the Power of Attorney and the document shall be notarized. In case of a foreign company, the document shall be Apostille or Authenticated by Indian Embassy/Consulate in that country and shall be attached to the Bid.
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D. Submission and Opening of Bids

ITB 24.1	For <u>Bid submission purposes</u> only, the Employer's address is Attention: The Managing Director, MMRC Address: Mumbai Metro Rail Corporation Ltd, MMRC Line 3 Transit Office, Wing 'A', 'E' Block, Bandra-Kurla Complex, Bandra (East), Mumbai- 400 051, India. Telephone: +91 22 2657 5109 The deadline for Bid submission is: Date: 26/10/2023 Time: 15:00 hrs.
ITB 27.1	The Technical Bid opening shall take place at: Address: Mumbai Metro Rail Corporation Ltd, MMRC Line 3 Transit Office, Wing 'A', 'E' Block, Bandra-Kurla Complex, Bandra (East), Mumbai- 400 051, India. Date: 26/10/2023 Time: 15:15 hrs.

E. Evaluation and Comparison of Bids

ITB 37.1	The currency to be used for Bid evaluation and comparison purposes shall be US Dollar (USD). Bid Prices expressed in various currencies in Schedule No. 6 shall be converted to USD as per the format. The source of exchange rate shall be Reserve Bank of India reference rate (foreign currency). The Date for the exchange rate shall be twenty-eight (28) days prior to the date of Bid Submission. If the source of the exchange rate for the Bidder's proposed currency cannot be found in the Reserve Bank of India reference rate (foreign currency), then the rate in the web site www.xe.com shall be used.
ITB 38.6	Add new Sub-Clause ITB 38.6 Purchase preference to Class-I Local Supplier Purchase preference shall be given to Class-I local suppliers in the procurements undertaken by MMRC in the manner specified hereunder: The following procedure shall be followed: i. Among all qualified bids, the lowest bid will be termed as L1. If L1 is from a local supplier, the Contract will be awarded to L1. ii. If L1 is not from a local supplier, the lowest bidder among the local suppliers, will be invited to match the L1 price subject to local supplier's quoted price falling within the margin of purchase preference, and the Contract shall be awarded to such local supplier subject to matching the L1 price. iii. In case such lowest eligible local supplier fails to match the L1 price, the local supplier with the next higher bid within the margin of purchase preference shall be invited to match the L1 price and so on and Contract shall be awarded accordingly.



	In case none of the local suppliers within the margin of purchase preference matches the L1 price, then the Contract may be awarded to the L1 bidder.
ITB 44.1	Add the following at the end of Sub-Clause ITB 44.1 The Performance Security shall be as per Clause PC 13.3.2, Section VIII, Part 3.

----- End -----



BIDDING DOCUMENTS



MUMBAI METRO LINE 3 (COLABA-BANDRA-SEEPZ)

CONTRACT MM3-CBS-DEQ-9-03B

Design, Manufacture, Supply, Installation, Testing &
Commissioning of Catenary Maintenance Vehicle
For Project "Mumbai Metro Line-3"

Part 1

Bidding Procedure

Section III

Evaluation and Qualification Criteria

September – 2023

**Mumbai Metro Rail Corporation Ltd
MMRC Line 3 Transit Office,
Wing A, Block E,
Bandra-Kurla Complex,
Bandra (East), Mumbai- 400 051, India.**



Bidding Documents

Composition of Documents

Part 1	Bidding Procedure
Section I	Instructions to Bidders
Section II	Bid Data Sheet
Section III	Evaluation and Qualification Criteria
Section IV-A	Bidding Forms
Section IV-B	Pricing Document
Section V	Eligible Source Countries of Japanese ODA Loans
Part 2	Employer's Requirements
Section VI-A	Employers Requirements – General Specifications
Section VI-B	Employer's Requirements – Technical Specifications
Part 3	Conditions of Contract and Contract Forms
Section VII	General Conditions of Contract (GC)
Section VIII	Particular Conditions of Contract (PC)
Section IX	Contract Forms
Part 4	Drawings
Section X	Drawings



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EVALUATION AND QUALIFICATION CRITERIA

1. Evaluation

Pursuant to the criteria listed in ITB 35.1 (a) – (b), the Bidder shall provide a valid and fully compliant proposal undertaking that Bidder will comply with all Clauses in the Employer's Requirements. The proposal shall include the Bidder's methodology, capabilities and expertise for evaluation by the Employer. This section states the requirements for the Bidder's proposal and the evaluation criteria to be adopted by the Employer. The Bid submitted in response to this invitation will be evaluated based on the following:

1.1. Technical Evaluation:

1.1.1. Design Proposal

- (a) The Employer will carry out a detailed technical evaluation of the Bids, in accordance with ITB 33 and ITB 35, in order to determine whether the technical aspects of the Equipment proposed are in compliance with the Bidding Documents. The Employer will evaluate the technical suitability and acceptability of Bidder's Technical Proposal as per Employer's Requirements-General Specification and Technical Specification.
- (b) The Bidder shall furnish their Technical Proposal for the Equipment according to Bid Form 1, Section IV-A, Part 1 and furnish all the attachments. The proposal shall be clear and concise in order to fully enable MMRC to evaluate compliance with the functional and other requirements, specified in the Employer's Requirements, Part 2.
- (c) For the avoidance of doubt, any review, evaluation and acceptance by the Employer of a technical proposal shall not relieve the awarded Bidder from its obligations, undertakings under the Contract, Bidder's understanding of scope of work and interfacing with other Contractors.
- (d) Bidder shall give their comments only against those Clauses where they wish to give any deviations, non-compliance, clarifications, remarks etc. The clauses against which no remarks are offered shall be deemed to be complied with by the Contractor. All Deviations/ non-compliance shall also be recorded in **Bid Form 2 – Nonmaterial Nonconformities**.

1.1.2. Bidder's (JV member's) Role in design, interface and integration of Equipment.

It is expected that the specific role of each member in the JV will be commensurate with their prior and proven experience of having successfully executed a similar role in their previous Contracts.

In the case of a **Joint Venture/Consortium**, the member of the Joint Venture/Consortium who meets of the specified criteria in factor **Section III - Qualification Criteria and Requirements**, shall design, interface and integrate the Equipment and shall have percentage participation of 15% or more in the JV. A copy of the JV agreement, or letter of intent, signed by all members, including a draft agreement indicating at least the parts of the Facilities to be executed by the respective members shall be submitted. The Bidder shall furnish the details in accordance with Bid Form 3- Structure of Bidder.



1.1.3. Bidder's declaration of the adequacy of the bid document

The Bidding Documents do not purport to contain all relevant information in relation to the Contractor's activities or the works and are provided solely on the basis that a Bidder will be responsible for making its own assessment of the works referred to in the Bidding Documents.

The Bidder is responsible for reviewing the Bid Documents (including all addenda) provided by the Employer to ensure that it has a complete copy of all documents.

1.2. Economic Evaluation

In addition to the criteria listed in ITB 38.2 (a) – (e) the following criteria shall apply.

1.2.1 Quantifiable Nonmaterial Nonconformities

(a) Pursuant to ITB 34.3 and ITB 38.2 (d), the cost of all quantifiable non-material nonconformities as submitted in Schedule No. 8, Section IV-B, Pricing Document, Part 1, shall be considered for fair comparison of Bids.

(b) In case any Bidder quotes apportioned price for Schedule No. 3 more than the maximum specified and for Schedule No. 4 less than the minimum specified, it will be treated as quantifiable Nonmaterial Nonconformity in accordance with ITB 38.2 (d), as it shall require faster stream of payment than specified. In such a case, the interest implication amount on early payment shall be added to the Bid Price for the purpose of comparison amongst Bidders for determination of the lowest evaluated Bid. The rate of annual interest for this purpose shall be 2 percentage points above the SBI Base Rate.

1.2.2 Other Factors

The following factors and methods will apply under ITB 38.2 (f):

(a) Time Schedule:

Time to complete the Plant and Installation Services from the effective date specified in Article 3 of the Contract Agreement (CF 2, Section IX, Part 3) for determining time for completion of all activities is as per the Key Dates specified in Appendix 1, Section VI-A, General Requirements, Part 2. Bids showing a different Completion Time will be rejected.

(b) Functional Guarantees- RAMS: the Bidder shall take into consideration the RAMS requirements listed at Clause No 1.11, Section VI-B, Technical Specifications, Part 2.

(c) Purchase preference to Local Suppliers:

The purchase preference to Local Suppliers shall be governed as per the provisions given in Part 1, Section 2, ITB Clause 14.2 and 38.6.

2. Qualification

(i) Exchange Rate for Qualification Criteria

Wherever a Form in Section IV-A, Bidding Forms, requires a Bidder to state a monetary amount, Bidders shall indicate the USD equivalent using the rate of exchange determined as follows:

(a) For turnover or financial data required for each year - Exchange rate prevailing on the last working day of the respective calendar year shall be taken into



consideration. For the countries where the financial year is ending on 31st December and for the countries where the financial year is ending on 31st March, the Exchange rate prevailing on the last working day of the respective calendar year shall be taken for this purpose.

- (b) **Value of single Contract** - Exchange rate prevailing on the date of the Contract. Exchange rates shall be taken from the publicly available source **identified in BDS 37.1.**
- (c) Other qualifying criteria are given in Clause 2.1 to 2.4.



Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No.	Factor	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements
				All Parties Combined	Each Member	One Member	
2.1 Eligibility							
2.1.1	Nationality	Nationality in accordance with ITB 4.3	Must meet requirement	N/A	Must meet requirement	N/A	Bid Form 4: ELI- 1 and Bid Form 5: ELI- 2, with attachments
2.1.2	Conflict of Interest	No conflicts of interest in ITB 4.2	Must meet requirement	N/A	Must meet requirement	N/A	Letter of Technical Bid
2.1.3	JICA Ineligibility	Not having been declared ineligible by JICA, as described in ITB Sub-Clause 4.4	Must meet requirement	N/A	Must meet requirement	N/A	Bid Form 15: ACK



Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No.	Factor	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements
				All Parties Combined	Each Member	One Member	
2.2 Historical Contract Non-Performance							
2.2.1	History of Non-Performing Contracts	Non-performance of a Contract ⁽ⁱ⁾ did not occur as a result of Contractor's default since 1 st January 2018.	Must meet requirement ⁽ⁱⁱ⁾	N/A	Must meet requirement ⁽ⁱⁱ⁾	N/A	Bid Form 6: CON
2.2.2	Pending Litigation	All pending litigation shall in total not represent more than fifty percent (50%) of the Bidder's net worth and shall be treated as resolved against the Bidder.	Must meet requirement ⁽ⁱⁱ⁾	N/A	Must meet requirement ⁽ⁱⁱ⁾	N/A	Bid Form 6: CON
2.2.3	Litigation History	No consistent history of court/arbitral award decisions against the Applicant ⁽ⁱⁱⁱ⁾ since 1st January 2018.	Must meet requirement ⁽ⁱⁱ⁾	N/A	Must meet requirement ⁽ⁱⁱ⁾	N/A	Bid Form 6: CON

Notes for the Bidder:

- (i) Non-performance, as decided by the Employer, shall include all Contracts,
 a) where non-performance was not challenged by the Contractor, including through referral to the dispute resolution mechanism under the respective Contract, and
 b) that were so challenged but fully settled against the Contractor.

Non-performance shall not include Contracts where Employers decision was overruled by the dispute resolution mechanism. Non-



Eligibility and Qualification Criteria			Compliance Requirements			Documentation
No.	Factor	Requirement	Single Entity	Joint Venture (existing or intended)		Submission Requirements
				All Parties Combined	Each Member	
		performance must be based on all information on fully settled disputes or litigation, i.e., dispute or litigation that has been resolved in accordance with the dispute resolution mechanism under the respective Contract and where all appeal instances available to the Applicant have been exhausted.				
		(ii) This requirement also applies to Contracts executed by the Bidder as a JV member.				
		(iii) The Bidder shall provide accurate information on the related Bidding Form about any litigation or arbitration resulting from Contracts completed or ongoing under its execution during the period stated. A consistent history of awards against the Bidder or any member of a joint venture may result in rejection of the Bid.				



Eligibility and Qualification Criteria			Compliance Requirements			Documentation	
No.	Factor/ Sub-Factor	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements
				All Parties Combined	Each Member	One Member	
2.3 Financial Situation							
2.3.1	Financial Performance	The audited balance sheets or, if not required by the laws of the Bidder's country, other financial statements, including Profit & Loss statement acceptable to the Employer, for the last 5 years ending 31 st March 2022 for the countries where the financial year ending on 31 st March, or for the last 5 years ending 31 st December 2022 for the countries where the financial year ending on 31 st December shall be submitted. As the minimum requirement, a Bidder's net worth calculated as the difference between total assets and total liabilities shall be positive for the last financial year during the above period.	Must meet requirement	N/A	Must meet requirement	N/A	Bid Form 7: FIN-1 with attachments
2.3.2	Average Annual Turnover⁽ⁱ⁾	Minimum average annual turnover (calculated as total certified payments received for Contracts in progress and/ or completed) as a prime Contractor over the last 5 financial years i.e., turnover values between 01-Apr-2019 to 31-Mar-2023 for the countries where the financial year is ending on 31-Mar or between 01-01-2018 to 31-Dec-2022 for the countries where the financial year is ending on 31-Dec must be USD 30,00,000 or the equivalent thereof.	Must meet requirement	Must meet requirement	Must meet 25% of the requirement	Must meet 40% of the requirement	Bid Form 8: FIN-2



Eligibility and Qualification Criteria			Compliance Requirements			Documentation	
No.	Factor/ Sub-Factor	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements
				All Parties Combined	Each Member	One Member	
2.3.3	Financial Resources	<p>The Bidder shall demonstrate that it has access to, or has available, liquid assets, lines of credit, and other financial means (independent of any Contractual advance payment) sufficient to meet the cash flow requirements of USD 9,60,000 or the equivalent thereof for the subject Contract net of the Bidder's other commitments.</p> <p>The Bidder shall also demonstrate, to the satisfaction of the Employer, that it has adequate sources of finance to meet 25% of the total commitments on works currently in progress on the date of Bid submission.</p>	Must meet requirement	Must meet requirement	Must meet 15% of the requirement	Must meet 50% of the requirement	Bid Form 9 FIR-1 and Bid Form 10 FIR-2

Note:

- (i) To bring the Contract value of Average Annual Turnover at par, the annual turnover values will be calculated by assuming 5% escalation per annum for Indian Currency and 2% escalation per annum for foreign currency for the first 4 years of the above turnover values and total value of 5 years divided by 5.



Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No.	Factor/ Sub-Factor	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements
				All Parties Combined	Each Member	One Member	
2.4 Experience							
2.4.1	General Experience	Experience under Contracts in the role of prime Contractor (single entity or JV member), Sub-Contractor or Management Contractor for at least the last five (5) years starting 1st January 2018.	Must meet requirement	N/A	Must meet requirement	N/A	Bid Form 11: EXP-1
2.4.2	Specific Experience	<p>A) A minimum number of 4 CMVs out of which at least 2 Nos. shall be in Standard Gauge of similar⁽ⁱ⁾ works (Design, Manufacture, Supply, Installation, Testing & Commissioning) shall have been satisfactorily and substantially completed during the period from 1st Jan 2018 till the Bid Submission date.</p> <p>B) Out of the above Contracts completed, at least one (01) Contract shall have been completed outside the country</p>	Must meet requirement	Must meet requirements ^(v)	N/A	N/A	Bid Form 12: EXP-2



Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No.	Factor/ Sub-Factor	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements
				All Parties Combined	Each Member	One Member	
2.4 Experience							
		of manufacture of the Equipment or in India. C) A minimum number of 2 CMVs, out of which at least 1 Nos. shall be in Standard Gauge, shall be in operation in Metro/Railway/ MRT systems with satisfactory performance over a minimum period of two (02) years after commissioning and supported by a performance certificate from the end-client.					
Notes for the Bidder:							
<p>(i) The similarity shall be as “All supplies of 8-wheeler CMVs for use in Metro / MRT/ Railway system.</p> <p>(ii) Substantial completion shall be based on 80% or more work completed under the Contract, including successful Installation and Commissioning.</p> <p>(iii) Eligible Bidders:</p> <p>(a) Manufacturers as Prime Member (in single entity/ JV/ sub-contractor), who declare during tender submission to supply from their manufacturing plant in India/ outside India with their own credentials, or</p> <p>(b) Indian subsidiaries, satisfying the criteria of Class-I or Class-II local supplier, of the foreign manufacturer and having a tie up with the foreign manufacturer for a valid transfer of technology agreement along with an undertaking from the foreign manufacturer that the process of design, manufacturing, testing and commissioning and the corresponding quality assurance program for all the above</p>							



Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No.	Factor/ Sub-Factor	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements
				All Parties Combined	Each Member	One Member	
2.4 Experience							
<p>activities of the Equipment being procured under this Bid have been checked and verified by them and also an undertaking for an assurance from the above manufacturer to provide the technical support for all the activities under this Bid and the after sales service up to the end of Defect Liability Period as also the supply of spares as per Clause PC 7.3, Section VIII, Part 3 is available and requisite documents are submitted along with the Bid. In this case, the credentials of foreign manufacturers can be used to satisfy the qualifying eligibility criteria spelt out in 2.4.2 above.</p> <p>The Bidder shall also disclose the details of the foreign manufacturing plant (i.e., the city and the country of the manufacturing plant etc.) with which they claim to fulfil the qualifying eligibility criteria spelt out in 2.4.2 above. The qualifying eligibility criteria shall be evaluated on the basis of considering the above plant and its country as the country of origin. The disclosing of the above foreign manufacturing plant shall be in addition to the disclosing of the details of the Bidder's manufacturing plant in India (i.e., the plant in India in which the Equipment to be supplied through this Bid shall be actually manufactured).</p> <p>(iv) For Contracts under which the Bidder participated as a JV member, only the Bidder's share, by value*, shall be considered to meet this requirement.</p> <p>(v) In case of a JV, the value* of Contracts completed by its members shall not be aggregated to determine whether the requirement of the minimum value* of a single Contract has been met. Instead, each Contract performed by each member shall satisfy the minimum value* of a single Contract as required for single entity. In determining whether the JV meets the requirement of total number of Contracts, only the number of Contracts completed by all members each of value* equal or more than the minimum value* required shall be aggregated.</p> <p>* Value here refers to number of CMVs.</p>							

-----End-----



BIDDING DOCUMENTS



MUMBAI METRO LINE 3 (COLABA-BANDRA-SEEPZ)

CONTRACT MM3-CBS-DEQ-9-03B

Design, Manufacture, Supply, Installation, Testing &
Commissioning of Catenary Maintenance Vehicle
for Project "Mumbai Metro Line-3"

Part 1

Bidding Procedures

Section IV-A

Bidding Forms

September – 2023

**Mumbai Metro Rail Corporation Ltd
MMRC Line 3 Transit Office,
Wing A, Block E,
Bandra-Kurla Complex,
Bandra (East), Mumbai- 400 051, India.**



Bidding Documents

Composition of Documents

Part 1	Bidding Procedure
Section I	Instructions to Bidders
Section II	Bid Data Sheet
Section III	Evaluation and Qualification Criteria
Section IV-A	Bidding Forms
Section IV-B	Pricing Document
Section V	Eligible Source Countries of Japanese ODA Loans
Part 2	Employer's Requirements
Section VI-A	Employers Requirements – General Specifications
Section VI-B	Employer's Requirements – Technical Specifications
Part 3	Conditions of Contract and Contract Forms
Section VII	General Conditions of Contract (GC)
Section VIII	Particular Conditions of Contract (PC)
Section IX	Contract Forms
Part 4	Drawings
Section X	Drawings



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Letter of Technical Bid

Date: *[insert date of Bid submission]*
Loan Agreement No.: ID-P268
IFB No.: MM3-CBS-DEQ-9-03B

To: **Mumbai Metro Rail Corporation Ltd.**

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): *[insert the number and issuing date of each Addendum]*,
- (b) We, including any Sub-Contractors/ vendors, for any part of the Contract, meet the eligibility requirements in accordance with ITB 4 and ITB 5,
- (c) We, including any Sub-Contractors/ vendors, for any part of the Contract, have no conflict of interest in accordance with ITB 4,
- (d) We offer to Design, Manufacture, Supply, Install and Test & Commission of **Catenary Maintenance Vehicle** in conformity with the Bidding Documents and as per the Employers requirements detailed in Part 2.
- (e) Our 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,
- (f) We are not participating, as a Bidder or as a Sub-Contractor/ Manufacturer, in more than one Bid in this Bidding process in accordance with ITB 4.2 (c),
- (g) We hereby certify that we have taken steps to ensure that no person acting for us or on our behalf will engage in any type of fraud and corruption.
- (h) We hereby certify that we have carefully examined all the contents of the Bidding documents including all the Bid addenda (if any) and all the pages of our Bid have been signed and stamped (by each constituent member in case of a JV or consortium)

Name of the Bidder**[insert complete name of the Bidder]*

Name of the person duly authorized to sign the Bid on behalf of the Bidder** *[insert complete name of person duly authorized to sign the Bid]*

Title of the person signing the Bid *[insert complete title of the person signing the Bid]*

Signature of the person named above with stamp *[insert signature of person whose name and capacity are shown above]*

Date signed *[insert date of signing]* day of *[insert month]*, *[insert year]*

*: In the case of the Bid submitted by a Joint Venture specify the name of the Joint Venture as Bidder.

** : Person signing the Bid shall have the power of attorney given by the Bidder to be attached with the Bid.



Letter of Price Bid

(To be submitted along with Price Bid)

Date: *[insert date of Bid submission]*

Loan Agreement No.: ID-P268

IFB No.: MM3-CBS-DEQ-9-03B

To: **Mumbai Metro Rail Corporation Ltd.**

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): *[insert the number and issuing date of each Addendum]*;

We offer to Design, Manufacture, Supply, Install, Test & Commission, in conformity with the Bidding Documents, the **Catenary Maintenance Vehicle** as per the Employer's Requirements

The total price of our Bid, excluding any discounts offered in item (b) below, is:

- (From Schedule No. 6): _____

[Indicate the various amounts (in words and figures) in the respective currencies from the respective Schedules],

- (b) The discounts offered and the methodology for their application are:
The discounts offered are: *[specify in detail each discount offered]*
The exact method of calculations to determine the net price after application of discounts is shown below: *[specify in detail the method that shall be used to apply the discounts]*,
- (c) Our 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) If our Bid is accepted, we commit to obtain a Performance Security in accordance with the Bidding Documents,
- (e) We understand that this Bid, together with your written acceptance thereof included in your Letter of Acceptance, shall constitute a binding Contract between us, until a formal Contract is prepared and executed; and
- (f) We understand that you are not bound to accept the lowest evaluated Bid or any other Bid that you may receive.

- Name of the Bidder* *[insert complete name of the Bidder]*
- Name of the person duly authorized to sign the Bid on behalf of the Bidder** *[insert complete name of person duly authorized to sign the Bid]*
- Title of the person signing the Bid *[insert complete title of the person signing the Bid]*
- Signature of the person named above with stamp *[insert signature of person whose name and capacity are shown above]*
- Date signed *[insert date of signing]* day of *[insert month]*, *[insert year]*

*: In the case of the Bid submitted by a Joint Venture/ Consortium, specify the name of the Joint Venture/ Consortium as Bidder.

** . Person signing the Bid shall have the power of attorney given by the Bidder to be attached with the Bid.



Bid Form 1: Bidder's Technical Proposal of CMV

The following is 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.

The Bidder shall provide the following information:

A. Technical Details of offered CMV	
A1	A detailed technical note along with catalogues and design details including description of the CMV and all major assemblies must be given along with main data sheet. It must cover the performance parameters of the Vehicle.
A2	Sufficient details with pictures to make a reasonable assessment of: i. The CMV as a whole ii. The Working System and its sub systems.
A3	A list of major items procured from outside for assembly.
A4	Any other relevant and important details.
B. General	
B1	The Bidder shall give details of System Support Requirements (Interface requirements), if any, for commissioning, operation and maintenance of the CMV.
C. Spare Parts, Special tools, Test Equipment & Maintenance Facilities	
C1	Details of the local agency for Installation, Testing & Commissioning work (if required) and Maintenance work shall be given as under: Company Profile: Experience details:
C2	For firms out of India, the details of the associate Indian firm for co-ordination work shall be given as under: Company Profile: Experience details: Type of works handled with details:
D. Bidder's Manufacturing Works	
D1	The Bidder shall submit the organization chart indicating the key people responsible for different functions, viz. Design, Manufacturing, Quality, Installation, Testing & Commissioning, with details of their experience.
D2	The Bidder shall detail the manufacturing works, location, area, approximate no. of workers employed, and major manufacturing facilities installed.
E. Technical Data	
1.	Annexure A-
2.	Annexure B-
3.	Annexure C-
4.	Annexure D-
5.	Annexure E-
6.	Annexure F-



Note: It is accepted that the design data provided at the Bidding stage may be subject to change during the design development process.

Bidder Company Name: _____
Bidder's Representative Name: _____
Signature: _____
Date of Submission: _____

Company Seal:



Annexure A

The following data shall be supplied for the car with the tender offer:

Sr. No.	Data	Value
1)	Length of the car	
2)	Total rigid wheelbase	
3)	Height of car floor (tare weight)	
4)	Distance between bogie centres	
5)	Height of coupler when wheels are new and fully worn out	
6)	Maximum height of the car with wheels in new condition (should not be >3845mm)	
7)	Maximum height of the cab at corners with wheels in new condition	
8)	Width of the car	
9)	Minimum height above rail level of any component with the car wheels in maximum worn conditions and car under loaded condition	
10)	Reduction in the above height in the event of spring rigging failure	
11)	Diameter of wheels over tread (new/worn)	
12)	Axle load maximum / minimum	
13)	Adhesive weight	
14)	Total weight of the car – a) in fully loaded condition a) in empty condition	
15)	Maximum speed of the car – a) Geared b) Safe vehicular	
16)	Maximum tractive effort at rail	
17)	Maximum continuous tractive effort (kg)	
18)	Maximum speed of operation at maximum continuous tractive effort (km/h)	
19)	Gradient to be negotiated by CMV without rollback = 4%. (Supporting calculation and confirmation in wet rail condition may also be provided.)	
20)	Name and address of the likely manufacturers of the following: i. Coupler ii. Axles (for powered axle only) iii. Springs iv. Roller bearings (Separately for the journal bearing and other important bearings) v. Brake equipment (MR pressure should be 10 BAR compatible with metro RS) vi. Other auxiliaries vii. Diesel Engine	



viii. Transmission	
ix. Control Equipment	
x. Storage Batteries	
xi. Crane with basket	
xii. Lifting and Swivelling Platform.	

21) The following drawings or data sheets shall also be submitted by Bidder along with his offer:

- i. A "section" view of the plan of the car, showing the layout of the major equipment along with principal dimensions.
- ii. Side elevation of the proposed car.
- iii. A "sectional" side elevation of the car under frame showing the disposition of the major equipment on the under frame.
- iv. General arrangement illustrating the system of suspension in detail.
- v. Visibility diagram from all driving positions.

22) The following information shall be furnished by the tenderer along with the offer:

- i. Tractive effort and draw bar pull/ speed curves corresponding to engine output.
- ii. Starting tractive effort and draw bar pull.
- iii. Car resistance data with basis and formula used.

23) Principal feature showing adequate fire retardancy should be identified.

23) Tentative brake rigging diagram along with details of brake cylinder and slack to demonstrate his capability for designing car body, the tenderer shall submit a set of actual calculations pertaining to car structure for vehicle, designed by him in the past. These shall be submitted along with his tender.



Annexure B
ENGINE DATA

Sr. No.	DESCRIPTION	Remarks
1.	General Data	
2.	Exact description and model of the engine	
3.	Rated output of the engine	
4.	Rated engine speed	
5.	Fuel oil consumption at idle speeds	
6.	Lube oil consumption at rated output as percentage of fuel oil consumption	
7	Safety devices provided: - Over speed - low lube oil - overload - high cooling water temperature - high lube oil temperature - high exhaust temperature - high intake temperature	
8	Method of starting, giving details of equipment	
9	Estimated Periodic schedules of maintenance.	
10	Periodicity of overhauling the following critical components:	
11	Torque speed curve which the manufacturer considers to be the maximum torque that should be used for rail traction.	



Annexure C

Details of the equipment proposed to be used in the car:

1	Air compressor 1. Make 2. Model 3. Maximum pressure 4. Capacity (at idle & full speed of engine)	
2	Auxiliary Alternator 1. Make 2. Model 3. Continuous / short time rating with details of voltage and current regulation.	
3	Hydraulic Transmission 1. Make 2. Type 3. Maximum input HP 4. Complete transmission characteristic curves including input power, output power, input & output torque, transmission efficiency for 100%, 75%, 50% & 25% of full load, against output speed. 5. Normal & max. Permissible oil temp. of torque converter.	
4	Reversing Arrangement 1. Method of reversing with full details 2. Ratio - forward & reverse	
5	Axle Drive Gear Box 1. Make & Type 2. Gear ratio	
6	Cardan Shaft 1. Make & Type 2. Torque rating, life rating and permissible angularity 3. Minimum compressed length with permissible length compensation.	
7	Hydraulic Pump for Cooling system 1. Type (fixed / variable) 2. Model 3. Make 4. Flow rate (LPM @ speed)	
8	Hydraulic motor for Cooling system 1. Type (fixed / variable) 2. Model 3. Make	



9	Crane with Hook and Basket a) Make & type b) Capacity c) Dimensions (attach suitable diagram) d) Rotational angle e) Maximum Height in extended condition from rail level f) Maximum extension from centre line of track 10g) Rise/lowering time	
10	Lifting and swivelling Platform a) Make & type b) Capacity c) Dimensions (attach suitable diagram) d) Rotational angle e) Maximum Height in extended condition from rail level f) Maximum extension from centre line of track g) Rise/lowering time	



Annexure D

Details & address of the Maintenance facility available in India nearest to the Employer for the major equipment used in the car:

Sr. No	Equipment	Make	Address of the maintenance facility
1	Engine		
2	Transmission		
3	DG Set		
4	Brake System		
5	Crane with hook and bucket.		
6	Lifting and Swivelling Platform		



Annexure E- Special Tools

a) **SPECIAL TOOLS**

The Contractor shall provide all necessary tools for normal as well as operation and for maintenance purpose at the time of handing over of car to Employer for trial operations in a suitable toolbox.

The Contractor shall supply one complete set of tools for CMV that are necessary for routine maintenance to be carried out. The list of necessary tools shall be given below:

Sr No.	Tool Description	Quantity



Annexure F- Protection and Safety Features

Protection and Safety Features

The list below is indicative. The Bidder shall detail all the protection and safety features provided in the CMV.

Sr No.	Feature	Remarks
1	Alarm/ indication for low fuel	
2	Protection against low oil level in hydraulic system.	
3	Provision of auto parking brake	
4	Provision of dead man switch.	
5	No traction with parking brakes on	
6	Electrical Bonding of CMV body with rail	
7	Provision of audible and visual alarms to the driver in the cab for the following conditions	
	7.1- Engine over-speed	
	7.2- Low engine lubrication oil pressure	
	7.3- High cooling water temperature	
	7.4- High transmission oil temperature	
	7.5- Air filter clogging	
8	-----	
9	-----	
-		
-		



Bid Form 2: Statement of Nonmaterial Nonconformities

Reference: Part 1 - Bidding Procedure Section III - Evaluation and Qualification Criteria, Clause 1.1.1 (d),

[Bidder shall list the items of nonmaterial nonconformities (if any) below.]

Clause Number	Details of Nonmaterial Nonconformities	Remarks explaining reasons for Nonmaterial Nonconformities and why it may be considered by the Employer

1. We hereby confirm that the Technical Proposals submitted by us, are in Clause-by-Clause Compliance with the Employer's Requirements and other specifications, including Addenda thereon, except as noted in this Bid Form.
2. We hereby confirm that all implicit and explicit nonconformities, i.e., deviations, omissions, comments, and remarks found elsewhere in our proposal shall be treated as NULL and VOID and stand withdrawn.
3. We hereby confirm that except for the nonconformities noted in this Bid Form, our offer is fully and truly compliant.
4. **All nonconformities have been listed in this Bid form and priced in Schedule No. 8, Section IV-B, Part 1.** Nonconformities not priced will be treated as null and void and stand withdrawn at nil price.

Note:

Where there is no Nonconformity, the statement shall be returned duly signed with an endorsement indicating 'No Nonconformity'. In case, Performa of nonconformities is not submitted or submitted as blank, it will be construed that the Bidder has not proposed any nonconformity from Bidding Documents and will provide all Equipment as per specifications and Bidding Documents.

Bidder Company Name: _____

Bidder's Representative Name: _____

Signature: _____

Date of Submission: _____

Company Seal:



Bid Form 3: Structure of the Bidder (in the case of JV)

(Refer Clause 11.2 (e) of Section I, ITB, Part 1)

The Bidder shall supply a chart particularizing the structure of the Bidder (identifying all companies comprising the Bidder in the event that the Bidder is a joint venture or consortium) and the ownership of each of the companies comprising the Bidder, identifying all respective intermediate and ultimate holding companies.

Composition of the Bidder

1. A notarized copy of the Memorandum of Understanding (MOU) relating to the composition of the Bidder shall be submitted. For guidance, if the Bidder is a joint venture or a consortium then the joint venture or consortium agreement is to be submitted by the Bidder. If the Bidder is an entity established or to be established for this Contract, details of the shareholders' agreement or proposed shareholders' agreement shall be supplied together with the percentage participation and percentage equity in the agreements.
2. The Contractual arrangements and copies of agreements in relation thereto must, as a minimum, provide information on all members or participants involved, their respective participation in the Bid, the management structure, ownership and control of the members or participants comprising the Bidder and if, appropriate, the name of the member or participant who would have overall lead management responsibility for the Works, the registered addresses of all parties and the names of their respective senior partners, chairmen or managing directors as appropriate. Such agreements shall also reflect the joint and several liabilities of the members to the Employer in the event that the Contract is awarded to them and provide "deadlock" provisions in the event that decisions of the joint venture or consortium cannot be reached by unanimous agreement.
3. The Bidder shall furnish the details, in the agreement, of the scope split of facilities amongst the Consortium/Joint Venture members.
4. The Bidder shall provide written confirmation that:
 - a) The agreement or agreements submitted represent the entire agreement between the members or participants comprising the Bidder as to the Bidder's legal persona.
 - b) There is or are no other agreements relating to the Bidder's incorporation, powers or organization which may affect in any way his ability to carry out the Facilities; and
 - c) No changes will be made to any such agreements during the tender period or during the Contract period (if Contract awarded) without first obtaining the Employer's agreement to the proposed change or changes.

The Bidder certifies compliance with the above requirements.

Bidder Company Name:

Bidder's Representative Name:

Signature:

Date of Submission:

Company Seal



Bid Form 4: ELI 1 - Bidder Information

Date: [insert day, month, year]

IFB No.: MM3-CBS-DEQ-9-03B

Page [insert page number] of [insert total number] pages.

[The Bidder shall provide the following information]

1. Bidder's Company's legal name: [Insert full name] -----.
2. In case of JV/ Consortium, legal name of the representative member and of each member: [Insert full name of each member in the JV and specify the representative member] -----
3. Bidder's actual or intended country of registration: [insert country of registration]
4. Bidder's actual or intended year of incorporation: [insert year of incorporation]
5. Bidder's legal address in country of registration: [insert street/number/town or city/country]
6. Bidder's Indian authorized representative information (if available) Name: [insert full name] Address: [insert street/number/town or city/country] Telephone/Fax numbers: [insert telephone/fax numbers, including country and city codes] Email Address: [insert E-mail address]
7. Attached are copies of original documents of: <input type="checkbox"/> Articles of Incorporation (or equivalent documents of constitution or association), and/or documents of registration of legal entity named above, in accordance with ITB 4.3. <input type="checkbox"/> In case of JV, letter of intent to form JV or JV agreement, in accordance with ITB 4.1.
8. Included are the organizational chart, a list of Board of Directors, and the beneficial ownership.

Bidder Company Name:

Bidder's Representative Name:

Signature:

Date of Submission:

Company Seal:



Bid Form 5: ELI 2- Bidder's Party Information

(To be filled up in case of a Joint Venture)

Date: [insert day, month, year]

IFB No.: MM3-CBS-DEQ-9-03B

Page [insert page number] of [insert total number] pages.

[The following form is additional to 'Bid Form 4: ELI-1' and shall be completed to provide information relating to each JV member (in case the Bidder is a JV)]

1. Bidder's company's legal name: [insert full name] -----
2. Bidder's Party legal name registered with the government: [Insert full name of Bidder's Party] -----
3. Bidder's Party country of registration: [insert country of registration] -----
4. Bidder's Party year of incorporation: [insert year of incorporation] -----
5. Bidder's Party legal address in country of registration: [insert street/number/town or city/country] -----
6. Bidder's Party authorized representative information. Name: [insert full name] ----- Address: [insert street/number/town or city/country] ----- Telephone/Fax numbers: [insert telephone/fax numbers, including country and city codes] ----- E-mail address: [insert E-mail address] -----
7. Attached are copies of original documents of <input type="checkbox"/> Articles of Incorporation (or equivalent documents of constitution or association), and/or registration documents of the legal entity named above, in accordance with ITB 4.3.
8. Included are the organizational chart, a list of Board of Directors, and the beneficial ownership.

Bidder Company Name: _____

Bidder's Representative Name: _____

Signature: _____

Date of Submission: _____

Company Seal:



Bid Form 6: CON Historical Contract Non-Performance

[The following table shall be filled in for the Bidder and for each member of a JV.]

Date: [insert day, month, year]

Bidder's Legal Name: [insert full name]

Joint Venture Party Legal Name: [insert full name]

IFB No.: MM3-CBS-DEQ-9-03B

Page [insert page number] of [insert total number] pages

1. History of Non-Performing Contracts

Non-Performing Contracts			
<input type="checkbox"/> Contract non-performance did not occur, in accordance with Section III, Evaluation and Qualification Criteria, Sub-Factor 2.2.1, as appropriate.			
<input type="checkbox"/> Contract(s) not performed, in accordance with the Section III, Evaluation and Qualification Criteria, Sub-Factor 2.2.1, as appropriate, is(are) indicated below:			
Year	Non- performed portion of Contract	Contract Identification	Total Contract Amount (current value, currency, exchange rate and USD equivalent)
[insert year]	[insert amount and percentage]	<ul style="list-style-type: none"> • Contract Identification: [indicate complete Contract name, number, and any other identification] • Name of Employer: [insert full name] • Address of Employer: [insert street/city/country] • Reason(s) for non-performance: [indicate main reason(s)] 	[insert amount]



2. Pending Litigation

Pending Litigation				
<input type="checkbox"/> No pending litigation in accordance with Part 1, Section III, Evaluation and Qualification Criteria, Sub-Factor 2.2.2, as appropriate. <input type="checkbox"/> Pending litigation in accordance with the Part 1, Section III, Evaluation and Qualification Criteria, Sub-Factor 2.2.2, as appropriate, is indicated below.				
Year of dispute	Amount in dispute (currency)	Outcome as Percentage of Net Worth	Contract Identification	Total Contract Amount (current value, currency, exchange rate and USD equivalent)
[insert year]	[insert amount]	[insert percentage]	<ul style="list-style-type: none"> • Contract Identification: [indicate complete Contract name, number, and any other identification] • Name of Employer: [insert full name] • Address of Employer: [insert street/ city/ country] • Matter in dispute: [indicate main issues in dispute] • Status of dispute: [indicate if it is being treated by the Adjudicator, under Arbitration or being dealt with by the Judiciary] 	[insert amount]



3. Litigation History

Litigation History		
<input type="checkbox"/> No court/arbitral award decisions against the Bidder, in accordance with Section III, Evaluation and Qualification Criteria, Sub-Factor 2.2.3, as appropriate. <input type="checkbox"/> Court/arbitral award decisions against the Bidder, in accordance with Section III, Evaluation and Qualification Criteria, Sub-Factor 2.2.3, as appropriate, are indicated below:		
Year of award	Contract Identification	Total Contract Amount (current value, currency, exchange rate and USD equivalent)
[insert year]	<ul style="list-style-type: none"> • Contract Identification: [indicate complete Contract name, number, and any other identification] • Name of Employer: [insert full name] • Address of Employer: [insert street/city/country] • Matter in dispute: [indicate main issues in dispute] • Party who initiated the dispute: [indicate "Employer" or "Contractor"] • Status of dispute: [indicate if it is being treated by the Adjudicator, under Arbitration or being dealt with by the Judiciary] 	[insert amount]

Bidder Company Name: _____

Bidder's Representative Name: _____

Signature: _____

Date of Submission: _____

Company Seal: _____



Bid Form 7: FIN 1 - Financial Situation

[The following table shall be filled in for the Bidder and for each member of a JV/ Consortium.]

Date: [insert day, month, year]

Bidder's Legal Name: [insert full name]

Joint Venture Party Legal Name: [insert full name]

IFB No.: MM3-CBS-DEQ-9-03B

Page [insert page number] of [insert total number] pages

1. Financial data

Type of Financial information in (currency)	Historic information for previous five (5) years (Amount, currency, exchange rate, USD equivalent)				
	Year 1	Year 2	Year 3	Year 4	Year 5
Statement of Financial Position (Information from Balance Sheet)					
Total Assets (TA)					
Total Liabilities (TL)					
Net Worth (NW)					
Curent Assets (CA)					
Curent Liabilities (CL)					
Information from Income Statement					
Total Revenue (TR)					
Profits Before Taxes (PBT)					
Profits After Taxes (PAT)					

2. Financial documents

The Bidder and its Parties shall provide audited/ CA certified copies of the financial statements for 5 years pursuant to Section III, Evaluation and Qualifications Criteria, Sub-factor 2.3.1. The financial statements shall:

- (a) reflect the financial situation of the Bidder or in case of JV/ Consortium member, of each member, and not an affiliated entity (such as parent company or group member).
- (b) be independently audited or certified in accordance with local legislation.
- (c) be complete, including all notes to the financial statements.
- (d) correspond to accounting periods already completed and audited.

Attached are copies of financial statements for the 5 years required above; and complying with the requirements.

Signature & Company Seal



Bid Form 8: FIN 2 - Average Annual Turnover

[The following table shall be filled in for the Bidder and for each member of a JV.]

Date: [insert day, month, year]

Bidder's Legal Name: [insert full name]

Joint Venture Party Legal Name: [insert full name]

IFB No.: MM3-CBS-DEQ-9-03B

Page [insert page number] of [insert total number] pages

Annual Turnover Data (Supplies of all equipment) as a Prime Contractor (defined as certified payments received for equipment supply Contracts in progress and/or completed) during the last 5 years			
Year	Amount and Currency	Exchange rate	USD equivalent
[indicate year]	[insert amount and indicate currency]	[insert applicable exchange rate]	[insert amount in USD equivalent]
Average Annual Turnover *			

* The Bidder and its Parties shall provide **audited/ CA certified copies** of the above financial statement for 5 years pursuant to Section III, Evaluation and Qualifications Criteria, Sub-factor 2.3.2.

* Total USD equivalent for all years divided by the total number of years, in accordance with Section III, Evaluation and Qualification Criteria, Sub Factor 2.3.2, as appropriate.

Bidder Company Name: _____
 Bidder's Representative Name: _____
 Signature: _____
 Date of Submission: _____

Company Seal:



Bid Form 9: FIR 1 - Financial Resources

[The following table shall be filled in for the Bidder and for each member of a JV.]

Date: [insert day, month, year]

Bidder's Legal Name: [insert full name]

Joint Venture Party Legal Name: [insert full name]

IFB No.: MM3-CBS-DEQ-9-03B

Page [insert page number] of [insert total number] pages

[Specify proposed sources of financing, such as liquid assets, unencumbered real assets, lines of credit, and other financial means, net of current commitments, available to meet the total construction cash flow demands of the subject Contract or Contracts as indicated in Section III, Evaluation and Qualification Criteria Sub-Factor 2.3.3].

Financial Resources		
No.	Source of financing	Amount (USD equivalent)
1		
2		
3		
4		

- The Bidder and its Parties shall **provide audited/ CA certified copies** of the above financial statement pursuant to the Section III, Evaluation and Qualifications Criteria, Sub-factor 2.3.3.

Bidder Company Name: _____

Bidder's Representative Name: _____

Signature: _____

Date of Submission: _____

Company Seal:



Bid Form 10: FIR 2 - Current Contract Commitments

[The following table shall be filled in for the Bidder and for each member of a JV.]

Date: [insert day, month, year]

Bidder's Legal Name: [insert full name]

Joint Venture Party Legal Name: [insert full name]

IFB No.: MM3-CBS-DEQ-9-03B

Page [insert page number] of [insert total number] pages

[Bidders and each member of a JV shall 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 accordance with Section III, Evaluation and Qualification Criteria Sub-Factor 2.3.3]

Current Contract Commitments					
S.No.	Name of Contract	Employer's Contact Address, Tel, Fax	Value of all outstanding manufactured Equipment Supplies [Current USD Equivalent]	Estimated Completion Date	Average Monthly Invoicing Over Last Six Months [USD/month]
1					
2					
3					
4					
5					

Note: The Bidders and each member of a JV shall **provide audited/ CA certified copies** of the above financial statement pursuant to Section III, Evaluation and Qualifications Criteria, Sub-factor 2.3.3.

Bidder Company Name:

Bidder's Representative Name:

Signature:

Date of Submission:

Company Seal:



Bid Form 11: Form EXP 1 - General Experience

[The following table shall be filled in for the Bidder and for each member of a JV.]

Date: [insert day, month, year]

Bidder's Legal Name: [insert full name]

Joint Venture Party Legal Name: [insert full name]

IFB No.: MM3-CBS-DEQ-9-03B

Page [insert page number] of [insert total number] pages

[Identify Contracts that demonstrate continuous work over the past [number] years pursuant to Section III, Evaluation and Qualification Criteria, Sub-Factor 2.4.1. List Contracts chronologically, according to their commencement (starting) dates.]

General Experience			
Starting Year	Ending Year	Contract Identification	Role of Bidder
[indicate year]	[indicate year]	<ul style="list-style-type: none"> Contract name: [insert full name] Brief description of the works performed by the Bidder: [describe works performed briefly] Amount of Contract: [insert amount, currency, exchange rate and USD equivalent] Name of Employer: [indicate full name] Address: [indicate street/number/town or city/country] 	[insert "Prime Contractor" (Single entity or JV member) or "Sub Contractor" or "Management Contractor"]

Bidder Company Name: _____

Bidder's Representative Name: _____

Signature: _____

Date of Submission: _____

Company Seal:



Bid Form 12: Form EXP 2 - Specific Experience

[The following table shall be filled in for Contracts performed by the Bidder and by each member of a JV.]

Date: [insert day, month, year]

Bidder's Legal Name: [insert full name]

Joint Venture Party Legal Name: [insert full name]

IFB No.: MM3-CBS-DEQ-9-03B

Page [insert page number] of [insert total number] pages

[Fill out one (1) form per Contract, in accordance with Section III, Evaluation and Qualification Criteria (Without Prequalification), Sub-Factor 2.4.2.]

Similar Contract No. [insert number] of [insert number of similar Contracts required]	Information		
Contract Identification	[insert Contract name and reference identification number, if applicable]		
Award date	[insert day, month, year, e.g., 15 June,2015]		
Completion date	[insert day, month, year, e.g., 03 October,2017]		
Role in Contract	Prime Contractor Only		
Total Contract Amount	[insert Contract amount(s) and currency(ies)]	USD [insert exchange rate and total Contract amount in USD equivalent]	
If member in a JV, specify participation in total Contract amount	[insert percentage of participation]	[insert amount(s) and currency(ies) of participation]	USD [insert exchange rate and amount of participation in USD equivalent]
Employer's Name	[insert full name]		
Address	[indicate street/number/town or city/country]		
Telephone/fax number	[insert telephone/fax numbers, including country and city area codes]		
E-mail	[insert E-mail address, if available]		



Similar Contract No. <i>[insert number of similar Contracts required]</i>	Information
Description of the similarity in accordance with Sub-Factor 2.4.2 of Section III:	
1. Physical size of required works items	<i>[insert physical size of items]</i>
2. Complexity	<i>[insert description of complexity]</i>
3. Methods/Technology	<i>[insert specific aspects of the methods/technology involved in the Contract]</i>
4. Other Characteristics	<i>[insert other characteristics as described in Section VI, Employer's Requirements]</i>

Bidder Company Name:

Bidder's Representative Name:

Signature:

Date of Submission:

.....

.....

.....

.....

Company Seal:



Bid Form 13: Certification of Minimum Local Content

I/ We, the Bidder(s), do hereby certify that the Plant/ Facilities/ Equipment offered under the Contract meet the minimum local content required for availing Purchase Preference as per the Clause 1.2.2 (d), Section III, Eligibility and Qualification Criteria, Part 1.

The local content in the proposed Bid shall be _____ % of the total value of the Contract. The details of activities against the local Content portion are as under:

Sr No	Activity/ Component (specify in detail)	Location (if any)

Authorized Signatory

[Insert name of signatory, title]

For and on behalf of [Insert name of the Bidder]

Date:

Notes:

- 1) The above Certificate is to be submitted only by those Bidders who wish to avail Purchase Preference as per Clause 1.2.2 (d), Section III, Eligibility and Qualification Criteria, Part 1.
- 2) The local content shall exclude net domestic indirect taxes, transportation, insurance, installation, Testing & Commissioning, training and after sales service support like AMC etc.
- 3) In case of procurement for a value (Quoted in Schedule No. 6) is more than ₹ 10 crores, the Bidder shall provide a certificate from the statutory auditor or cost auditor of the company (in case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of local content.
- 4) For procurements up to ₹ 10 crores, the Bidder shall submit self-certification of the percentage of local content.
- 5) If any false declarations regarding local content is found, this will be in breach of the Code of Integrity under Rule 175 (1) (i) (h) of the General Financial Rules for which the Bidder or its successor can be debarred for a period of 3 years as per Rule 151 (iii) of the General Financial Rules along with such other actions as may be permissible under the law.
- 6) A Bidder who has been debarred by any procuring entity for violation of the conditions of purchase preference shall not be eligible for preference for procurement by any other entity for the duration of the debarment. The debarment for such other procuring entities shall take effect prospectively from the date on which it comes to the notice of the other procuring entities.



Bid Form 14: Check List of Submittals

1. The following check list is intended to help the Bidders in submitting the offer to ensure that is complete. Bidders are advised to go through the list carefully, take necessary action and mark accordingly in Column No 4.
2. Bidders are also required to submit a copy of the checklist, duly marked, along with their offer.
3. The check list is indicative and does not absolve the responsibility of the Bidder to submit any other document/ information, if so required, in the Bidding Documents.

Sr. No.	Description	Reference (Bidding Document)	Submitted (Yes/ No/ Not Applicable)
1	Technical Package (Envelope No 1).		
1.1	Original Bid Security in a separate sealed envelope.	ITB 21, Section I, Bid Security Form	
1.2	Letter of Technical Bid signed	Letter of Technical Bid, Section IV-A	
1.3	Technical Proposal of CMV	Bid form 1, Section IV-A	
1.4	The written confirmation of authorization to sign on behalf of the Bidder with Notarized Power of Attorney from the Bidder. In case of a foreign company, the document shall be Apostille or Authenticated by Indian Embassy/Consulate in that country and shall be attached to the Bid.	ITB 22.2, Section II,	
1.5	Statement of Non-Material Nonconformance	1.1.2 (d) Sec III & Bid Form 2	
1.6	Structure of Bidder (if applicable)	1.1.2 Sec I ITB & Bid Form 3	
1.7	Bidder's Information (for JVs)	Bid Form 4	
1.8	Bidder's Party Information	Bid Form 5	
1.9	Historical Contract Non-Performance	Bid Form 6	
1.9	Financial Situation	2.3.1 Sec III & Bid Form 7	
1.10	Average Annual Turnover Status	2.3.2 Sec III & Bid Form 8	
1.11	Financial Resources	2.3.3 Sec III & Bid Form 9	
1.12	Current Contract Commitment	2.3.3 Sec III & Bid Form 10	



1.13	General Experience	2.4.1 Sec III & Bid Form 11	
1.14	Specific Experience	2.4.2 Sec III & Bid Form 12	
1.15	Certification for minimum local content	1.2.2 (d) Sec III & Bid Form 13	
1.16	Acknowledgement of Compliance with JICA Conditions	Bid Form 15: ACK	
1.17	Debarred/ Blacklisted Status	Bid Form 16: DBR	
1.18	In addition to the original of the Bid, the number of copies to be submitted is two (02) sets of hard copies	ITB 22.1 Sec II	
1.19	One soft/ electronic version (PDF on CD duly labelled) of Technical Package.	ITB 22.1 Sec II	
1.20	Any other documents		
1.21	One set of Original Bidding documents including Addenda duly stamped and signed at each in separate sealed envelope.	ITB 11.2 (I) Sec II	
2.	Financial Package (Envelope No 2)		
2.1	Letter of Price Bid signed	Letter of Price bid, Section IV-A	
2.2	Schedule No 1, 2, 3, 4, 6, 7 and 8 (As applicable) filled up and signed	Sec IV-B	
2.3	One soft/ electronic version (PDF on CD duly labelled) of financial Package.	ITB 22.1 Sec II	

Bidder Company Name: _____

Bidder's Representative Name: _____

Signature: _____

Date of Submission: _____

Company Seal: _____



Bid Form 15 ACK: Acknowledgement of Compliance

A) I, [insert name and position of authorized signatory], being duly authorized by [insert name of Bidder/members of joint venture (“JV”)] (hereinafter referred to as the “Bidder”) to execute this Acknowledgement of Compliance **with Guidelines for Procurement under Japanese ODA Loans**, hereby certify on behalf of the Bidder and myself that all information provided in the Bid submitted by the Bidder for [Loan No ID-P268 and project Mumbai Metro Line 3 (Colaba – Bandra – SEEPZ)] is true, correct and accurate to the best of the Bidder’s and my knowledge and belief. I further certify, on behalf of the Bidder, that:

- (i) the Bid has been prepared and submitted in full compliance with the terms and conditions set forth in the Guidelines for Procurement under Japanese ODA Loans (hereinafter referred to as the “Guidelines”); and
- (ii) the Bidder has not, directly or indirectly, taken any action which is or constitutes a corrupt, fraudulent, collusive or coercive act or practice in violation of the Guidelines and is not subject to any conflict of interest as stipulated in the relevant section of the Guidelines.

<If debarment for more than one year by the World Bank Group is NOT imposed, use the following sentence B).>

B) I certify that the Bidder has NOT been debarred by the World Bank Group for more than one year since the date of issuance of Invitation for Bids.

<If debarment for more than one year by the World Bank Group has been imposed BUT three (3) years have passed since the date of such debarment decision, use the following sentence B’).>

C) I certify that the Bidder has been debarred by the World Bank Group for a period more than one year BUT that on the date of issuance of Invitation for Bids at least three (3) years had passed since the date of such debarment decision. Details of the debarment are as follows:

Name of the debarred firm	Starting date of debarment	Ending date of debarment	Reason for debarment

D) I certify that the Bidder will not enter into a subcontract with a firm which has been debarred by the World Bank Group for a period more than one year, unless on the date of the subcontract at least three (3) years have passed since the date of such debarment decision.

E) I certify, on behalf of the Bidder, that if selected to undertake services in connection with the Contract, the Bidder shall carry out such services in continuing compliance with the terms and conditions of the Guidelines.

F) I further certify, on behalf of the Bidder, that if the Bidder is requested, directly or indirectly, to engage in any corrupt or fraudulent action under any applicable law, such as the payment of a rebate, at any time during a process of public procurement, negotiations, execution or implementation of Contract (including amendment thereof), the Bidder shall report all relevant facts regarding such request to the relevant section



in JICA (details of which are specified below) in a timely manner.

JICA's information desk on fraud and corruption (A report can be made to either of the offices identified below.)

- (1) JICA Headquarters: Legal Affairs Division, General Affairs Department
URL: <https://www2.jica.go.jp/en/odainfo/index.php>
Tel: +81 (0)3 5226 8850
- (2) JICA India office,
2nd Floor, Dr. Gopal Das Bhawan, 28, Barakhambha Road, New Delhi - 110001
Tel: +91 11 47685500
FAX: +91 11 47685555
URL <http://www.jica.go.jp/india/english/office/index.html>

The Bidder acknowledges and agrees that the reporting obligation stated above shall NOT in any way affect the Bidder's responsibilities, obligations or rights, under relevant laws, regulations, Contracts, guidelines or otherwise, to disclose or report such request or other information to any other person(s) or to take any other action, required to or allowed to, be taken by the Bidder. The Bidder further acknowledges and agrees that JICA is not involved in or responsible for the procurement process in any way.

If any of the statements made herein is subsequently proven to be untrue or incorrect based on facts subsequently determined, or if any of the warranties or covenants made herein is not complied with, the Bidder will accept, comply with, and not object to any remedies taken by the Employer and any sanctions imposed by or actions taken by JICA.

_____ **Authorized Signatory**
[Insert name of signatory, title]
For and on behalf of [Insert name of the Bidder]
Date:



Bid Form 16: DBR

[The following statement shall be signed and stamped by the Bidder and by each member of a JV as well as any specialist Sub Contractor proposed to be used by the Bidder for any part of the Contract]

By virtue of my signature below, I confirm that the Bidder(s) represented by me for submitting Bid for Mumbai Metro Line-3 - Design, Manufacture, Supply, Install, and Test & Commission the Equipment is/are not **DEBARRED/ BLACKLISTED** by Delhi Metro Rail Corporation and/or other Metro Rail Corporation chaired by Secretary of Ministry of Urban Development, Government of India, Multilateral and bilateral funding agencies, Government of India, Railway Administration, any Central Government/ State Government/ Semi Government undertaking/ Authority/ Entity, as on the due date of submission of Bid.

Signed: _____

Date: _____

NOTE: Copy of the Notification of such Debarment/Blacklist shall be submitted in the Bid, in the case the Bidder is Debarred/ Blacklisted.

Bidder Company Name:

Bidder's Representative Name:

Signature:

Date of Submission:

Company Seal:



Bid Form 17: Form of Joint Venture/ Consortium Agreement

(On a non-judicial stamp paper of INR 500)

Date: _____, 2023

Contract MM3-CBS-9-03B (Package: 9): Design, Manufacture, Supply, Installation, Testing & Commissioning of **Catenary Maintenance Vehicle** for Project “Mumbai Metro Line-3”, (COLABA-BANDRA-SEEPZ) Project.

- Pursuant to Invitation for Bids is MM3-CBS-9-03B.
- Pursuant to “Option A, Single-Stage Two-Envelope Bidding, Section I” of the Standard Bidding Documents for Procurement of Plant Design, Supply and Installation (version 1.1) published by JICA in February 2013.
- Pursuant to the applicable Guidelines for Procurement under Japanese ODA Loans are those published in April 2012; and
- Pursuant to the Bidding Documents for the Contract MM3-CBS-9-03B (Package:9):

Design, Manufacture, Supply, Installation, Testing & Commissioning of Catenary Maintenance Vehicle.

for Project “Mumbai Metro Line-3”, (COLABA-BANDRA-SEEPZ) Project., issued the Invitation for Bids (IFB) by Mumbai Metro Rail Corporation Ltd on _____, 2023.

We, representing the parties to the Joint Venture/Consortium Agreement and consisting of:

Name of Partner *[write the name of each partner]*

Represented by Mr. /Ms.:

Position:

Address:

Telephone:

Fax:

E-mail:

Account:

Tax code:

Power of Attorney No. dated *(in the case of attorney)*.

Name of Partner *[write the name of each partner]*

Represented by Mr. /Ms.:

Position:

Address:

Telephone:

Fax:

E-mail:

Account:

Tax code:

Power of Attorney No. dated *(in the case of attorney)*.

The parties hereto (hereinafter referred to as “the Partners”) agree to sign this Joint Venture/Consortium Agreement with the following contents:



Article 1. General Principle

1. The Partners hereby voluntarily form a Joint Venture/Consortium Agreement for participation in the bidding for Contract MM3-CBS-9-03B (Package:9) under the MUMBAI METRO LINE 3, (COLABA-BANDRA-SEEPZ) Project. 2. The Partners agree that the name of the Joint Venture/Consortium to be used for all transactions related to this Contract MM3-CBS-9-03B (Package: 9) is: _____ [*write the agreed name of the joint venture/consortium*].

3. The Partners pledge that not any partner of this Joint Venture/Consortium will, at its discretion, participate independently or in partnership with other partners in bidding for this Contract MM3-CBS-9-03B (Package:9). In the case where the Contract is awarded to this Joint Venture/Consortium, no partner hereof will have the right to refuse to perform its responsibilities and obligations under this Agreement without the written consent of the other partners in the Joint Venture/Consortium. Should a partner of the Joint Venture/Consortium refuse to fulfil its own responsibilities in accordance with this agreement, such partner shall:
(Please provide details



Article 2. Sharing of Responsibilities

The Partners agree that they shall be jointly and severally liable for the execution of the project in accordance with terms of contract. The Partner's further agree that each partner hereof shall share the responsibilities to perform the Contract MM3-CBS-9-03B (Package: 9) as follows:

1. The Lead Partner Role

The Partners agree to give power to _____ [state the name of the partner] to be the Lead Partner of the Joint Venture/Consortium, representing the Joint Venture/Consortium in the following activities:

- To sign the Bid,
- To sign letters and documents for communication with the Employer during the bidding process, including the letter of request for clarification of Bid Documents and the letter of explanation and clarification of the Bid,
- To participate in contract negotiation process and finalization of Contract,
- To sign petitions, if any, for the bidder,
- To conduct other works [specify the contents of other works (if any)]

2. The JV members in compliance with the provisions of Clause 9.6 of GC, Section VII. General Conditions :.....

3. The governance structure of JV:

4. The operational rules and financial management mechanism including that for receipt of payments under the Contract and distribution thereof amongst JV members :.....

5. The stakes or percentage participation level of each member:

6. The dispute resolution mechanism amongst the members:

7. The distribution of main scope of works to be executed by the respective members (Bidder's attention is invited to the fact that while describing distribution of the Scope of Works/Activities amongst the JV/Consortium members, it should be kept in view that such distribution respects and matches with the respective technical expertise of each member relating to their past Specific Experience in Key Activities as was claimed by the JV/Consortium under Experience Clause 4.2 (b) of the prequalification document for getting prequalified/eligible to bid for the Contract(s). Any distribution of scope amongst JV members that vitiates or is in contrary to the prequalification submittals/process may lead to the rejection of bid)

8. The Performance security is to be submitted by the respective JV members of the Contractor in proportion to their percentage shares in this Contract in term of clause 13 of PC, Section VIII Particular Conditions of Contract.....



Article 3. Effectiveness of Joint Venture/Consortium Agreement

1. This Joint Venture/Consortium Agreement shall take effect from the date of its signing.
2. This Joint Venture/Consortium Agreement shall be terminated in the following cases:
 - The Partners have fulfilled their responsibilities and obligations and have liquidated the Contract,
 - *The Partners agree to terminate this Agreement,*
 - Bidding for Contract MM3-CBS-9-03B (Package:9) under the MUMBAI METRO LINE 3, (COLABA-BANDRA-SEEPZ) Project is cancelled as notified by the Employer.

This Joint Venture/Consortium Agreement is made in _____ copies of the same validity, with each party keeping _____ copies.

LAWFUL REPRESENTATIVE OF THE LEAD PARTNER

[specify name and title, sign and seal]

LAWFUL REPRESENTATIVES OF PARTNERS OF THE JOINT VENTURE/CONSORTIUM

[specify name, title, sign and seal:

Note: Provide the following to this Form:

1. Wherever the descriptions are in *Italic* the details shall be provided.
2. Attach the Power of Attorney from each partner appointing and authorizing the above-named persons to act as their Official Representatives.
3. Attach the Certificate by a Notary Public certifying the authenticity of the signature and capacity of the persons(s) issuing the Power of Attorney.



Bid Form 18: Form of Bid Security (Bank Guarantee)

(To be stamped in accordance with the Stamp Act of the Country of Issuing Bank)

[Guarantor letterhead or SWIFT identifier code]

Beneficiary: Mumbai Metro Rail Corporation Ltd, MMRC Line 3 Transit Office, Wing 'A', 'E' Block, Bandra-Kurla Complex, Bandra (East), Mumbai 400 051, India.

IFB No.: [MM3-CBS-DEQ-9-03B]

Date: [*insert date of issue*]

BID GUARANTEE No.: [*insert guarantee reference number*]

Guarantor: [*insert name and address of place of issue, unless indicated in the letterhead*]

We have been informed that [*insert name of the Bidder, which in the case of a joint venture shall be the name of the joint venture (whether legally constituted or prospective) or the names of all members thereof*] (hereinafter called “the Applicant”) has submitted or will submit to the Beneficiary its Bid (hereinafter called “the Bid”) for the Design, Manufacture, Supply, Installation, and Testing & Commissioning of the **Catenary Maintenance Vehicle** for Mumbai Metro Line 3 (Colaba – Bandra – SEEPZ) Project under Loan Agreement No. [ID-P268].

Furthermore, we understand that, according to the Beneficiary’s conditions, Bids must be supported by a Bid guarantee.

We, as Guarantor, hereby irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of [*insert amount in words, (insert amount in figures)*] upon receipt by us of the Beneficiary’s complying demand, supported by the Beneficiary’s statement, whether in the demand itself or a separate signed document accompanying or identifying the demand, stating that either the Applicant:

- a) Has withdrawn its Bid during the period of Bid validity set forth in the Applicant’s Letter of Bid (hereinafter called “the Bid Validity Period”), or any extension thereto provided by the Applicant; or
- b) Having been notified of the acceptance of its Bid by the Beneficiary during the Bid Validity Period or any extension thereto provided by the Applicant, (i) fails to execute the Contract Agreement, or (ii) fails to furnish the Performance Security, in accordance with the Instructions to Bidders of the Beneficiary’s Bidding Documents.

This guarantee will expire on _____ ((Expiry Date, i.e., 28 days beyond the bid validity period) and shall be returned to the Applicant: (a) if the Applicant is the successful Bidder, upon our receipt of copies of the Contract Agreement signed by the Applicant and the Performance Security issued to the Beneficiary in relation to such Contract Agreement; or (b) if the Applicant is not the successful Bidder, upon the earlier of (i) our receipt of a copy of the Beneficiary’s notification to the Applicant of the results of the Bidding process; or (ii) twenty-eight (28) days after the end of the Bid Validity Period.

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



This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 758.

Bidder Company Name: _____

Bidder's Representative Name: _____

Signature: _____

Date of Submission: _____

Company Seal:

Below is not the part of BG format.

Note for information of the Bidder:

- 1) The terms '**Bidder**' and '**Applicant**' have been used interchangeably in the above **Form of Bid Security (Bank Guarantee)** meaning the same as the 'Bidder' as stated in ITB 4. The term '**Applicant**' shall not be construed as the **applicant** who has approached the Bank for issuing the Bank Guarantee(s).
- 2) The Bidder shall be careful while getting the Bank Guarantee(s) prepared from their Bankers as any default in the correctness of BG as per the BG requirements shall lead to rejection.

----- End -----



BIDDING DOCUMENTS



MUMBAI METRO LINE 3 (COLABA-BANDRA-SEEPZ)

CONTRACT MM3-CBS-DEQ-9-03B

Design, Manufacture, Supply, Installation, Testing &
Commissioning of Catenary Maintenance Vehicle
For Project "Mumbai Metro Line-3"

Part 1

Bidding Procedure

Section IV-B

Pricing Document

September – 2023

**Mumbai Metro Rail Corporation Ltd
MMRCL Line 3 Transit Office,
Wing A, Block E,
Bandra-Kurla Complex,
Bandra (East), Mumbai- 400 051, India.**



Bidding Documents

Composition of Documents

Part 1	Bidding Procedure
Section I	Instructions to Bidders
Section II	Bid Data Sheet
Section III	Evaluation and Qualification Criteria
Section IV-A	Bidding Forms
Section IV-B	Pricing Document
Section V	Eligible Source Countries of Japanese ODA Loans
Part 2	Employer's Requirements
Section VI-A	Employers Requirements – General Specifications
Section VI-B	Employer's Requirements – Technical Specifications
Part 3	Conditions of Contract and Contract Forms
Section VII	General Conditions of Contract (GC)
Section VIII	Particular Conditions of Contract (PC)
Section IX	Contract Forms
Part 4	Drawings
Section X	Drawings



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1.1 Preamble

The Pricing Document shall be read in conjunction with Invitation for Bids, Instructions to Bidders and all Bidding Documents, Specifications and Drawings as listed in Sub-Clause 6.1 of Part 1, Section I, ITB and Section II, BDS. The Contract (Design, Manufacture, Supply, Installation, Testing & Commissioning of the Facilities including supply of O&M manuals, Training of Employer's O&M staff) is a Fixed Price Contract. The Pricing Document is divided into Schedules representing one or more groups of inter-related facilities. The detailed Scope of work is given in Part 2, Section VI-B, Employer's Requirement – Technical Specifications.

The individual item descriptions within each Schedule are indicative of the Work included in this Contract and shall not be taken as defining the scope of work to be executed either under the Schedule or the Contract.

The item descriptions, if given, are general summaries only. Therefore, no omission from, or error in item descriptions within this Pricing Document shall warrant an adjustment of the Contract Price nor entitle the Contractor to seek an extension of time under the Contract.

The activity descriptions for items within Schedule shall be deemed to cover all aspects of the relevant item scope, irrespective of the fact that the Bidder may not have inserted an amount against any item description. The total amount of each Schedule shall be deemed inclusive of all of the Contractor's obligations to execute the part of the Facilities covered by the Schedule and to perform all of his other obligations under the Contract in respect thereof. The Contractor shall not be entitled to receive any further or additional payment in respect of such Schedule.

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.

Prices shall be filled in indelible ink and any alterations necessary due to errors, etc., shall be initialled by the Bidder.

The person authorized to sign on behalf of the Bidder shall sign in full, with company seal and date, at the bottom of all pages of the Pricing Schedule.

1.2 Contract Price

The Contract Price consists of price for Design, Manufacture, Supply, Installation, Testing & Commissioning of the Facilities and training of Employer's O&M staff as per the requirements given in Employer's Requirements- Technical Specifications, Section VI-B, Part 2.

1.2.1 All the prices shown in the Schedules shall include all taxes, duties, levy, cess, insurance, transportation, handling costs, unloading at site etc. which constitute the Contract Price and will be the total amount to be paid to the Contractor for executing the Works and performing all other obligations under the Contract. The prices in different Schedules shall be quoted as per ITB 19.1, Section II, Part 1.

1.2.2 The Schedules and the Contract Prices shall not be subject to adjustment by the Contractor in respect of any error or oversight in the Pricing Document. The Pricing Document represents the full extent of the Contractor's entitlement to receive payment as per the Schedules. Arithmetical errors, if any found in the Contractor's



submission, will be corrected by the Employer as indicated in the Instruction to Bidders, Clause No 36.1, Part 1.

1.2.3 The rate for each item detailed in Schedule Nos. 1, 2, 3, 4 & 6 (Grand summary), and 7 (Recommended spare parts) are for finished items of work, 100% complete in all respects, and shall include but not be limited to the preliminary and detailed design, supply of all materials, equipment, landing charges, shipping costs for transport by air, sea or land (or any combination thereof), insurance charges, taxes, duties, levy, cess, etc. unloading, storage, installation, factory testing, testing & commissioning at site including intergrated testing with other designated Contractor, supply of spare parts and special tools, training of employer's O&M staff, provision of as-built drawings, provision of O&M manuals, and all types of clearances/approvals required from government authorities. The rate also includes the Contractor's profit and establishment overhead, all general risks, insurance liabilities, compliance with labour laws as per statutory obligations set out or implied in the Contract, attending to defects list prepared by the Employer prior to handover of works and facilities, and any other Contractual requirements stated in the Employer's requirements.

1.2.4 Deemed Export

The Bidder shall be solely responsible for claiming and availing all deemed export benefits if available during the currency of Contract. However, for availing the said benefits, necessary payment certificate in accordance with the laws of the land and extant policies of the Government of India will be issued by METRO DEPOT at the specific request of the Contractor. Contractor shall process for refund for 100% of the paid Custom Duties/Basic custom duty (as applicable) only and full terminal excise duties for items as above after availing the concessional duties such as Project Import Benefits under chapter 98.01 of Customs Tariff Act, etc. from the Statutory Authorities based on submission of documentary evidence by the Contractor. Contractor shall be fully responsible for ensuring that all necessary documentation/information, as may be required, for processing the refund of paid duties from the Statutory Authorities are correctly prepared by them and are timely submitted, so as to claim the refund of paid duties from the Statutory Authorities. The Contractor shall arrange for the remittance of the refund so obtained to the Employer within 15 days. In case of failure by the Contractor to obtain and remit the refund within reasonable time (to be decided by the Project Manager & intimated to Contractor) to the Employer, the same will be recovered by the Employer from the amounts due as payment to the Contractor or as debt due from the Contractor.

1.2.5 Exemption in state taxes

In case of any waiver/ reduction subsequent to the Base Date for GST (CGST, SGST, IGST, UGST etc.) and any other tax, duties, levy, cess, etc., Custom duties in full or part thereof, the Contractor will be required to obtain exemption/refund of such taxes, duties etc., from the concerned authorities. The Contractor shall arrange for the remittance of the refund so obtained to the Employer. In case of failure by the Contractor to obtain and remit the refund within reasonable time (to be decided by the Project Manager & intimated to Contractor) to the Employer, the same will be recovered by the Employer from the amounts due as payment to the Contractor or as debt due from the Contractor. If the Contractor fails to take the



required action to obtain refund or exemption, the Employer shall take action in accordance with the Conditions of Contract.

1.2.6 Record of Taxes, Duties etc.

The Bidder shall also give breakdown of his fixed Price clearly giving the Custom Duty, GST (CGST, SGST, IGST, UGST etc.) and any other Tax, levy, Cess, etc. along with the applicable rate in the Form attached as Appendix A of Schedule No. 6 (Grand Summary).

The Contractor shall maintain complete records in respect of payments made by them for taxes, duties, and other levies payable to various authorities (except Income Tax or Corporate Tax) and advise the Employer the summary of such payment every quarter in a format advised by the Employer during execution of the Contract.

The detailed records shall however remain open for inspection by the Employer/ Project Manager at any time and copies of the records shall be furnished as required by the Project Manager. Should there be any statutory changes in taxes & duties with respect to the tax structure as on base date, the amount payable/recoverable from the Contractor in accordance with the conditions of the Bid will generally be calculated based on these records. However, Employer at his sole discretion, if not satisfied with the veracity of records or records are incomplete or otherwise, may separately determine the amount payable/recoverable from the Contractor in accordance with the conditions of the Bid, which shall be final and binding.

1.2.7 Concessional benefits for Project Import

MML3 Metro Project is eligible for availing concessional duty benefits as per Customs Tariff Act for Project Imports and Bidders shall refer to Project Import Regulation 1986 (PIR), Section 5, read along with Customs Manual Chapter 5, Para 3, 4 & 5. After award of Contract, at the request of the Contractor, MMRC shall issue sponsoring/ recommendation letter to the Contractor for getting themselves registered for availing Project Import Benefit. However, the responsibility to avail the concessional benefits under Project Import or otherwise as extended in accordance with the law of the land shall solely rest with the contractor and all logistics and other arrangement in connection with the import of material shall remain with the Contractor as per the Bid conditions. The Contractor shall be the importer of all items to be imported for this project.

1.3 Description of Pricing Schedule

The Pricing Documents comprise the following Schedules:

Schedule No. 1- Plant, to be supplied from abroad.

Schedule No. 2- Plant, to be supplied from within the Employer's country.

Schedule No. 3- Design services.

Schedule No. 4- Installation, Testing & Commissioning, and other Services.

Schedule No. 5- Provisional Sums (Deleted)

Schedule No. 6- Grand Summary

Schedule No. 7- Recommended Spare parts.



Schedule No. 8- Pricing for unqualified withdrawal of conditions, qualifications, non-material non-conformities, etc.

1.3.1 Schedule No. 1

Schedule No. 1 is dedicated to Plant, to be supplied from abroad at Metro Depot at Mumbai as per the contractual requirements. This Schedule comprises all those obligations and ongoing activities throughout the Contract not associated directly with any other Schedule.

This includes but is not limited to:

- (a) Procurement of raw materials, parts and components for manufacture and supply of the Equipment,
- (b) Completion of manufacture and assembly of Equipment offshore.
- (c) Completion of Inspection, all testing of Equipment and its sub-systems in Factory,
- (d) Completion of all Factory Acceptance Tests,
- (e) Completion of despatch from offshore factory, provision of marine and transit insurance from off-shore Factory inclusive of release of Equipment at port in India and inland transportation up to the Metro Depot.
- (f) Delivery and unloading of Equipment in Metro depot in good condition,
- (g) Supply of DLP Spares to Metro depot as per the Contract and its successful delivery,
- (h) Any other item not listed but is considered necessary to comply with the scope of work

1.3.2 Schedule No. 2

Schedule No. 2 is dedicated to Plant, to be supplied from within the Employer's country at Metro Depot at Mumbai as per the contractual requirements. This Schedule comprises all those obligations and ongoing activities throughout the Contract not associated directly with any other Schedule.

This includes but is not limited to:

- (a) Procurement of raw materials, parts and components for manufacture and supply of the Equipment,
- (b) Completion of manufacture and assembly of Equipment in Employer's country.
- (c) Completion of Inspection, all testing of Equipment and its sub-systems in Factory,
- (d) Completion of all Factory Acceptance Tests,
- (e) Completion of despatch from Factory with provision of transit Insurance to Metro depot, Mumbai inclusive of inland transportation up to the Metro Depot.
- (f) Delivery and unloading of Equipment in Metro depot in good condition,
- (g) Supply of DLP Spares to Metro depot as per the Contract and its successful delivery,
- (h) Any other item not listed but is considered necessary to comply with the scope of work.

1.3.3 Schedule No. 3

Schedule No. 3 is dedicated to the activities relating to Design Services as per the requirements and other details given in the Technical Specifications, Section VI-B, Part 2, and other Specifications.

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



This includes but is not limited to the submission and getting approval from Project Manager of:

- (a) Preliminary Design drawings and documents
- (b) Detailed Design drawings and documents
- (c) Works program
- (d) Interface Management Plan
- (e) Design Document
- (f) Project Implementation Plan
- (g) Training Plan
- (h) Quality Plan
- (i) RAMS Plan
- (j) Submission of 3-D BIM model

Any other item considered necessary to comply with the scope of Contract.

1.3.4 Schedule No. 4

Schedule No. 4 is dedicated to the Facilities related to Installation, Testing & Commissioning, and all other allied activities as per the Employer's Requirements stated in Part 2, Sections VI-A & VI-B, Drawings and other Specifications and detailed below.

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

This includes but is not limited to:

- (a) Installation, Testing & Commissioning (including Guarantee Testing) of Equipment,
- (b) Submission of technical details if called for obtaining sanction of statutory authorities.
- (c) Training of Operating & Maintenance personnel of Employer at Metro Depot by deputing Instructors.
- (d) Submission of "As-Built drawings"
- (e) Submission of Training Manuals
- (f) Submission of Operating and Maintenance Manuals
- (g) Provision of Spare parts Catalogue
- (h) Any other item considered necessary by the Contractor to comply with the Scope of Works.

1.3.5 Schedule No. 5: (Provisional Sums)

Deleted

1.3.6 Schedule No. 6:

Schedule No. 6 is dedicated to the Grand Summary of Prices quoted against Schedule Nos. 1, 2, 3, and 4. Total of Schedule – Grand Summary to be carried forward to Bid Form.

The Bidder shall also give breakdown of his fixed Lump Sum Price clearly giving the Custom Duty, GST (CGST, SGST, IGST, UGST etc.) and any other Tax, levy, Cess, etc. along with the applicable rate in the Form attached as Appendix A to this Schedule No.6.

1.3.7 Schedule No. 7:



This schedule pertains to spares parts, consumables and special tools recommended by the Bidder. The prices quoted under this Schedule shall remain fixed till the acceptance of the Facilities (issue of Operational Acceptance Certificate) and thereafter shall be adjusted in accordance with Appendix 2, Contract Forms, Section IX, Part 3. The spares shall be supplied at MMRC Depot.

1.3.8 Schedule No. 8:

This shall detail the pricing for unqualified withdrawal of Nonmaterial Nonconformities submitted in 'Statement of Nonmaterial Nonconformities', Bid Form 2, Section IV-A, Bidding Forms.

1.3.9 Price / Cost Breakdown

- a) The total of Schedule Nos. 1, 2, 3, and 4 is shown in Schedule No. 6 (Grand Summary) of this Pricing Document shall be deemed to include all costs associated with the supply, manufacture and delivery to Site of such item by the Contractor (including, without limitation, the cost of design, manufacture, packing, supply and delivery to Site, testing & commissioning, labour cost, preliminaries and other general requirements, overheads and profit, taxes, duties, any other costs.) irrespective of the quantity of the items to be supplied.
- b) Variations will only be considered if there is any additional work required beyond the scope as mentioned in Part 2 Section VI-A & VI-B - Employer's Requirements and as mentioned in this section elsewhere or the Project Manager instructs any changes to the existing scope.
- c) Payments to the Contractor will be made in accordance with Terms and Procedure for Payment as mentioned in Appendix 1 to Contract Forms in Part 3, Section IX.
- d) No payment will be made against any item in the Contractor's Pricing Document which has a value entered against in the Amount column as indicating '0', 'NIL' or left blank.

1.4 Payment Concept

Payment will be calculated as per Appendix 1, Section IX, Contract Forms, subject to the Project Manager/Employer being satisfied that the Facilities for each item are 100% complete. Payment will be based on the Contractor's submission of a stage-wise statement in the case of supply portion of the Contract as per Appendix 1, Section IX, Contract Forms.

- a) **Apportionment of Lump Sum Price to Schedules & Milestones under Each Schedule**
 1. The whole of Facilities is divided into Schedules. Each of these Schedules represents a major item associated with the Facilities. Schedules are named according to their general scope of Work.
 2. The Lump Sum price for the whole of Facilities shall be apportioned by the Bidder among the various Schedules.
 3. In case of a Joint Venture/Consortium, Payment will be made in the name of Joint Venture/Consortium only. However, on combined request by all members of JV/Consortium, payments can be made to Individual JV/Consortium members with approval of the Employer.
 4. The sums of amounts shown in a Schedule Nos. 1, 2, 3 & 4 are the amounts that are to be carried forward to the Grand Summary at Schedule No. 6. For Schedules that involve payment in foreign currency, the division of the respective Schedule amounts between INR, JPY, USD and Euro shall be shown in the said Summary.



5. The scope and extent of the Facilities 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 Schedules.
6. The maximum/ minimum amount or percentage of the total price that can be apportioned to Schedule Nos. 3 and 4 is indicated in the respective schedules.

1.5 Custom Clearance

The Contractor shall be solely responsible for Custom clearances (including any other related activities) of all items that may be directly or indirectly required for execution of this Contract.



Schedules of Rates and Prices

**Schedule No. 1: Equipment to be supplied from abroad DDP Basis
 (Price to be quoted as per Clause 1.2.1) - CMV**

Item	Description	Equipment	Unit	Quantity	INR	JPY	EURO	USD
					Amount	Amount	Amount	Amount
1	Obtain the "Notice of No Objection" or "Notice of No Objection Subject to ---"from the Project Manager as per Employer's Requirement (detailed in Part 2) after completion of all the following: <ul style="list-style-type: none"> • Issue of Inspection Certificate on completion of all Factory Acceptance Tests, • Marine Insurance and transit insurance up to Metro Depot, • Documents certifying shipping to port in India, custom clearance at port in India, delivery of Equipment and its unloading at Metro Depot at Mumbai in good condition. 	CMV	No.	1				
2	DLP Spares – (Details to be given as per Appendix B). Note: Total amount of all spares to be indicated here.	CMV	Set	1				
Total (to be carried to Schedule No. 6 Grand Summary)								



Item	Description	Equipment	Unit	Quantity	INR	JPY	EURO	USD
					Amount	Amount	Amount	Amount
					Name of the Bidder			
					Signature of the Bidder			

Note:

- Only items to be supplied from abroad are to be quoted in this statement. If an item is to be supplied from within the country, its to be quoted in Schedule No.2.

Country of Origin Declaration Form

Item	Description	Code	Country



**Schedule No. 2: To be supplied from within the Employer's country- DDP Basis
 (Price to be quoted as per Clause 1.2.1) - CMV**

Item	Description	Equipment	Unit	Quantity	Amount (INR)
1	Obtain the "Notice of No Objection" or "Notice of No Objection Subject to ---"from the Project Manager as per Employer's Requirement (detailed in Part 2) after completion of all the following: <ul style="list-style-type: none"> • Issue of Inspection Certificate on satisfactory completion of all Factory Acceptance Tests. • Transit Insurance. • Despatch Documents. • Despatch of Plant from onshore factory. • Inland transportation in India, delivery of Plant and its unloading at MMRC Depot site, Mumbai in good condition. 	CMV	No.	1	
2	DLP Spares (Details to be given as per Appendix B). Note: Total amount of all spares to be indicated here.	CMV	Set	1	
Total (to be carried to Schedule No. 6 Grand Summary)					
Name of the Bidder					
Signature of the Bidder					

Note: Only items to be supplied from within the country are to be quoted in this Schedule No. 2. If an item is to be supplied from abroad, it is to be quoted in Schedule No.1.



Schedule No. 3: Design Services (Price to be quoted as per Clause 1.2.1) - CMV.

Item	Description	Equipment	INR	JPY	EURO	USD
			Amount	Amount	Amount	Amount
1	Obtain the "Notice of No Objection" or "Notice of No Objection Subject to ---"from the Project Manager as per Employer's Requirement (detailed in Part 2) for: This includes but is not limited to the submission of: Part 1: <ul style="list-style-type: none"> • Work Program • Interface Management Plan • Design Document • Design drawings. Part 2: <ul style="list-style-type: none"> • Safety Plan & Quality Plan • Project Implementation Plan • RAMS Plan • Inspection & Testing Plan • 3-D BIM model of Facilities in Revit Software/Autocad 3D 	CMV				
Total (to be carried to Schedule No. 6 Grand Summary)						
Name of the Bidder						
Signature of the Bidder						

Notes:

- The total amount quoted in Schedule No. 3 shall be ≤10% of the Grand Summary in Schedule No. 6 (sum of prices quoted in Schedule Nos. 1 to 4) of the Equipment.



Schedule No. 4: Installation, Testing & Commissioning, and Other Services (Price to be quoted as per Clause 1.2.1) - CMV.

Item	Description	Equipment	Unit	Quantity	INR	JPY	USD	EURO
					Amount	Amount	Amount	Amount
1	<ul style="list-style-type: none"> • Obtain the “Notice of No Objection” or “Notice of No Objection Subject to ---” from the Project Manager as per Employer’s Requirement (detailed in Part 2) for: • This includes but is not limited to: • Installation of Plant, obtaining certificate of satisfactory completion of functional tests and running of Plant in the Depot. • Completion of Commissioning including Guarantee Testing in the Depot. • Instrumentation Tests, trials. • Assisting in obtaining of Sanction of Statutory Authorities (if applicable). • Submission of Training Manual and O&M Manuals, • Completion of Training of Employer’s O&M Staff at Site. • Submission of Spare Parts catalogue. • Supply of special tools, fixtures, gauges and Maintenance toolbox equipped with all repair & maintenance tools. 	CMV	No	1				
Total (Only Amount to be shown)								
Name of the Bidder								



Item	Description	Equipment	Unit	Quantity	INR	JPY	USD	EURO
					Amount	Amount	Amount	Amount
Signature of the Bidder								

NOTE:

- The total amount quoted in Schedule No. 4 shall not be less than 10% of the total quoted price indicated in Schedule No 6 (sum of prices quoted in Schedule Nos. 1 to 5) for Equipment.



Schedule No. 5: Provisional Sums

DELETED



Schedule No. 6: Grand Summary (CMV)

Schedule	Description	Amount INR 3	Amount JPY 4	Amount USD 5	Amount EURO 6
1	Plant & Spares to be supplied from abroad				
2	Plant & Spares to be supplied within the Employer's country				
3	Design Services				
4	Installation, Testing & Commissioning, and Other Services				
6	TOTAL COST				

EQUIVALENT BID TOTAL (total of Col 3, 4, 5 and 6 above) in USD (in figures) _____

EQUIVALENT BID TOTAL (total of Col 3, 4, 5 and 6 above) in USD (In words) _____

Name of the Bidder	
Signature of the Bidder	

Notes:

- Payments for this Contract will be made in Indian Rupees, Japanese JPY and/or maximum two other international currencies (USD or EURO), if the Contractor so desires, or in a combination of all four currencies, as stated in the Bid.
- The Bidder shall complete the equivalent Bid Total in USD in figures and words above.



- For the conversion to USD/Euro/JPY for INR equivalent the date of exchange rate will be Base Date as mentioned in ITB 37.1. The rate for conversion shall be taken as valid for base date of the Tender (28 days before the last date of bid submission) as published by Reserve Bank of India and if the rate is not published, the as per the website of www.xe.com
 - Any Non-material non-conformities are to be indicated in the **Statement of Non-material Non-conformities, Section IV-A, Bidding Form 2**. The price for unqualified withdrawal of the deviations shall be entered in Schedule No. 8 of the Price Schedule and the Employer shall add this price to the quoted price for the purpose of comparison of Bids to ascertain the lowest Bidder.
-



Appendix A

Details of Taxes/Duties/Levies, etc. included in The Bid Price

Sr. No.	Taxable Amount	Custom Duty		CGST		SGST		IGST		UGST		Any Other Tax/Levy/Cess etc		Total Amount of all Taxes/Duties /Levies/Cess etc
		Rate %	Amount	Rate %	Amount	Rate %	Amount	Rate %	Amount	Rate %	Amount	Rate %	Amount	
<u>Schedule No. 1*</u>														
1														
2														
Total														
<u>Schedule No. 2*</u>														
1														
2														
Total														
<u>Schedule No. 3*</u>														
1														
Total														
<u>Schedule No. 4*</u>														
1														
2														
Total														
<u>Schedule No. 7*</u>														
1														
2														



Sr. No.	Taxable Amount	Custom Duty		CGST		SGST		IGST		UGST		Any Other Tax/Levy/Cess etc		Total Amount of all Taxes/Duties /Levies/Cess etc
		Rate %	Amount	Rate %	Amount	Rate %	Amount	Rate %	Amount	Rate %	Amount	Rate %	Amount	
3														
--														
Total														
<u>Schedule No. 8*</u>														
1														
2														
Total														
Grand Total														

*Please mention similar groups of goods/services which attract the same rate of tax under each schedule. The Bidder shall add more rows wherever required.

Refer to Clause 1.2.6 of Section IV-B above and the Notes below for an explanation of the above table.

NOTES:

The Bidder is to give in his Bid offer, a breakdown of his fixed Lump Sum Price clearly detailing the following:

- Custom duty on offshore manufactured Plant/ Equipment, if any along with rate of Custom duty.
- GST (CGST/SGST/IGST/UGST, etc) (after availing relevant Credit) on completely assembled/manufactured Plant/ Equipment, if any along with rate of GST (CGST/SGST/IGST/UGST, etc).
- Custom duty on imported spares, special tools, etc.. along with rate of Custom duty.
- GST (CGST/SGST/IGST /UGST, etc) on Spares, Jigs, Fixtures, Special tools, Testing and Diagnostic Equipment etc. along with rate of GST.
- GST (CGST/SGST/IGST/UGST, etc) on the completely assembled/manufactured Plant/ Equipment along with the rate of GST.



- GST (CGST/SGST/IGST/UGST, etc) on the indigenous finished Spares, Special tools and Testing Equipment etc. along with rate of GST.
- GST (CGST/SGST/IGST/UGST, etc) on works along with applicable rate.
- Any other tax/ levies/ Cess. etc. (If applicable)
- If the rates of taxes mentioned in above table is different from the actual applicable rates, then the actual applicable rates will be considered for variation purpose only, however no change in Bid prices quoted in different schedules shall be considered.

Name of the Bidder	
Signature of the Bidder	



Schedule No. 7: Recommended Spare Parts-
(Price to be quoted as per Clause 1.2.1) - CMV.
(These include Consumables, Lubricants, Unit Exchange Spares and Special Tools.)

Item	Description	Unit	Unit Rate			
			INR	JPY	USD	EURO
1.						
2.						
3.						
4.						
5.						
6.						
.						

Note:

1. The Bidder shall make a comprehensive and exhaustive list of all spare parts which may be needed for replacement against wear and tear during the approximate half life of the vehicle.
2. The Bidder shall ensure that all items listed in Appendix C: Maintenance Spares are included in the above list.
3. The prices shall be quoted as per clause 1.2.1 and clause 1.3.7.



Schedule No. 8: Statement of Nonmaterial Nonconformities: (Price to be quoted as per Clause 1.2.1)

(Pricing for unqualified withdrawal of Nonmaterial Nonconformities submitted in 'Statement of Nonmaterial Nonconformities',
 Bid Form 2, Section IV-A, Bidding Forms)

Item	Equipment	Nonmaterial Nonconformities, i.e., Conditions, comments, remarks, deviations, etc.	Key date affected by each non- conformity	Increase or decrease for unqualified withdrawal of each Nonmaterial Nonconformity.			
				Foreign Currency (ies)	Indian Rupees	Schedule No.	Key date
BID TOTAL							
EQUIVALENT BID TOTAL in figures (IN USD)							
Name of the Bidder							
Signature of the Bidder							

Notes:

1. In this Appendix, the Bidder shall indicate every key date that will be affected by each remark, comment, condition, qualifications or deviation, etc. that has been specified in Statement of Nonmaterial Deviations, Section IV-A, Bid Form 2 "Statement of Nonmaterial Deviations".
2. Prices for unqualified withdrawal of each remark, comment, condition, qualifications or deviation, etc. that has been specified in Statement of Nonmaterial Deviations, Section IV-A, Bid Form 2 - Bidding Forms shall be quoted in this Schedule No. 8, clearly indicating the Schedule No. and Key date to which it will be allocated. The 'Lump Sum Price' quoted by the Bidder in 'BID TOTAL' in Grand Summary (Schedule No. 6) shall not include the Price for withdrawal of remark, comment, condition, qualifications or



deviation etc. quoted in this Schedule No. 8. However, the Employer shall adjust the Bid Price by taking into consideration the nonmaterial nonconformities to evaluate the Bid Price (for comparison purpose only) of the Technical Bids which are substantially responsive.

3. In case price for unqualified withdrawal of any remark, comment, condition, qualification or deviation etc. indicated in Statement of Nonmaterial Deviations, Section IV-A, Bidding Form 2 is not quoted in Schedule No. 8, it shall be considered that the remark, comment, condition, qualification or deviation is unconditionally withdrawn without any financial implication. However, Employer at its sole discretion and option may assess the financial implication of the said remark, comment, condition, qualification or deviation etc. based on best engineering principles and concepts, which shall be binding on the bidder, and the same may be considered by Employer for financial evaluation.
-



Appendix B- DLP Spares

Note: The Contractor shall add additional items (consumables and spare parts) which may be required for servicing and maintenance during 2 years of DLP. The value of all these items shall be added in the Contract Price. If any item is deficient during DLP, the same shall be supplied by the Contractor free of cost. Items which are found in excess at the end of DLP shall remain the property of the Employer.

	DESCRIPTION	Qty.	Unit Rate				Amount			
			INR	JPY	USD	EURO	INR	JPY	USD	EURO
1	Complete Filter set for each system.	1 each								
2	Brake Block	12								
3	Pin Kit for Brake rigging	1								
4	Pneumatic, solenoid & magnet valves	1 for each type required								
5	Brake gauges (MR, BP & BC)	1 each								
6	Rotary Switches of all type used in CMV	1 each type required								
7	Battery fuse	1								
8	Spares for Crane & Lifting platform									
9	Spares of Portable Trolley suitable for wheel set	1								



Appendix C: Maintenance Spares (to be included in the list of Recommended spares)

CMV

S No.	Description	Unit	Unit Rate			
			INR	JPY	USD	EURO
Spares for Transmission system						
1	Filter Element	Nos.				
2	Repair Kit F/R Cylinder	Nos.				
3	Cylinder	Nos.				
4	Valve	Nos.				
5	Gaskets of each type	Nos.				
6	Adaptor	Nos.				
7	Oils of each type	Litres				
8	Pressure Transmitter	Nos.				
9	Switch, Pressure	Nos.				
10	Controller, temperature	Nos.				
11	Strainer	Nos.				
12	Breather	Nos.				
13	Ball Housing	Nos.				
14	Grease Nipple	Nos.				
15	Circlip	Nos.				
16	Snap Ring	Nos.				
Spares for Crane with Interchangeable Basket						
1	Filters of each type	Nos.				
2	Guide Blocks of each type	Nos.				
3	Seal Kit	Nos.				
SPARES FOR ENGINE						
1	TS Oil Filter Element	Nos.				



2	Washers of each type	Nos.				
3	Sealing Ring of each type	Nos.				
4	Ring, general of each type	Nos.				
5	Filter Kit	Nos.				
6	Easy-Change Filter	Nos.				
7	V-Belt	Nos.				
8	Cylinder Head Gasket	Nos.				
9	Gaskets of each type	Nos.				
10	Oil/Water Sensor	Nos.				
11	Sensor	Nos.				
SPARES FOR DG SET						
1	Main Element	Nos.				
2	Element Secondary	Nos.				
3	Solenoid Assy	Nos.				
4	V-Belt	Nos.				
5	O Ring (Drain Plug)	Nos.				
SPARES FOR LIFTING AND SWIVELLING PLATFORM						
1	Hydraulic Cylinder Seal Kit	Nos.				
2	Power Pack Kit	Nos.				
SPARES FOR BATTERY FUSE						
1	Battery Fuse of each type	Nos.				
SPARES FOR ROTARY SWITCHES						
1	Throttle switch	Nos.				
2	Range selector switch	Nos.				
3	Head Light switch	Nos.				
4	Forward reverse swich	Nos.				



SPARES FOR BRAKE SYSTEM						
1	Washers of each type	Nos.				
2	All steel lock nut of each type	Nos.				
3	FS All steel lock nut of each type	Nos.				
4	Pivot pin of each type	Nos.				
5	Brake block	Nos.				
6	Pressure switch	Nos.				
7	3 Way Magnetic Valve					
8	Solenoid valve					
9	Duplex pressure gauge (self-illuminating)	Nos.				
10	Rotary Switches of each type	No.				
11	Pin Kit for Brake rigging	Set				
12	Brake gauges (MR, PB, BP & BC) each type	Nos.				
CONSUMABLES						
1	Coolant for Engine	Litres				
2	Transmission Oil	Litres				
3	Hydraulic Oil	Litres				
4	Final Drive Oil	Litres				
5	Grease	Kgs.				
MISCELLANEOUS						
1	Portable Trolley suitable for wheel set	Nos.				
Total Amount (to be carried forward to Schedule No 1 and/or Schedule No 2)						

Note:

- Only items to be supplied from abroad are to be carried forward to in Schedule No.1. If an item is to be supplied from within the country, it's to be carried forward to in Schedule No.2.
- Mention each type of item in a separate row and price it separately.

----- End -----



BIDDING DOCUMENTS



MUMBAI METRO LINE 3 (COLABA-BANDRA-SEEPZ)

CONTRACT MM3-CBS-DEQ-9-03B

Design, Manufacture, Supply, Installation, Testing &
Commissioning of Catenary Maintenance Vehicle
for Project "Mumbai Metro Line-3"

Part 1

Bidding Procedures

Section V

Eligible Source Countries of Japanese ODA Loans

September – 2023

**Mumbai Metro Rail Corporation Ltd
MMRCL Line 3 Transit Office,
Wing A, Block E,
Bandra-Kurla Complex,
Bandra (East), Mumbai- 400 051, India.**



Bidding Documents

Composition of Documents

Part 1	Bidding Procedures
Section I	Instructions to Bidders
Section II	Bid Data Sheet
Section III	Evaluation and Qualification Criteria
Section IV-A	Bidding Forms
Section IV-B	Pricing Document
Section V	Eligible Source Countries of Japanese ODA Loans
Part 2	Employer's Requirements
Section VI-A	Employer's Requirements – General Specifications
Section VI-B	Employer's Requirements – Technical Specifications
Part 3	Conditions of Contract and Contract Forms
Section VII	General Conditions of Contract (GC)
Section VIII	Particular Conditions of Contract (PC)
Section IX	Contract Forms
Part 4	Drawings
Section X	Drawings



Section V. Eligible Source Countries of Japanese ODA Loans

[All countries and Areas]

----- End -----



BIDDING DOCUMENTS



MUMBAI METRO LINE 3 (COLABA-BANDRA-SEEPZ)

CONTRACT MM3-CBS-DEQ-9-03B

Design, Manufacture, Supply, Installation, Testing &
Commissioning of Catenary Maintenance Vehicle
for Project "Mumbai Metro Line-3"

PART 2

Employer's Requirements

Section VI-A: Employers Requirements – General Specifications

Section VI-B: Employer's Requirements – Technical Specifications

September – 2023

**Mumbai Metro Rail Corporation Ltd
MMRC Line 3 Transit Office,
Wing 'A', 'E' Block,
Bandra-Kurla Complex,
Bandra (East), Mumbai 400 051, India**



Bidding Documents

Composition of Documents

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BIDDING DOCUMENTS



MUMBAI METRO LINE - 3 (COLABA-BANDRA-SEEPZ)

CONTRACT MM3-CBS-DEQ-9-03B

Design, Manufacture, Supply, Installation, Testing &
Commissioning of Catenary Maintenance Vehicle
for Project "Mumbai Metro Line-3"

Part 2

Employer's Requirements

Section VI-A

General Specifications

September – 2023

Mumbai Metro Rail Corporation Ltd
MMRC Line 3 Transit Office,
Wing A, Block E,
Bandra-Kurla Complex,
Bandra (East), Mumbai- 400 051, India.



Bidding Documents

Composition of Documents

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CHAPTER 1

1. General Requirements

1.1 General

This Specification covers the general aspects of the Contract viz., description of the Works, Project Planning and Progress Monitoring, Management Plans, Interface Management, Document Submission, etc. amongst some other aspects. This General Specification shall be read in conjunction with Technical Specification, Section VI-B, Part 2 along with drawings and other Contract documents in Part 1 and Part 3.

(a) Application of the General Specification (GS)

The provisions contained in the Technical Specifications and the Employer's Drawings shall prevail over the provisions contained in the General Specifications. These shall be read in conjunction with General Conditions of Contract (GC), Particular Conditions of Contract (PC), Technical Specifications, Instructions to Bidders and other Contract Documents.

(b) Scope of Work:

The Scope of Work under this Contract Covers Design, Manufacture, Supply, Installation, Testing & Commissioning of the Equipment as detailed in Bidding Documents with supply of associated accessories for Mumbai Metro Line 3 Depot, Mumbai including training of Employer's Personnel for Operation & Maintenance of the Equipment as per the Contract requirements.

(c) Abbreviations & Definitions:

The abbreviations and definitions of terms used in General Specifications are detailed in Appendix 2.

(d) Submission for Notice of No Objection

Documents, drawings, specifications, and any other matters which have been given Notice of No Objection by the Project Manager shall not be changed without further submission and review by the Project Manager.

1.2 Power Supply

Traction: 25 kV, AC, 50 Hz single-phase traction system shall consist of Rigid Overhead Catenary System (ROCS) in the complete underground portion of 32.5 kms from Seepz to Cuffe Parade and Flexible Overhead Catenary System (FOCS) in the Depot yard and other than underground section in the of Mumbai Metro Line 3 Project.

Non-traction: 415 V, AC, 50 Hz, 3 phase, 3 core connection power supply shall be available for non-traction purposes in the Depot for operations of the Equipment. The Contractor shall design the Equipment such that it is capable of giving guaranteed performance within $\pm 10\%$ of voltage fluctuations. The Equipment installed shall not cause unbalance to the supply.

1.3 Climatic Conditions

- (a) The Equipment shall be required to work under the climatic conditions of Mumbai. The water at site is expected to be hard with high salt content.
- (b) The Contractor shall check the prevailing climatic conditions from the website



(<http://www.wunderground.com.>) or the Regional Meteorological Centre of Mumbai and design the Equipment on the most severe conditions with allowance for further extreme conditions.

- (c) High level of IP protection is required in order to ensure equipment reliability under the dusty and rainy climatic conditions prevalent in Mumbai area. The Contractor shall also take into consideration the conditions in which the Facilities may be required to operate that may affect the operating environment in any way.

1.4 Electromagnetic Compatibility (EMC)

- a) Some equipment is expected to work in close proximity of other systems like OCS, Signaling and Telecommunications, etc. The Equipment shall not generate electromagnetic disturbances above levels that are appropriate for their intended place of use.
- b) In addition, the Equipment shall have an adequate level of immunity to electromagnetic disturbances so that it can operate correctly in its intended environment. The equipment shall comply to IEC 61000 standard for EMC.
- c) The Contractor shall interface with relevant interfacing Contractors for verification of Electromagnetic Compatibility with those Contracts.

1.5 Environmental Protection

The Contractor shall conform and comply with the various Indian Environmental Laws and codes as applicable relating to Environment Protection, Air Pollution, Water Pollution, Noise Pollution, Hazardous Waste Disposal, etc. These include, but not limited to, the latest version of the following:

- (i) Environment Protection Act, 1986
- (ii) Air (Prevention and Control of Pollution) Act, 1981
- (iii) The Noise Pollution (Regulation & Control) Rules, 2000
- (iv) The Hazardous Waste (Management & Handling) Rules, 1989

1.6 Standards and Codes

- (a) Unless otherwise stated in the Contract, reference in this Section to International Standards, European Standards, British Standards, British Standard Codes of Practice, Indian Standards and similar standards shall mean the latest edition of the document stated in the Technical Specifications, Section VI-B.
- (b) Plant & Equipment, related equipment and its software shall be in accordance with the requirements of the standards and codes specified in the Employer's Requirements - Technical Specification. The Contractor may propose an alternative equivalent international standard or deviation from the specified standards during the design stage. The Contractor shall, in such a case, apply for a 'Notice of No Objection' or 'Notice of No Objection subject to ...' from the Project Manager. The Contractor shall state the exact nature of the change, the reason for making the change and relevant specifications of the materials and equipment.
- (c) Where no standard is identifiable, the Contractor shall make a proposal, based on the best international practice, which shall be subject to review by the Project Manager.



- (d) During the preliminary design phase, the Contractor shall submit a consolidated list of all the standards that he intends to use for the design, manufacturing and testing and other phases of the Contract, for review of the Project Manager. Wherever required by the Project Manager, the Contractor shall submit an extract of the standard for review by the Project Manager.

1.7 Units

All drawings and design calculations submitted with the Bid, or in accordance with the requirements of the Contract, shall use SI units.

----- End of Chapter 1 -----



CHAPTER 2

2. Planning, Program and Progress Monitoring

2.1 Planning

- 2.1.1 The Contractor shall prepare a programme, using CPM scheduling software Primavera Project Planner (P6) programme or MS Project of the latest version, which shall reflect the detailed planning undertaken for satisfactory completion of the Project. The targeted planning shall be realistic and achievable.
- 2.1.2 Key dates (as defined in Appendix 1) shall be an integral part of the programme.
- 2.1.3 The Contractor shall monitor his own and his sub-Contractors' performance to ensure compliance with his obligations under the Contract.
- 2.1.4 The submissions of the programmes (described in this Chapter) and Management Plans (described in Chapter 3) shall comply with the requirements as given in 'Appendix 7- List of Deliverables' by the Contractor.
- 2.1.5 All programme submissions shall, unless otherwise specified, conform to the level of details specified in Appendix 3.

2.2 Works Programme

- 2.2.1 The Contractor shall prepare and submit his **Works Programme** including details of start and completions of different major activities, viz. Interface, Design submission; Procurement, Manufacturing, Testing and Delivery; Installation, Testing & Commissioning and Training within the period specified in Appendix 7 that shall be adopted to achieve Key Dates of the Contract.
- 2.2.2 All submissions made by the Contractor shall be properly co-ordinated taking care of due allowance for the Project Manager's review process (refer Clause 2.11) to be undertaken, including the time needed for any re-submissions.
- 2.2.3 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.
- 2.2.4 A standard Gregorian calendar shall be used for planning and execution of the Works. The programmes shall take into consideration allowance for Public Holidays and non-work periods. If a Key Date falls on a Public Holiday (as declared by Government of Maharashtra) or a non-workday, it shall be effective the next working day.
- 2.2.5 All terminology, definitions and conventions shall be in accordance with BS 6079-2:2000 Project Management.

2.3 IT Requirement of Employer

- 2.3.1 Employer is implementing an Enterprise-wide cloud-based IT project titled "Integrated Project Management Platform". The IT project envisages following application stack:
- a) Planning, Progress, Performance reporting and Scheduling services using Primavera Project Planner (P6) program or MS Project convertible to MPX or XML of the latest version.
 - b) Collaborative Document Control and Management Services (using Proliance



and Bentley Project Wise).

- c) 3D Modelling through Revit and clash detection through Navis Works (BIM solution).
 - d) Comprehensive Asset Management System.
 - e) Enterprise-wide ERP implementation
- 2.3.2 The effective use of such IT platform requires availability of web-based system at the Contractor's location with certain definite user's rights. Data uploading by Contractor's trained staff is key to effective implementation of the IT system. The Bidders are required to consider in their proposal the cost of IT staff for document uploading.
- 2.3.3 In view of the above, the Contractor shall be required to:
- a) Upload the drawings / designs created by the Contractor as per the classification on the Project Management Information System (PMIS).
 - b) Key Contract related communication and progress related data as per processes defined on PMIS.
 - c) Provide 3D modelling in Revit (Compatible with BIM system) of the Facilities after finalization of the design for incorporation in the Depot BIM model. 3D model shall include foundation, trenches, cable ducts etc. associated with the Equipment. The Contractor shall obtain Project Manager's NoNO of the 3D Model.
- 2.3.4 The Project Manager's IT Project Team shall render necessary assistance to the Contractor, to comply with the software system requirement.

2.4 Bi-monthly Progress Report

The Contractor shall prepare Bi-monthly Progress reports, as detailed in Appendix 4, and in the prescribed format which can be collected from the Project Manager after award of Contract. These reports shall be regularly submitted to the Project Manager.

2.5 Meetings

2.5.1 The Contractor or his representative/ Equipment Project Manager shall participate in meetings as indicated below:

2.5.2 Initial Contract Meeting:

This meeting shall take place within fourteen (14) days of the issue of Letter of Acceptance. The agenda of the meeting shall include, amongst other issues, the following points:

- a) Submission of performance bank guarantees, insurance policies and any other document.
- b) Nomination of the Contractor's Representative, Document Controller and Key Personnel for all coordination and compliance of the Contractual obligations.
- c) Training of Contractor's staff in Employer's Project Management Information system.
- d) Signing of the Contract Agreement.
- e) Planned activities for the first 30, 60 and 90 days after the Effective Date.



- f) Details of various submissions to be made during design stage.
- g) List of Preliminary and Detailed drawings.

2.5.3 Interim meetings during the execution of the Contract:

The Project Manager shall convene interim meetings, as and when required and considered necessary by either the Project Manager or the Contractor, whether online or with physical presence to sort out issues relating to progress, interface and any outstanding issues.

The Project Manager shall record minutes of all meetings and distribute them within seven (7) days of the meeting. The meetings will be chaired by the Project Manager.

2.6 Review Periods for Contractor's Submissions:

2.6.1 The Project Manager shall review the Contractor's submissions which require his acceptance and shall signify his acceptance or otherwise within 14 days. The Contractor shall, when required by the Project Manager, re-submit its programs within 14 days of receipt of the Project Manager's comments.

2.6.2 The Project Manager will endeavour to review and respond to the Contractor on the adequacy and acceptability of the Contractor's submissions and re-submissions as soon as reasonably possible, but the Contractor should always allow for a 14-day review period.

2.7 Failure to make Submissions:

Failure of the Contractor to submit any program, or any required revisions thereto within the time limits stated shall be sufficient reason for certification that the Contractor is not performing the work required in a timely manner.

2.8 Project Calendar:

2.8.1 Project Days shall be deemed to commence at 0000 hours on the morning of the day in question. Where reference is made to the completion of an activity or Milestone by a particular day, this shall mean by midnight of the day.

2.8.2 For Project purposes, the presentation shall be in "Day" units.

2.8.3 Bi-monthly periods shall be of 2 months duration and commencing from 1st January, 1st March, 1st May, and so on or any part of it.

----- End of Chapter 2 -----



CHAPTER 3

3. Management Plans:

3.1 General

3.1.1 **List of Plans:** In order to ensure satisfactory execution of the Contract, completion of works within specified targets, and quality in design, manufacturing and execution of work, following Management Plans shall be developed during execution of the Contract. These Plans shall be developed and submitted by the Contractor for Project Manager's review and issue of Notice of No Objection by the PM:

- a) Phase 1 plans shall cover 'Interface Management Plan', and Design submissions.
- b) Phase 2 plans shall cover Project Implementation Plan (detailing Procurement, Manufacturing, Testing & Delivery Plan, Testing & Commissioning Plan, Site Safety Plan' and 'Defects Liability Plan'), 'Training Plan', 'Quality Plan', 'RAMS Plan' and BIM of the CMV.

The plans shall collectively define and describe the Contractor's proposed methods and procedures to meet the requirements of the contracted work. The submissions of the plans shall comply with the requirements as given in Appendix 7- list of deliverables by the Contractor.

3.2 Project Management Key Personnel:

3.2.1 The Contractor shall submit the names, qualifications, experience, and positions of key personnel's information of Project Management Key personnel as described below:

The Contractor shall depute and advise the names of the following key personnel that meet the experience requirements given below:

Sr. No.	Position	Total Work Experience (years)	Experience in similar position held, in Works similar in scope and nature (years)
1	Eqpt Project Manager	6	3
2	Design Manager	6	3
3	Interface Manager/ Chief Interface Coordinator	4	2
4	Installation, Testing & Commissioning Manager (Site Engineer)	4	2
5	Quality Manager	4	1

- (a) The Eqpt Project Manager shall coordinate all activities including interface, design, manufacture, inspection, delivery, installation, testing & commissioning



and maintenance of the complete Facilities & satisfactory execution of the Contract on behalf of the Contractor. He can also act as Interface Manager subject to satisfying the qualifying requirements of Interface Manager.

- (b) The Design Manager can also act as Interface Manager subject to satisfying the qualifying requirement of Interface Manager.
- (c) The Interface Manager shall have completed at least one interface work of similar nature of item.
- (d) The Site Engineer shall undertake the responsibility of Installation, Testing & Commissioning activities of the CMV under the Contract in addition to the interface requirements during these activities. He shall also work as Safety Manager during the work of Installation, Testing & Commissioning at Site. He shall have completed at one work of installation, testing and commissioning of similar nature of item.
- (e) The Quality Manager shall be responsible for checking the quality of the CMV at all stages of work, viz. design, procurement, manufacturing, installation and commissioning.

3.2.2 The Contractor shall nominate a suitably qualified and experienced English-speaking Equipment Project Manager from his staff to be the nodal person and main contact person for coordinating the execution of the Contract.

3.3 Interface Management Plan

3.3.1 The Interface Manager shall develop the Interface Management plan in accordance with the requirements of Chapter 4.

3.3.2 The Plan shall include all the interface requirements with the respective Interfacing Contractors at different stages of execution, viz., design, installation, testing and commissioning.

3.3.3 He shall carry out the interfacing work with all interfacing Contractors and the Project Manager.

3.4 Project Implementation Plan

The Project Implementation Plan shall cover the following plans:

3.4.1 Procurement Plan

a) The Contractor shall prepare the Procurement plan detailing the list of items procured/ outsourced with their lead times and the procedure for procuring all these items in compliance to Quality standards and operational requirements meeting the Contractual obligations.

b) Vendors/ Subcontractors

(i) Vendors/ Subcontractors for the major items of the CMV bought out from and major items of services/ works outsourced from the Vendors/ Sub-contractors as detailed in Clause No. 1.10, Section VI-B, Part 2, must have in their possession a genuine and valid ISO:9001 (latest) quality certification or equivalent quality standard and meet the following minimum criteria:

- The vendors for the major bought out items must have adequate experience (say about three (03) years) for the manufacturing of the similar item.



- The vendors for the respective major bought out items shall have supplied the same/ similar item in at least one (01) equipment and completed at least two (02) years of service performance.
 - The subcontractors for the services and major items of work outsourced as above, must have adequate experience of (say three (03) years) for the similar type of service/ work.
 - Any deviation in the above requirements shall be at the discretion of the Employer during design stage.
- (ii) The Bidder shall submit the details of proposed vendors/Sub-contractors, referred to above, in **Form given in Appendix 8- Vendor Approval Form for Project Manager's NoNO**. The details of major items of the CMV bought out from and major items of services/ works outsourced from the Vendors/ Sub-contractors for the specific Equipment are given in Clause 2.2.4, Section VI-B, Technical Specifications.

3.4.2 Manufacturing Plan

- a) The Contractor shall prepare Manufacturing plan detailing the stages of manufacturing the CMV in compliance to Employer's requirement and standard quality procedure.
- b) The plan should give details of the manufacturing and associated activities outsourced by the Contractor.

3.4.3 Inspection & Testing Plan

- a) The Contractor shall give details of Inspection and Testing of procured materials before their acceptance and use.
- b) The Plan shall also detail the stage wise testing of the CMV and its parts/ sub-assemblies during manufacture.
- c) Details of Factory Acceptance Test (FAT) shall be included in the plan including details of tests constituting the Factory Acceptance Tests.

3.4.4 Delivery Plan

- a) The Contractor shall prepare Delivery plan giving details of delivery methodology complying with the employer's requirements.
- b) It shall cover the packaging, transportation, delivery, unloading, storage and preservation of the CMV delivered.
- c) It shall list out the approximate no packages with their approximate contents and weight.
- d) Delivery of the CMV shall be carried out only after getting Notice of No Objection from the Project Manager after FAT.

3.4.5 Testing & Commissioning Plan

- a) The Contractor shall submit the Testing & Commissioning Plan (SAT) detailing the methodology for testing & Commissioning of the CMV. The Contractor shall also list out the pre-requisites to be complied by the Employer for SAT and commissioning of the CMV.
- b) The Testing & Commissioning Plan shall contain, but not limited to, the following topics:



- i) the details of each test, procedure of test and criteria for successful tests,
- ii) Interface requirements with interfacing Contractors during testing and commissioning,
- iii) Commissioning and Guarantee testing, and
- iv) documentation for Testing & Commissioning.

3.4.6 Site Safety Plan

The Contractor shall submit a Site Safety Plan which shall be prepared as per the requirements of Clause 14.4, Chapter 15, Section VI-A. This shall include the details of safety measures to be taken during unloading, testing and commissioning.

3.4.7 DLP & Maintenance Plan

- (a) The Contractor shall submit a Defect Liability Plan which shall describe Contractor's methodologies detailing as to how the defects noticed during Defect Liability Period shall be dealt with including management of spares required during this period.
- (b) The Contractor shall also describe the methodology for carrying out servicing and maintenance of the CMV during DLP giving details of resources deployed and spares management.

3.4.8 System Safety Plan

- (a) The Contractor shall submit a System Safety Plan, which shall contain sufficient information to demonstrate clearly as to how the safe working of the CMV shall be ensured. This Plan should include an outline of the safety procedures and regulations to be developed and the mechanisms by which they will be implemented for ensuring safety including Hazard Analysis, Fire control, EMC / EMI control, and safety in transportation of the CMV, etc.
- (b) The Contractor shall ensure that all the hazards are identified. He shall list all possible hazards and mention methods adopted to resolve them.
- (c) The Fire Control Plan shall evaluate and ensure inter alia that the fire loadings of material proposed to be used, and the fire withstand ratings, etc. are compatible with currently accepted international practices.
- (d) The EMC / EMI Control Plan shall describe the means of control for the design process and EMC submissions to be supplies to demonstrate that the CMV is compatible for electromagnetic compatibility and interference with currently accepted international practices and Employer's Specifications.

3.5 Training Plan:

3.5.1 The Contractor shall prepare Training Plan in accordance with the requirements of Chapter 11. The plan shall include details of day wise planning of training of staff for Operational and maintenance aspects, the resources to be deployed by the Contractor and the pre-requisites desired to be complied with by the Employer before commencement of training.

3.6 Quality Plan

3.6.1 The Contractor shall submit a Quality Plan in accordance with the requirements of Chapter 6. It shall contain sufficient information to demonstrate clearly the proposed method of achieving the Contractor's Quality objectives in compliance to the requirements the Contract.



3.6.2 The Plan shall be based on acceptable International Standards (such as ISO 9001/2015 "Model for Quality Assurance in Design Development, Production, Installation and Servicing" or other relevant standards).

3.6.3 The Quality Plan shall embrace all activities of Contractors and sub-Contractors/vendors of major items of supply and shall include design, manufacturing, sub-Contracting, tests and inspection, installation, commissioning and maintenance activities as also the Quality Audits.

3.7 RAMS Plan

3.7.1 RAM Plan

- a) The Contractor shall implement a RAM Plan and RAM report in accordance with the Employer's Requirements, Section VI-A, General Specifications and Section VI-B, Technical Specifications, Part 2, and EN 50126.
- b) The Contractor's RAM Plan shall include Failure Modes, Effects and Criticality Analysis, and the production of a Reliability Critical Items List.

3.7.2 System Safety Assurance Plan

- a) The Contractor's System Safety Assurance Plan and Safety Report which shall include safety Hazard Analysis with risk mitigation measures.
- b) The Contractor shall submit sufficient information to demonstrate clearly as to how the safe working of the CMV shall be ensured. This Plan should include an outline of the safety procedures and regulations to be developed and the mechanisms by which they will be implemented for ensuring safety including Hazard Analysis, Fire control, and safety in transportation of the CMV, etc.
- c) The Contractor shall ensure that all the hazards are identified. He shall list all possible hazards and mention methods adopted to resolve them.
- d) The Fire Control Plan shall evaluate and ensure inter alia that the fire loadings of material proposed to be used, and the fire withstand ratings, etc. are compatible with currently accepted international practices.
- e) The Contractor shall describe the means of control for the EMC to demonstrate that the CMV is compatible for electromagnetic compatibility with other Interfacing Contracts and interference with currently accepted international practices and Employer's Specifications.

----- End of Chapter 3 -----



CHAPTER 4

4. Interface Management

4.1 General

- 4.1.1 The Contractor shall interface the Design, Manufacture, Supply, and Commissioning, covering with that of other Interfacing Contractors. The Contractor shall keep the Project Manager fully informed in respect of such interfaces, such information being given to the Project Manager in a timely manner ensuring that the work of the Contractor, Interfacing Contractor and other Contractors is carried out as per the Key Dates.
- 4.1.2 The Equipment Project Manager will nominate a suitable person as Interface Manager/ Chief Interface Coordinator who shall assume the primary role as Contractual focal point with the various Interfacing Contractors and the Project Manager. The Interface Manager shall deal directly with other Interfacing Contractors, keeping the Project Manager informed, for all interface design information, supply of CMV, testing and commissioning so that work is not delayed.
- 4.1.3 Major Interfacing Contractors for Equipment Contractor are (wherever applicable):
- a) Depot Civil Contractor (DPT)
 - b) Depot E&M Contractor (DEM)
 - c) Rolling Stock Contractor (RS)
 - d) Track Contractor (TWK)
 - e) Signalling & Telecom Contractor (STPT)
 - f) Common Asset Management System Contractor (CAMS)
 - g) Any other relevant Contractor.
- 4.1.4 **Other Contractors**
The Interface Management Team (IMT) of the Project Manager shall advise the Contractor of the contact details of all the system-wide Contractors for co-ordination. Their Contracts shall have the provisions to interface directly with Equipment Project Manager for the exchange of information. Equipment Project Manager shall do the required interface with them as and when required.
- 4.1.5 The Contractor shall use his best endeavours to resolve all interfaces applicable to the Contract and shall be proactive in seeking out solutions to the interface issues.
- 4.2 Contractor's Co-ordination Responsibilities**
- 4.2.1 The Contractor shall co-ordinate with the PM and shall be required to attend meetings organized to coordinate the interface issues with system-wide Contractors.
- 4.2.2 The Master Interface Matrix (MIM), enclosed in Appendix 5, assigns the Contractor the role either as Lead Party or as Follower Party for each interfacing Contractor. PM may update the MIM at any time to include additional Interfacing Contractors, and the Contractor's lump sum price shall be deemed to include any such additional works related to interfacing.



- 4.2.3 The lead Interfacing Contractor shall be responsible for monitoring, managing, and resolving all interface issues between the Interfacing Contractors.
- 4.2.4 In a situation where either the Lead Contract or the Interfacing Contract is yet to be awarded, the required co-ordination with the awarded Contract shall be done by the PM, with the express understanding that there may be changes as and when the other Contracts are awarded.
- 4.2.5 The Contractor shall ensure that all the Interface requirements are included in his Interface Management Plan.

4.3 Interface Responsibilities

- 4.3.1 The tentative interface requirements for Design, Manufacture, Supply, Installation, Testing & Commissioning including the guarantee Testing are tabulated, interface Contractor-wise, in Appendix 5.
- 4.3.2 The Contractor shall be responsible for ensuring that all requirements of the specifications pertaining to interfaces are satisfied.
- 4.3.3 The requirements specified herein are by no means exhaustive and complete and it remains the Contractor's responsibility to develop and execute jointly an Interface Plan after the award of the Contract and throughout the execution of works, to ensure that:
- a) all interfacing issues between the two Contracts are satisfactorily resolved,
 - b) design, manufacture, supply, installation and testing of equipment and software are fully coordinated, and
 - c) that all equipment supplied under the Contract is fully compatible with other systems, whilst meeting the requirements of the respective specifications.
- 4.3.4 The Interface Management Plan (IMP) shall be submitted to the Project Manager for review and comments. The Project Manager will play a lead role in ensuring that the Interfacing Contractors perform in a timely and cooperative manner.
- 4.3.5 The IMP shall be updated by the Contractor, as and when needed, and submitted to the Project Manager. Should it appear to Project Manager that the progress of the Works does not conform with the IMP, the Contractor shall be required to revise all such programs and plans such that they do reflect that the progress of the Works is mutually consistent and conforms to other provisions of the Contract.
- 4.3.6 The Contractor shall review the details of interface works and notify the Project Manager of any amendments to the interface sheets required in the process of its work. Unless such requests are reviewed without objection by the Project Manager, the Equipment Contractor shall design and construct the works in accordance with the provisions outlined in this the attached interface sheets.

4.4 Interfacing Functions

- The Lead Interfacing Contractors are responsible for, but not limited to, the following,
- a) Preparing the Interface Management Plan and subsequent procedures,



- b) Preparing their Interface Sheets (IS), Interface Specification Forms (ISF) and Confirmation Co-ordination Forms (CCF) and issuing same to the relevant Interface Contractors and PM,
- c) Co-ordinating with the relevant Interface Contractors to establish coordinated Combined Services Drawings (CSD) & Structural, Electrical and Mechanical (SEM) Drawings,
- d) Updating the IS from time to time and submitting the same to the PM for review.

4.5 Scope of Work of the Contractor:

- 4.5.1 The information and scope of the work to be provided by the Contractor include but may not necessarily be limited to those outlined in the attached interface sheets.
- 4.5.2 The Interfacing Contractors shall liaison with the Contractor in the Design, Installation, Commissioning, Testing and Acceptance of the CMV.
- 4.5.3 The Contractor shall provide all access and attendance necessary in accordance with the Contract requirements to enable the Interfacing Contractors to complete those activities defined under the interface sheets attached to this interface specification in a timely manner.
- 4.5.4 Where Contractor works are identified as failing to meet the requirements of the Contract and which will impact the Interfacing Contractor's works, the Contractor shall submit the proposed remedial measures to the Project Manager for review and shall copy the same to the Interfacing Contractors.

4.6 Interface with Depot Civil GC Team and Construction Contractor(s)

- 4.6.1 The Project Manager with experience and help of Depot Civil GC Team will design the facilities in depots and workshops. This interface is to improve it further to meet the requirements.
- 4.6.2 In order to perform the work, the Contractor will be required to communicate directly with Project Manager. The Project Manager will record the details of all these meetings and provide a copy to the Project Manager. The Contractor will also give the notice for meetings with sufficient time to enable Project Manager to attend these meetings.
- 4.6.3 The Project Manager will provide the Contractor with authorization; assistance and the support of its own personnel should the Contractor request Project Manager to intervene on its behalf with such meetings.

4.7 Interface between the Contractor and Other Interfacing Contractors:

- 4.7.1 The Project Manager with experience and help of Depot Civil GC Team will design the facilities in depots and workshops. This interface is to improve it further to meet the requirements.
- 4.7.2 In order to perform the work, the Contractor will be required to communicate directly with Project Manager. The Project Manager will record the details of all these meetings and provide a copy to the Project Manager. The Contractor will also give the notice for meetings with sufficient time to enable Project Manager to attend these meetings.
- 4.7.3 The Project Manager will provide the Contractor with authorization; assistance



and the support of its own personnel should the Contractor request Project Manager to intervene on its behalf with such meetings.

4.8 Interface with Common Asset Management System (CAMS) Contractor

4.8.1 The Employer is implementing IT-based Common Asset Management System (CAMS), which shall enable it to manage and optimize various processes (viz. maintenance management, O&M management, supply chain management, reporting, etc.)

4.8.2 The CAMS Contractor shall coordinate and interface with Contractor for successful integration of assets into the Common Asset Management System.

4.8.3 The Equipment to the required levels of breakdown shall be entered into the CAMS.

4.8.4 The Equipment data shall be fed into the CAMS broadly in three forms:

- a) Wherever applicable, predetermined set of active failure rules shall be transmitted to Operation Control Centre. CAMS shall be able to take this data for processing.
- b) Wherever applicable, appropriate data shall be downloaded from Control Console of the Equipment through GPRS or WLAN or Wi-Fi at predetermined intervals or locations. CAMS shall be capable of interfacing with the concerned database and take in filtered data as per design.
- c) Other data will be fed manually in the CAMS.

4.8.5 Wherever applicable, preventive and corrective maintenance data generated by the Control Console of each Equipment to be captured to raise the work request /work orders, and to update the equipment data.

4.8.6 The point of interface to the CAMS will be the CAMS depot (or other location) rack via Ethernet LAN connectivity.

4.9 Monthly Information Report (Interface)

The Contractor shall submit Monthly Information Report (MIR), till finalization of Design, showing progress of Interface requirements with different Interfacing Contractors. The format of MIR can be collected from the Project Manager after award of Contract.

----- End of Chapter 4 -----



CHAPTER 5

5. Document Submission

5.1 General

5.1.1 The Contractor shall submit all documentation related to the execution of the Contract and as specified in the Bidding Document for the PM's information, comment and notice of no objection.

5.1.2 All submissions shall be made to the PM in a format which has Notice of No Objection by the PM and in accordance with the requirements in

- a) the Contract,
- b) Unless otherwise stated herein, all documents shall, as a minimum, be produced in accordance with the following requirements:
 - i) All documentation shall be submitted in the English language using SI Units,
 - ii) All documentation presented as print material shall use paper of suitable quality for a retention time under conditions of normal usage and storage for a minimum period of 10 years without deterioration or fading,
 - iii) Documentation provided on DVD, electronic media shall allow archiving, storage, retrieval, amendment and printing out,
 - iv) All documentation shall be produced with a suitable indexing and document numbering system to be agreed with the Employer and compatible with Employer's project,
 - v) Management System (EDMS).

5.1.3 All designs specifically produced for this Contract shall become the property of the Employer and shall be clearly identified as such on all documents.

5.1.4 Drawings & Design documents:

- a) Drawings sizes shall generally be A1, A2 or A3. All drawings shall be capable of being photo reduced in a legible form to A3 size, sketches may be submitted in A4 size.
- b) Other documents shall be A3 or A4 size with associated drawings within the document provided as A3 sized documents. For A4 sized documents associated drawings shall be A4 or A3 folded to A4.

5.1.5 Document format:

- a) The Contractor shall use suitable, compatible, industry standard software packages in the preparation of documentation for submission to the PM.
- b) The following software which shall be compatible with the Employer's Requirement and also with Intel-Windows based computers shall be used, unless otherwise stated, for the various electronic submissions required:

- Text Documents	MS Word
- Spread Sheets	MS Excel
- Data Base Files	MS Access
- Presentation Files	MS Power Point
- Programs	Primavera P6 or MS Project
- Drawings	Auto CAD



- Photographic Files Adobe Photo Shop
- Project Management MS Project

5.1.6 The design submissions include Design Calculations, Design Reports and Design Drawings.

5.1.7 In the event that a statutory body (e.g., Government of India, Ministry of Railways; Research, Design, Standards Organization (RDSO); Commissioner of Metro Railway Safety, etc.) requires design information in a particular format, it shall be incumbent upon the Contractor to provide the same, as directed by the Project Manager.

5.2 Review of Data

5.2.1 As soon as practicable after the award of the Contract, the Contractor shall review all applicable data, criteria, standards, directives, and information provided to him as the basis for design. Any apparent inconsistencies or erroneous information shall be brought to the attention of the Project Manager. Such information shall not alleviate the Contractor from its responsibilities under the Contract.

5.3 Format of Deliverables

5.3.1 Drawings and CAD data shall comply with the requirements of 'Appendix 6- Drawing and CAD Standards'. Reports, calculations, specifications, technical data and similar documents shall be provided in A4 format, and one of the copies shall be ring bound to facilitate photocopying. A3 size drawings included in documents shall be folded to A4 size.

5.4 Number of Copies

The Contractor shall submit 4 sets of hard copies of all submissions mentioned below after obtaining NoNO (Status 'C') from the Project Manager. This includes preliminary, and detailed design submissions, Management Plans, Works Program, and all other submissions.

- a) Full size Paper drawings (folded and collated).
- b) Design documents and calculations.
- c) Design Report.
- d) All other submissions.
- e) Each of the above in electronic format (.pdf on CD)

The Contractor shall also submit additional copies of the above submissions as and asked for by the Project Manager.

5.5 Document Notification Codes

The PM will respond to the Contractor by issuing a Document Submission Report (DSR) indicating notification in one of the following three ways:

DRAWING/DOCUMENT SUBMISSION REPORT			
CODE	STATUS		COMMENT
'A'	Objection		Complete re-submission required
'B'	No Objection with comments		Incorporate All Comments - & re-submit Documents
'C'	No Objection		Notice of No Objection
Signature:		Print Name:	Date:



- a) Issue of a Notice of "No Objection", status code 'C', entitles the Contractor to proceed to the next stage of the programme of work. Receipt of such notice of no objection does not in any way remove any responsibility from the Contractor for complying with the Contract.
 - b) If the PM discovers minor non-compliance, discrepancies, omissions, etc. that, in his opinion, are not of a fundamental nature, he will return the completed Document Submission Report (DSR) – Status Sheet with the status code 'B' checked as 'No Objection with comments' with a Document Submission Report (DSR) – Comment Sheet containing a listing of the Employer's Requirements Comments and area of deficiency which are required to be amended, included or improved to comply with the Contract. Issue of a 'No Objection with comments' entitles the Contractor to proceed to the next stage of the programme of work, subject to the required amendments of documents whereby the PM's comments are taken into account fully and implemented exactly.
 - c) If the PM discovers major non-compliance, discrepancies, omissions, etc. that, in his opinion, are of a fundamental nature, he may return the Document Submission Report (DSR) – Status Sheet with the status code 'A' checked 'Objection. A complete resubmission is required' with a Document Submission Report (DSR) – Comment Sheet containing a listing of the PM Comments and area of deficiency which are required to be amended, included or improved to comply with requirements of the Contract. The issuance of an 'Objection. A complete resubmission is required' does not entitle the Contractor to proceed to the next stage of the programme of work until it is entirely resubmitted in a proper way and all of the PM's comments are fully taken into account and a satisfactory re-submission has been made (i.e., one which results in a code 'B' 'No Objection with comments or code 'C' 'Notice of no objection').
- 5.5.1 The Project Manager will complete his review of the submission within 14 calendar days, after which the review comments in writing or on marked up drawings and specifications will be furnished to the Contractor. Within two weeks of the receipt of the Project Manager's comments, the Contractor shall submit its proposals for implementation in the next submission. Where the comments are minor, such proposals may be clarified by calculations, part prints, etc. acceptable to the Project Manager and included in the Contractor's next submission. Should the Project Manager deem the submission to be unacceptable, the Contractor shall revise and resubmit the entire submission within two weeks, unless otherwise agreed with the Project Manager.
- 5.5.2 After Project Manager's review of the design submissions, the Contractor shall update the documentation incorporating Project Manager's observations and other design requirements. For all subsequent submissions, the Contractor shall demonstrate that all the previous comments by Project Manager have been incorporated. The comments previously issued by Project Manager shall also become part of the submission.
- 5.6 As Built/ Manufactured Drawings and Documents**
- 5.6.1 As-built drawings are intended to show the works exactly as constructed. These are prepared by amending the manufacturing drawings to take into consideration



changes necessitated by manufacturing methodology. These drawings shall be completed and submitted to the Project Manager within the time schedule specified in **Appendix 7- List of deliverables.**

5.7 Document Identification and Numbering

5.7.1 The Contractor shall follow the project-wide Document Identification and Numbering Procedure of the Employer.

5.7.2 The Contractor shall, after award of the Contract, co-ordinate with the Document Controller of the Project Manager and shall take from him the details of the Numbering System to be followed with the Project Manager.

5.8 Structure of Handover Documentation

5.8.1 The Contractor shall provide the following documentation on handover of the system to the PM:

- a) Full Asset Register
- b) Licenses and Warranties
- c) Material Certification File
- d) Operations & Maintenance Manual
- e) Operator's Handbook
- f) Spares Parts List (Including Illustrated Parts Catalogue)

----- End of Chapter 5 -----



CHAPTER 6

6. Quality Management

6.1 Introduction

6.1.1 The Contractor shall maintain and implement a Quality Management System, based on International Standard ISO 9001: 2015, that shall remain in effect from the instance of manufacturing until commissioning/ handing over and shall submit it for PM's Notice of No Objection (NoNO) as specified in this Section.

6.1.2 Company manufacturing the Plant & Equipment is required to be certified to ISO 9001 or better standard by a registered Certifier that is acceptable by Project Manager (PM). Company's Sub-contractors shall also be covered by the Contractor's ISO 9001 QMS.

6.1.3 The Contractor's Quality Plan shall be capable of ensuring that all aspects of the Works, including but not limited to, design, procurement, fabrication/ manufacturing, inspection, installation, testing, and commissioning will comply with the requirements of the Contract.

6.1.4 The Contractor's Quality Plan shall ensure that all goods and materials, whether procured on-shore in India or off-shore before shipping, or manufactured in Works, their handling, assembling, testing, and fabrication, is of high quality and comply with the Contract requirements. All the suppliers, vendors and outsourced agencies shall also comply with the Contract requirements.

6.1.5 The Contractor shall, for the PM/ Employer's Inspection, verification and /or Test and Commissioning provide:

- (a) Right to inspect,
- (b) Facilities to carry-out the inspection of their work, and
- (c) Assistance in travel and accommodation arrangements.

6.2 Quality Management System (QMS)

6.2.1 Contractor's QMS shall be capable of demonstrating by self-certification that all relevant standards, regulations, testing requirements and all requirements of the Contract are being met.

6.2.2 The Contractor shall designate an approved Quality Engineer who shall be classified as one of the Key Personnel and shall be responsible for overseeing the implementation of Quality Plan, Inspection Test Plans (ITPs), MSTs, etc. of the Contractor. The Quality Manager shall not report to the Contractor's Manufacturing Head but shall be directly reporting to Contractor's Project Manager/ any other higher authority.

6.3 QMS documentation

Contractor shall submit the following documents as fulfilment of his QMS requirement for seeking PM's NoNO as specified in this Section, before start of his Work.

6.3.1 Quality Plan

Quality Plan, identifying its Quality Procedures, Audits, Organization chart, Documentations, Process Flowchart, Documents related to Control Process,



Non-conformity, Corrective and Preventive Actions, etc. covering the entire scope of his Works in the Contract. Such Plan shall include but not limited to the schedule of internal, consultant/ subcontractor/ supplier Audits, Reports of which shall be promptly submitted to PM for information and record.

6.3.2 Design, Manufacturing, Installation, Testing and Commissioning Stage Quality Control

a) Design Stage shall include all pertinent details to manage and control Design which shall not be limited to:

- i) The procedures for the control of design and/or its changes if any, shall be defined in order that such activities are reviewed, verified, validated and approved before enactment,
- ii) All design documents (drawings, plans, specifications, calculations and reports) produced by the Contractor's organization shall be checked and certified by the Designer before seeking NoNO from PM,
- iii) The Contractor shall maintain records showing design calculation and data supporting design review activities,
- iv) The details shall laydown bearing of a detailed approved Method Statement before undertaking any work,
- v) PM reserves the right to inspect and audit these documents at any time for verification.

b) Manufacturing Stage shall include all pertinent details to manage and control manufacture which shall not be limited to:

- i) Manufacturing Process, QA/QC ensuring compliance with design, drawings and specifications,
- ii) Checklist for Design, Manufacturing, Installation, Testing and Commissioning,
- iii) Clear identification and traceability of material and manufactured parts,
- iv) Detailed narration on disposition of non-conforming material or product so as to avoid unintended use/installation shall find a plan in this Plan,
- v) The details shall include process and system of purchasing of materials/ equipment including approved bought-out items ensuring they comply with the requirements of the specification,
- vi) Compliance with vendor approval of the bought-out items/ sub-contracted works by the Project Manager. The Vendor approval proposals shall be submitted in form given in Appendix 8 in the time frame as given in Appendix 7- List of Deliverables.
- vii) Purchasing documentation and specific verification arrangements prior to release for use/installation,

c) Installation Stage shall include all pertinent details to manage and control installation work which shall not be limited to:

- i) Resource Planning incorporating Plant and Labour,
- ii) Harmonizing with relevant Drawings and Works Specifications,



- iii) Hazard, Safety and Environmental provisions that need to be taken care of to eliminate and/or mitigate the risks shall be identified and separately submitted,
- d) Testing & Commissioning Stage** shall include all pertinent details to manage and control any test and inspection activities which shall not be limited to:
 - i) The procedure and instructions for the inspection and/or testing,
 - ii) The test method or a reference to the relevant standard of testing,
 - iii) Details of Inspections, Tests and Trials, its level and frequencies of each aspect of the Works of all incoming materials, in process and final product,
 - iv) The inspection and/or testing required for the completion of an activity.

6.4 Quality System Requirements

- 6.4.1 All testing in India is to be carried out by laboratories accredited by NABL (National Accreditation Board of Testing and Calibration Laboratories) or internationally by accredited laboratory complaint to ISO 17025: 2005.
- 6.4.2 All testing of equipment, software, plant and materials must be carried-out by persons accredited to meet the requirements and Standards.

6.5 Reports

- 6.5.1 The Contractor shall compile and submit 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.
- 6.5.2 Each report of inspection and/or of test shall be signed by a representative of the Contractor who has been allocated the requisite authority under the relevant ITP and signed by the Contractor's Quality Engineer.
- 6.5.3 The Contractor shall ensure that a signed copy of report each-in-situ and each off-site inspection/ test is filed in his Records within seven (7) working days of the date of completion of the test process respectively.
- 6.5.4 The Project Manager reserves the right to inspect and audit these documents anytime.

----- End of Chapter 6 -----



CHAPTER 7

7 Software Quality Assurance

7.1 Specifically Developed Software

7.1.1 All software to be specifically developed or modified (re-engineered software) for the MML3 Project under this contract shall follow the requirements of EN 50128 (Railway Applications: Software of Railway Control and Protection Systems).

----- End of Chapter 7 -----



CHAPTER 8

8 Packaging & Storage, Shipping and Delivery

8.1 Packaging & Storage

- 8.1.1 The Contractor shall, after manufacturing/ assembling, protect and store, in a manner to be accepted by the Project Manager, all 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, transit or storage on or off the Site.
- 8.1.2 Secure and covered storage shall be provided at Site for all Equipment and materials other than those accepted by the Project Manager as suitable for open storage.
- 8.1.3 The Contractor shall provide all packing, crating and markings.
- 8.1.4 Each case, crate or package shall be waterproof, rot-proof and insect/rodent proof and of robust construction.
- 8.1.5 Each case, crate or package shall be legibly and indelibly marked in large letters with the Site address, Contract number, "right way up", opening points and other markings as necessary to permit materials to be readily identified and handled during transit.
- 8.1.6 All spare parts shall be tropicalized in their packing for prolonged storage in accordance with BS 1133 or equivalent. and shall be suitably labelled to indicate:
- (a) Ownership (MMRC)
 - (b) Description of item and relevant part number
 - (c) Serial number, if applicable
- 8.1.7 Protection requirements shall include but not be limited to:
- (a) Electrical and other delicate items or equipment.
 - (b) Tube ends, cable ends, cable entry points into equipment and other similar terminations and openings shall be blanked off to prevent ingress of dirt, moisture, vermin or insects and to provide protection against damage.
 - (c) 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.
 - (d) Particular care shall be taken to prevent damage to or corrosion of shafts and journals where they rest on timber or other supports, which may contain moisture. At such points, wrappings impregnated with anti-rusting composition shall be used. Wrapping shall be of sufficient strength to resist chafing under the pressures and movements likely to occur in transit.
 - (e) Spare ball and roller bearings and similarly protected items shall not be removed from the manufacturer's wrappings or packing.
- 8.1.8 Each case, crate or package shall contain a comprehensive packing list showing the contents with details of item number, mark, size and weight. A second copy of the packing list shall be enclosed in a watertight enclosure on the outside of each case.



- 8.1.9 All cases/ crates heavier than 100 kg shall be marked on the outside of the case to show the gross weight, the points for slinging, and where the weight is bearing.
- 8.1.10 Care shall be taken to prevent movement of contents within cases/ crates by the provision of bracings, straps and securing bolts as necessary. Bags of loose items shall be packed in cases and shall be clearly identified by well-secured labels on which the quantity and name of the part and its index or catalogue number have been stamped.
- 8.1.11 If sea transportation of Equipment from manufacturer's works to Site at Mumbai is required, their seaworthy packing/ treatment shall be ensured for the safe transportation. It shall apply to sea transportation of spares and other materials also.

8.2 Shipping/ Surface Transportation

- 8.2.1 The Contractor shall notify the Project Manager fourteen (14) days in advance of any expected shipment/ Transportation date and give further notification of the actual shipment/ Transportation date and routing when such information is subsequently established.
- 8.2.2 Two (02) copies of packing list and test certificates shall be delivered along with the package at site and one copy shall be despatched to the Project Manager.
- 8.2.3 Without prejudice to any other provisions of the Contract, the Contractor shall be responsible for all legal requirements, dues, taxes and other such requirements including all expenses in connection with this.

8.3 Transportation

- 8.3.1 Procedures for access to and from the site shall be co-ordinated with the relevant Interfacing Contractors and other Relevant Authorities.
- 8.3.2 The Contractor shall use such routes and rights of entry to the Site as may be decided by the Project Manager from time to time. Routes for 'very large' or 'very heavy' loads shall be discussed with the Project Manager in advance and all arrangements thereafter shall be submitted to the Project Manager. 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 Project Manager for possible solutions.
- 8.3.3 The Contractor shall be responsible for obtaining permission from the Traffic Police and other relevant authorities to move "very large" and "very heavy" loads and for arranging police escorts if required.
- 8.3.4 The Contractor shall repair damage caused, if any to existing roads, footpaths, steps, cables, sewers, drains, etc. and shall reinstate the same at its own expense to the satisfaction of the relevant authorities.
- 8.3.5 All of the Contracted material/ supplies should be transported only through registered common carriers, as per the provisions of Carriage by Road Act, 2007 and Carriage by Road Rules, 2011.



8.4 Delivery

- 8.4.1 The Contractor shall unload the CMV and all items to be supplied under the Contract at the designated delivery point and positioning or storing them. All facilities required for unloading the CMV at Site shall be arranged by the Contractor at his cost.
- 8.4.2 Any part of the CMV 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.
- 8.4.3 The Contractor shall store and secure the Works, CMV and other items until the same have been inspected and are considered delivered at the designated point by the PM.
- 8.4.4 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.
- 8.4.5 An item shall only be considered delivered when all damages have been repaired and all documentation including post-delivery preparation have been completed to the satisfaction of the PM.

---- End of Chapter 8 ----



CHAPTER 9

9 Installation, Testing & Commissioning

9.1 General

9.1.1 The Contractor shall install, test and commission the CMV at Site in compliance with the Employer's Requirements and contractual obligations.

9.2 Installation, Testing & Commissioning Plan

9.2.1 The Installation, Testing & Commissioning Plan shall contain, but not limited to, the following topics:

- a) the inter-relationship with Interfacing Contractors during installation, testing & commissioning,
- b) submission of Testing & Commissioning details and procedures,
- c) the objectives of each test and criteria for successful tests,
- d) documentation for conducting tests.

9.2.2 Notwithstanding the foregoing provisions of this Clause, or that certain of the Contractor's proposed methods of inspection, 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.

9.3 Sequence of Tests

9.3.1 The sequence of tests shall be:

- a) Open Package inspection on receipt of CMV at Site
- b) Installation checks after completion of installation,
- c) Testing of CMV after installation,
- d) Site Acceptance Tests (SAT) including Guarantee tests and commissioning of CMV.

9.3.2 All facilities required for carrying out the SAT viz. labour, operator, and consumables shall be arranged by the Contractor, at his own cost.

9.3.3 Three Phase and Single-Phase Power will be made available to Contractor free of charge for Testing & Commissioning of the CMV. The Contractor shall liaise with Interfacing Contractors for availing of the power and assuring compliance of all safety procedures.

----- **End of Chapter 9** -----



CHAPTER 10

10 Materials and Equipment

10.1 Materials

10.1.1 General

- a) Materials for inclusion into the Works shall be new unless otherwise stated in the Contract or having been given a Notice of No Objection by the Project Manager.
- b) Certificates of tests by manufacturers, which are submitted to the Project Manager, 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.
- c) Materials, or components 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 given a Notice of No Objection by the Project Manager.

10.2 Equipment

10.2.1 Equipment Protection

All equipment shall be capable of continuous operation in its normal environment and achieve its stated service life. The Contractor shall be responsible for ensuring that his equipment and systems are not adversely affected by the modified environmental conditions caused by the localized heat or vapor emissions or moisture of other adjacent Equipment whether provided under the Contract or otherwise.

10.3 Electronic Control Racks & Cabinets

10.3.1 Racks & Cabinets

- a) Electronic control equipment shall be housed in suitably enclosed metal cabinets.
- b) The equipment shall be of modular construction to facilitate easy maintenance, repair and replacement of parts. Standard commercial parts shall be utilized to the maximum extent possible.
- c) 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.
- d) There shall be a minimum walkway of 1000mm between equipment racks.
- e) 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 minimize the ingress of moisture, dust and dirt.
- f) Outdoor equipment shall be sealed against the ingress of dust, moisture, and vermin.
- g) No item of equipment which is removable as part of routine maintenance procedures shall generally be mounted greater than 2.0 m above floor level.
- h) The Contractor shall provide for all cubicles, cabinets and panels, a means of locking appropriate to the location.



10.3.2 **Cables**

- a) All cables shall be of the type LSZH and Fire Resistant with Circuit Integrity according to IEC 60331-24 with a sustainability of at least 1 hour.
- b) No joints or splices shall be permitted in cables or wires except at recognized termination points.
- c) All multi-core cables shall allow 25% or 2 cores, whichever is the greater, as spares.
- d) All cable cores shall be terminated including all spare conductors.
- e) Each cable core shall be uniquely numbered and identified with a label giving details of the circuit carried.
- f) 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.

----- End of Chapter 10 -----



CHAPTER 11

11 Training

11.1 Training Requirements

- 11.1.1 The Contractor shall provide comprehensive training to the Employer's staff to enable safe and efficient Operation and Maintenance of the CMV supplied as part of the Contract to achieve maximum reliability and economy of Operation and Maintenance.
- 11.1.2 The Contractor shall submit Training Manual within the time schedule as specified in Appendix 7- List of Deliverables and obtain Notice of No Objection from the PM for use by the Employer for conducting in-house training.
- 11.1.3 The Training Manual shall include, but not limited to, the following aspects of CMV for its Operation and Maintenance:
- a) Schedule of training courses.
 - b) Syllabus, format and duration of each course and training evaluation methods.
 - c) Training facilities to be provided by the Employer and the Contractor.
 - d) On-Site training during Installation, Testing & Commissioning.
 - e) Instructor's qualifications.
 - f) Operation and procedures under normal and degraded modes of the CMV.
- 11.1.4 The training syllabus should concentrate on familiarisation with various systems of the CMV along with practical hands-on-training.
- 11.1.5 Training Instructors provided by the Contractor shall be fully qualified and experienced engineers and experts in the relevant field with experience in imparting training to Engineers and Technicians to the level of competency essential for Operation and Maintenance of the CMV under the Contract. The instructors shall be English speaking and preferably having some knowledge of Hindi. The appointment of Instructors shall be confirmed only after its detailed curriculum vitae have been accepted by the Project Manager. In the event that an Instructor is subsequently deemed not to be competent, he shall be replaced forthwith.
- 11.1.6 The Contractor is required to provide at its own cost, all other necessary training aids such as printed notes, video programs, models, drawings, e-learning modules, CDs and other training aids.
- 11.1.7 Facilities such as classrooms complete with furniture, electric points etc, will be made available, to the extent available and shall be provided, by the Employer free of cost to the Contractor for imparting training as provided in the Contract.
- 11.1.8 All expenses of trainers, including travel and lodging, shall be borne by the Contractor. The cost of training material to trainees shall also be borne by the Contractor.
- 11.1.9 Any gadgets, e.g., laptop, projector etc., needed for the training shall be arranged by the Contractor. Onsite training will be done on the commissioned CMV.



11.2 Training Objectives: Operations

11.2.1 The Operations training shall cover all operational aspects of the CMV including safety features, fault diagnosis and measures to rectify the minor faults.

11.2.2 After classroom training, the Employer's staff is required to be trained in actual operation of the CMV for a sufficient duration to acquire the required confidence in operation in the MMRC Depot.

11.3 Training Objectives: Maintenance:

11.3.1 The objective of training of maintenance staff is that the maintainers should be able to maintain the CMV safely under all operating conditions and failure modes.

11.3.2 During the Defect Liability Period when the Contractor is responsible for maintenance, servicing, fault finding and repairs, he shall provide practical hands-on training to the Employer's maintenance staff during maintenance periods.

11.3.3 The training in maintenance of the CMV shall enable the engineers, inspectors, and staff to achieve the following broad objectives:

- a) Full understanding of all aspects of the CMV design and functions of all the sub-systems of the CMV including proprietary and sub-Contractor's equipment, software, etc.
- b) All planned maintenance and overhaul of the systems and equipment supplied, installed, or modified under the Contract.
- c) Fault finding and rectification techniques for the systems and equipment supplied (by use of special test equipment, if required), installed or modified under the Contract.
- d) All maintenance practices and procedures necessary for the safe and efficient operation of the systems and equipment, installed or modified under the Contract.

11.4 Training Methods

11.4.1 Training shall consist of classroom (theory) training, computer based interactive multi-media training, and practical (hands on) training. The Contractor shall issue Competency Certificate to those staff who have acquired adequate knowledge in the Operations and Maintenance of the CMV.

11.4.2 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 competency with the course content and to assess the level of knowledge and understanding of the course content by each trainee.

11.5 Training Records

11.5.1 The Contractor shall, at the completion of each training course provide the PM with a consolidated training record listing the training course title, date of training, name of all trainees, training result and other relevant information.

--- End of Chapter 11 ---



CHAPTER 12

12 Operations & Maintenance

12.1 General

- 12.1.1 The Contractor shall provide Operation & Maintenance Manual explaining the operational and Maintenance related aspects of the complete system together with its component subsidiary systems and individual items of CMV. The characteristics, ratings and any necessary operating limits of the CMV and Sub-systems shall be provided.
- 12.1.2 The manual shall include details of all the various systems and sub-systems from a maintenance and fault-finding viewpoint, with particulars of operating parameters, tools for dismantling and testing, methods of assembly and disassembly, tolerances, repair techniques and all other information necessary to set up a repair and servicing program.
- 12.1.3 The Manual shall provide documentation for all hardware and software for computer systems and other associated electronic equipment used in the CMV.
- 12.1.4 The manual shall also include inspection/ overhaul procedure and periodicity of various inspection/ overhaul schedules in detail including the tools, special tools/plants, and facilities required.
- 12.1.5 The Contractor shall submit Operations and Maintenance Manual(s) and submit to the Project Manager for review. Upon issue of Notice of No Objection from the Project Manager, the Contractor shall provide five (05) hard copies and one (01) electronic soft copy (.pdf on CD) to the Employer.
- 12.1.6 Each manual shall be divided into indexed sections explaining the subject matter in logical steps. The manuals shall consist of printed sheets bound in stiff cover and wear-resistant binders.
- 12.1.7 Information shall be provided in pictorial form wherever possible and shall include step-by-step instructions and views of the CMV including exploded views and flow charts to enable faults to be quickly identified and system modification to be undertaken at any time.

12.2 Operations Manual

- 12.2.1 The Contractor shall provide Operations Manual explaining the purpose and operation of the complete system together with its sub-systems of Equipment. The characteristics, ratings and any necessary operating limits of the Equipment and sub-systems shall be provided.
- 12.2.2 Both normal and degraded state of operations must be covered in the Manual.

12.3 Maintenance Manual

- 12.3.1 The Contractor shall provide maintenance manuals showing details of the complete Equipment and its sub-systems from a maintenance and fault-finding viewpoint, with particulars of tools for dismantling and testing, methods of assembly and disassembly, tolerances, repair techniques and all other information necessary to set up a repair and servicing program.
- 12.3.2 The manual shall also include inspection/overhaul procedure and periodicity of



various inspection/ overhaul schedules in detail including the tools, special tools/plants, and facilities required.

12.3.3 The maintenance manual shall also include an illustrated parts catalogue of all equipment and components supplied and shall contain sufficient information including Part No, description, general or specific purpose and technical specification to identify and requisition the appropriate part by maintenance staff.

12.3.4 The catalogue shall also contain illustrations to indicate the location of each replaceable item, which shall be clear and progressive with exploded views to enable parts to be identified easily by cross-reference with the alpha-numeric list.

12.4 Other information to be submitted:

12.4.1 Cable wiring schedule

12.4.2 Electrical circuit working details.

12.4.3 Troubleshooting manual

12.4.4 Drawing of body and bogie of CMV including underfloor, cabin and roof etc.

12.4.5 Maintenance Schedule along with check sheet of each equipment.

---- End of Chapter 12 ----



CHAPTER 13

13 Supply of Spares, Special Tools and Test Equipment

13.1 Spares Documentation

13.1.1 The Contractor shall submit a list of all spares of the Equipment, along with the delivery of the Equipment, which shall contain following information as a minimum:

- a) Full description of spares including a note whether it is sealed unit or an assembly or sub-assembly which can be broken down into component parts,
- b) Names, addresses, telephone numbers and other particulars of manufacturers and their local representatives, if any,
- c) Models/ part numbers,
- d) Quantity installed in the system,
- e) Shelf life, (for perishable items)
- f) Anticipated periodicity of replacement,
- g) Overall dimensions and weight including minimum packing (if any) for shelf space purposes,
- h) Normal delivery times after placement of Purchase Order.

13.1.2 The warranty period of all spares or any other item / equipment delivered shall be minimum 12 months from the date of receipt of material.

13.1.3 The Contractor shall furnish an undertaking that he has no objection whatsoever and shall not in any way deter or obstruct the Employer, its licensee or its representative from dealing directly with the Contractor's Vendors for the purchase of the spares after the Operational Acceptance of the Equipment.

13.1.4 Contractor shall obtain an undertaking from vendors, OEMs, etc. that they have no objection to deal directly with Employer for supply of spares, equipment and/or sub-systems.

13.1.5 The Contractor shall identify principal source suppliers that can supply the proprietary Spares. For non-proprietary items, the Contractor shall submit the list of alternate/ second source of suppliers during design stage.

13.2 Consumable Spares

13.2.1 The consumable spares shall include lubricants, oils, greases, sealants, filter media, gaskets, lamps, rubber items and wearable parts, etc. and such items, whose declared life is one year or less, considering use of the Equipment for at least 25 days in a month with single shift working.

13.2.2 It shall be the responsibility of the Contractor to maintain a certain defined stock of consumable spares, as per the requirement assessed and agreed jointly between the Contractor and the Project Manager, during Maintenance Service period (DLP) at the depot.

13.2.3 Stocks of spares maintained by the Contractor at the Depot will be jointly checked with Employer's Engineer every three months. Certificate by Engineer confirming availability of the Contractor's spares in Depots as per agreed list will



be a pre-requisite for release of interim payments of the Contractor. However, this condition will not be applicable during the last six months period before the expected expiry of the Contract period including the DLP/ Maintenance period.

13.3 Commissioning Spares

13.3.1 The Contractor shall submit to the Project Manager for review a list of minimum spare parts that he intends to make available during the installation, testing & commissioning period. All parts as agreed jointly between the Contractor and the Project Manager shall be stocked at the Depot for use during commissioning.

13.3.2 The Contractor shall keep on Site, under its own custody and at its own cost, throughout the installation, testing & commissioning including guarantee testing period, stocks of spare parts, to enable rapid replacement of any item found to be defective or in any way in non-conformance with the Specification.

13.4 Supply of Spares by the Contractor

13.4.1 In the event of Contractor failing to supply the spare parts in accordance with this Contract, he shall in respect of each item of spare, furnish free of cost to the Employer, the drawings, specifications, 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 its 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).

13.4.2 Under such circumstances, the Contractor shall also grant to the Employer, without payment of any royalty or charge, full right and 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.

13.4.3 The Contractor will so far as it is reasonably able to bind its 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.

---- End of Chapter 13 ----



CHAPTER 14

14 Site Management

14.1 Access to Site

14.1.1 The Contractor will be given access to the Site in accordance with Clause 10.2 of the General Conditions of Contract. The Contractor shall approach the Depot Civil Contractor for access to the Site for delivery of the Equipment/ Inspection/ Interface work.

14.2 Site Facilities

14.2.1 The Contractor will be provided, free of cost, if required by the Contractor and considered justified by the Project Manager, a total space at depot, as per the requirements decided by the Project Manager in consultation with the Contractor, for the setting up of Contractor's site office and for keeping covered stores, and for the staff working for Installation, Testing & Commissioning.

14.2.2 The Contractor shall arrange its own fabrication of covered space, furnishing, security, etc as required for fulfilment of the contractual obligations.

14.2.3 Suitable and adequate fire-fighting equipment shall be arranged and provided by the Contractor as is considered necessary.

14.2.4 The Contractor shall provide its own material handling facilities for loading/unloading of Equipment and any heavy item, at the port of arrival, for transshipment, and at the MMRC depot. The Contractor shall, however, be allowed to use any necessary Depot facilities free of charge for assembly, installation, commissioning, inspection, and repairs, subject to its availability. The Employer shall, however, not be responsible for adequacy, reliability and safety of the facilities provided to the Contractor.

14.2.5 Reasonably lit access to the areas and to rail sidings, if applicable, will be provided by the Employer. The Contractor shall be solely responsible for the security and housekeeping of the area, plant and possessions allocated to him.

14.2.6 The Contractor shall be responsible for making applications or requests to the concerned Authorities for availing of the facilities available at the Depot. The Contractor shall comply with all regulations of the utility companies and Government departments concerned.

14.3 Site Management

14.3.1 The Contractor shall:

- a) confine its use of the areas of the Site to purposes as required for the work,
- b) refrain from depositing rubbish or causing nuisance or permitting nuisance to be caused and, unless reviewed without objection by the Project Manager, depositing earth on or removing earth from areas of the site,
- c) Wherever stated, pay all rates and charges of any nature whatsoever arising out of his use of the Site and all work areas provided therein as provided under the Contract.
- d) not use any part of the Site or Works for advertising purposes except with the acceptance of the Project Manager.



- 14.3.2 The Site shall be maintained in a clean and tidy condition. Materials, including those required for Temporary Works, shall be stored in an orderly manner.
- 14.3.3 The Contractor shall provide all necessary protective clothing, safety equipment, hand tools, ladders, trestles, power supply, and replacement equipment for the staff engaged on Site.
- 14.3.4 Because of the multi-disciplinary 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 organization and co-ordination of access and occupation requirements, the Contractor shall maintain a close liaison with other Contractors.
- 14.3.5 As soon as any or all the Contractor's temporary installations are no longer required for the execution of the Works, the Contractor shall remove those facilities and ensure that the area is left free of debris, excess materials, and obstructions.

14.4 Site Safety

- 14.4.1 The Contractor shall, during installation stage, take care of the Occupational Health, Safety & Environment aspects (OHS&E) for the health and safety of his workers engaged in the Installation work. The Contractor shall be expected to follow the provisions of different statutory provisions and ensure the Health and Safety of workers and taking care of the Environment. The Contractor as well as his subcontractors shall actively pursue both at the Works and the Installation Site, the achievement of
- a) BS EN OHSAS 18001:2007- OHS Management System
 - b) ISO 14001:2004- Environmental Management System.
- 14.4.2 The Contractor shall carryout the work of unloading of CMV at Site, its installation, testing and commissioning as per the safety requirements of Chief Safety Specialist, Project Manager Office.
- 14.4.3 The Contractor shall ensure, where required, availability of a Portable First Aid Box in a fully equipped state and a trained person to give First aid at Site during the period the Contractor's personnel are on site for Installation, Testing & Commissioning work.
- 14.4.4 The Contractor shall be fully responsible for the safety of its personnel, its sub-Contractors' personnel, the public, and any persons directly or indirectly associated with the Installation Works, on or in the vicinity of the depot site for any unwanted/ unsafe act on the part of its workers.
- 14.4.5 The Contractor shall notify and submit a report to the Project Manager immediately after the occurrence of a safety incidence involving its staff or that of its sub-Contractors, or to any person at the Installation site. Reportable incidents shall include fatal accidents, major injuries (any fracture, loss of limb or part of limb, dislocation of the shoulder, hip, knee or spine, loss of sight whether temporary or permanent, penetrating injury to the eye) and dangerous occurrences (Collapse of foundation, building or lifting appliances, fire, electrical short circuit resulting in damages, any explosion, collision of any moving equipment etc).



- 14.4.6 The Contractor shall submit the report of the above reportable incidences in standard forms available with the Project Manager. The first report shall be made through SMS to the Co-ordinating Engineer of the Project Manager.
- 14.4.7 The Contractor shall also carry out his own investigation of the reportable incidences and submit the investigation report to the Project Manager. Follow up action as is considered necessary shall also be taken by the Contractor.
- 14.4.8 In the case of a reportable incidence, the Contractor shall not disturb the scene of incidence except to make the area safe or to shift the injured persons for treatment till the clearance is given by the Project Manager.
- 14.4.9 The Contractor shall deploy his persons at the Site who are competent for the work involving hazardous situations, viz. working close to 25kV Overhead Electrical system, working at height, etc. Each person deployed shall carry a Permit to Work with him issued by the Contractor. Permit to work for Electrical Work shall be issued on standard forms to be collected from the Project Manager.
- 14.4.10 All persons deployed by the Contractor shall wear suitable and sufficient Personal Protective Equipment, e.g., Safety Helmets, Safety Shoes, and where required, Protective Goggles, Safety Harnesses, etc.
- 14.4.11 The Site Engineer shall also act as the Safety Officer during the work at Site and shall be suitably trained in this work.

---- End of Chapter 14 ----



CHAPTER 15

15 Photographs and Public Relations

15.1 Progress Photographs

15.1.1 During manufacturing of the CMV, the Contractor shall furnish photographs of the manufactured CMV in its periodic reports.

15.1.2 Each photograph shall show the following information:

MMRC Contract No:

Contract Name:

Contractor:

Date of Photograph and Photograph No (Unique serial number):

Description (in brief):

15.2 Public Relations

15.2.1 The Contractor shall not provide any press release, press statement, or publish any subject related to the Project without first seeking clearance from MMRC.

15.2.2 The Contractor shall, in conjunction with the Project Manager, liaise with Public Relations Officer, MMRC on all press and public relations matters in connection with the Contract.

15.2.3 All press queries relating to the Contract received by the Contractor must be referred to MMRC for clearance, in consultation with the Project Manager.

---- End of Chapter 15 ----





**MUMBAI METRO LINE - 3
(COLABA-BANDRA-SEEPZ)**

Part 2

EMPLOYER'S REQUIREMENTS

Section VI-A

**GENERAL SPECIFICATIONS AND
APPENDICES**

APPENDICES

**Mumbai Metro Rail Corporation Ltd
MMRC Line 3 Transit Office,
Wing 'A', 'E' Block,
Bandra-Kurla Complex,
Bandra (East) Mumbai 400 051.**



APPENDIX 1- Key Dates

1 KEY DATES

The Contractor shall prepare and submit his detailed Work Program to achieve key dates of various activities on time. The Contractor shall complete the work in a phased manner by fixing priorities to different stretches of work to give access to the other interfacing Contractors as per the requirement of project from time to time and as per the key dates (milestones) indicated below:

CONTRACT KEYDATES Schedule of Key Dates- -----

Key date No.	Key Activity	Days
KD – 1	Submission of Works program, Interface Management Plan, Preliminary & Detailed Design Drawings/ documents, and vendor approval proposals and obtaining the Project Manager's 'Notice of No Objection'.	70
KD – 2	Submission of all remaining Management Plans and obtaining the Project Manager's 'No Objection' to the above.	112
KD – 3	Delivery of the CMV to MML3 Depot, Mumbai.	336
KD – 4	Installation, Testing & Commissioning, Supply of O&M Manual, Training Manual and Training of O&M Personnel of Employer.	392
KD – 5	Completion of all other obligations of the Contract under the Contract	420

Notes on Key Dates:

1. The achievement of a Key Date shall be subject to the issuing of a Notice of No Objection from the Project Manager.
2. The achievement of a Key Date shall require completion of all the works specified for achievement of the Key Date.
3. The achievement of Key Dates shall be read in conjunction with the Interface Specifications to establish access requirements for Interfacing Contractors.

Applicable rate for liquidated damages for respective CMV

- 1) If the Contractor fails to deliver as per the Key Dates within the period fixed for such delivery in the Contract or as extended from time to time, or at any time repudiates the Contract before the expiry of such period, the Employer may, without prejudice to his other rights, recover from the Contractor the Liquidated Damages which shall be 0.25% of the total value of the amounts apportioned to the respective Key Dates for each complete week of delay.
- 2) There is no maximum limit in levy of LD for delays in individual Key Dates. However, the aggregate amount of such liquidated damages shall in no event exceed 10% of the Contract price.



- 3) In case the Contractor is able to achieve KD-3, without delay on Contractor's account, all the applicable liquidated damages on KD-1 and KD-2 may be waived off and LD amount, if deducted, may be returned (without interest) to the Contractor.
- 4) In case the Contractor is able to achieve KD-4, without delay on Contractor's account, all the applicable liquidated damages on KD-1 to KD-3 may be waived off and LD amount, if deducted, may be returned (without interest) to the Contractor.

----- End of Appendix 1 -----



APPENDIX 2- Abbreviation & Definitions

TABLE 1- ABBREVIATIONS

Abbreviation	Description
AMS	Asset Management System
BIM	Building Information Modelling
BS	British Standard
CAD	Computer Aided Design and Drafting
CD	Compact Disc
CNC	Computer Numerical Control
CPM	Critical Path Method
DDC	Depot Civil GC team
EDMS	Employer's Data Management System
E&M	Electrical & Mechanical
EMC	Electro Magnetic Compatibility
EMI	Electro Magnetic Interference
ES	European Standard
FAT	Factory Acceptance Test
GC	General Consultants
GCIM	General Consultant Interface Manager (assigned by the PM)
IMP	Interface Management Plan
IP	Ingress Protection
IT	Information Technology
LAN	Local Area Network
LED	Light-Emitting Diode
NoNO	Notice of No Objection
OCC	Operational Control Center
OCS	Overhead Catenary System
OEM	Original Equipment Manufacturer
OHS&E	Operational Health, Safety & Environment
O&M	Operation and Maintenance
PDM	Precedence Diagramming Method
PM	Project Manager
QA	Quality Assurance
RS	Rolling Stock
SAT	Site Acceptance Test
SI	International System (of Measurement)
STPT	Signaling, Train Control, PSD and Telecommunication



TABLE 2- DEFINITIONS

Definition	Meaning
Access Dates	These are the dates that are to be achieved by the Interfacing Contractors and which are considered to be essential to the successful completion of the Contract to the Original planned schedule.
As-Built Drawings	These are those drawings produced by the Contractor and endorsed by it as true records of construction of the Works and which have been given a Notice of No Objection by the PM.
Design Checker	Means a suitably qualified person appointed by the Contractor to check the Design of the Works.
Factory Acceptance Tests (FAT)	Means the tests to be performed at the Contractor's Works prior to delivery to the Site to verify compliance with the Specifications.
Installation Tests	Means the tests to be performed to verify the conformity of completion of an installation to the design documents previously issued a Notice of No Objection by the PM prior to the start Installation.
Service Trial	Means the phase after completion of the Guarantee Testing and Commissioning where the training and operating procedures are validated. Service Trial form part of the Tests and Inspection to be performed under the Contract.
Guarantee Testing and Commissioning	Means those tests that demonstrate the integration of the complete system meeting the requirements of the Specification in an operating environment.
Validation	Means the process of confirmation by examination and provision of objective evidence that the application produced achieves the particular requirements specified.
Works	Means the Permanent Works or the Temporary Works, or either of them as appropriate.
Permanent Works	Means the Plant and Equipment to be supplied and installed, as well as all the Installation Services to be carried out by the Contractor under the Contract.
Temporary Works	Means the works that shall not remain on the Site after Employer's taking over of the Works.
Maintenance	Means the maintenance to be carried out in accordance with the Contractor's Maintenance Manual.
Preventive Maintenance	Means the maintenance specified by the Contractor's Maintenance Manuals to be carried out from the period of taking over of the Contract Works.

----- End of Appendix 2 -----



APPENDIX 3- Programs

3 PROGRAMS

3.1 Time-scaled Network / Bar Chart

3.1.1 All programs shall be developed by computerised Critical Path Method (CPM) using the Precedence Diagramming Method (PDM) and shall be presented in either bar chart or time- scaled network diagram format, suitably coloured to enable easy reading. All durations for the purpose of programming shall be in calendar days.

3.1.2 The coding structure shall be such that the activities can be summarised to the various levels. Each level shall be summarised and collapsed to the next level using the programming software. The Contractor shall propose essential codes and activity codes to be used for review of the Project Manager. The Project Manager may require additional activity codes subject only to restrictions imposed by the programming software. Each activity in the network shall be coded, as a minimum, with the following:

- a) Contract number, activity type, and unique identification numbers.
- b) Activity codes to indicate Unit, Segment, Stage or Phase, for e.g., design, manufacturing, delivery, installation, etc.
- c) The Contractor shall note that breakdown of system into sub-systems is essential and shall be carried out not through further coding but through activity descriptions in a consistent manner such as to allow storing. However, the Project Manager shall have the right to require the Contractor to code sub-systems, using codes approved by him, if necessary.
 - i) Area, location and location details under Activity Code – Unit.
 - ii) Cost and resources
 - iii) Cost and resources codes shall be submitted for the approval of the Project Manager. All logical and necessary relationships between activities shall be shown.

3.1.3 All key dates indicated in the Contract shall be shown. In addition to the key dates, the Contractor may require certain events that are critical to its work to be reflected in its programs. These shall be reflected as "milestones". Appropriate activity codes shall be used to distinguish "milestones" from the Key Dates.

3.1.4 Where duration for review of the Contractor's submissions is specified elsewhere in the Contract, they shall be used. Where they are not specified, a duration of 14 days for review of each submission shall be used.

3.1.5 Activity descriptions shall be brief (<48 characters) and shall convey the nature and scope of the work. Abbreviations shall be explained in the legend. Float time shall be distinguished from schedule performance.

3.1.6 The CPM Network Diagram shall be developed to permit modification to the schedule and allow for impacts on the schedule to be analysed by introduction of "what if" statements into the input data.

3.2 Time Scaled Network/Bar Chart Details

3.2.1 **Design:** The Design network/bar chart shall detail the various design,



submission and acceptance stages including approval by the Project Manager, preparation, submission and approval of drawings, manuals and all other activities related to the design.

- 3.2.2 **Manufacturing:** The manufacturing network chart shall indicate the relationship and duration of the activities necessary to procure, manufacture, assemble equipment, testing, shipping and delivery of Equipment in time to support the activities at site. It shall establish milestones for monitoring the progress of the manufacturing process. The network shall also cover activities of Sub-Contractor as appropriate, including testing.
- 3.2.3 **Testing and Commissioning:** The Factory and Site Testing and Commissioning network/ bar chart shall present the relationship and duration of those items relating to Testing and Commissioning tests including those related to other Interfacing Contractors. The network/bar chart shall present testing approach to be used, the deployment of resources in accordance with M&P delivery dates.
- 3.2.4 **Guarantee Testing:** The Guarantee Testing network/ bar chart shall indicate the activities required to verify the functioning of the Equipment in conjunction with activities of the System-wide and Civil Contractors.

----- **End of Appendix 3** -----



APPENDIX 4- Bi-Monthly Progress Report

4 Bi-monthly Progress Report

4.1 Contract Stages

4.1.1 The Contractor shall submit to the Project Manager, a Bi-monthly Progress Report. This Report shall be submitted by the end of each calendar Bi-monthly period and shall account for all work actually performed from 1st day of the last Bi-monthly period and up to end of the Bi-monthly period of the submission. It shall be submitted in a format to which the Project Manager shall have given consent, but not be limited to the topics listed in the clauses below.

4.2 Financial Status

4.2.1 A narrative review of all significant financial matters, and actions proposed or taken in respect to any outstanding matters.

4.2.2 A spread sheet indicating the status of all payments due and made.

4.2.3 A report on of the status of any outstanding claims. The report shall provide interim updated accounts of continuing claims.

4.3 Physical Progress

4.3.1 It shall describe the status of work performed, including critical items and problem areas, corrective actions taken or planned and other pertinent activities, and shall address interface issues, problems and resolutions.

4.4 Program Update

4.4.1 Program updating shall include:

- a) The Bi-monthly Program Update shall be prepared by recording actual activity completion dates and activities completed up to the end of the Bi-monthly period together with estimates of remaining duration and expected activity completion based on current progress. The Program Update shall be accompanied by an Activity Report and a Narrative Statement.
- b) Discuss Variation Order Work Items, if any.

4.5 Milestones Status

A report on the status of all Milestones due to have been achieved during the Bi-monthly period and forecasts of achievement of any missed Milestones, and those due in the next Quarterly period.

4.6 Planning and Co-Ordination

4.6.1 A summary of all planning/co-ordination activities during the Bi-monthly period and details of outstanding actions.

4.6.2 A schedule of all submissions and consents/approvals obtained/outstanding.

4.7 Areas of Concern & Critical Issues

The Contractor shall submit a review of all areas of concern and critical issues during the Bi-monthly period including appropriate details of such issues for drawing attention of the Project Manager.

----- End of Appendix 4 -----



APPENDIX 5- Interface Sheet
 Attachment A - Interface Specification Form

INTERFACE SPECIFICATION			Ref: to create	
	Contract Designation	Contractors Sequence Number	Date of Issue	
Initiating Contractor			Interface Manager Signature	
Responding Contractor			Interface Manager Signature	
Interface Specification Required for;			Response Required by;	
Reviewed by;				
Design Sections			Station Arch. / Building Services	
<u>Description of the Interface</u>				
<u>Specific Details of the Interface</u>				<u>Location</u>
<u>Drawings / Specifications Attached</u>				
Title	Drawing / Specification Ref.		Drawing Issue	
<u>Document</u>				
Document	Name	Date	Document References (if any)	
Prepared by:				



Attachment B - Confirmation of Co-ordination Form

Mumbai Metro Rail Project					
Ref No.					
CONFIRMATION OF CO-ORDINATION					
CONTRACT:			TRANSMITTAL No.:		
TITLE:					
ACTIVITY NO.:					
GENERAL DESCRIPTION:					
SIGNATURE OF INTERFACING CONTRACTORS:					
	Interfacing Contractor	Authorized Name	Signature	Date Reviewed	Comment
1					
2					
Signatures above confirm that this design document has been reviewed as part of the co-ordination process.					
<p>NOTE: Where Contractors are not in agreement with the details on this submission, they are to comment above and advise the interfacing party in question requesting accommodation of the requirement and advise the PM under separate cover and report progress in Monthly Report / Co-ordination Meetings.</p>					



Attachment N – Indicative Interface Sheets for Contract MM3-CBS-DEQ-9-03B

SL NO	Description
N1	Indicative Interface Sheet for Diesel CMV (DEQ) and Rolling Stock (RS)
N2	Indicative Interface Sheet for Diesel CMV (DEQ) and Depot Electrical & Mechanical (DEM)
N3	Indicative Interface Sheet for Diesel CMV (DEQ) and Track Work (TWK-02 & 03)
N4	Indicative interface Sheet for Signalling & Train Control, Platform Screen Doors and Telecommunication Systems (STPT) and Diesel CMV (DEQ)
N5	Indicative Interface Sheet for Common Asset Management System (CAMS) and Diesel CMV (DEQ)



INTERFACE SHEET

N1. Indicative Interface Sheet for Diesel CMV2 (9-03B) and Rolling Stock (RS)

Mumbai Metro Interface Sheet	Contract A	Diesel CMV (DEQ)	Contract B	Rolling Stock (RS)	Rev # :	
					Date:	
Approved by:	Diesel CMV2 (DEQ) (Lead Contract)		Rolling Stock (RS) (Participating Contract)		First issue:	
GC issued by:						
Checked by:						
General Interface details between the Diesel CMV (DEQ) and Rolling Stock (RS)						
Contract A (CMV2)		DESIGN STAGE		Contract B (RS)		
DEQ3B/RS-01: Shall ask and collect, from Contract B, all relevant information (coupler details, brake system details etc.) of Rolling Stock to incorporate in the design of CMV to meet with its functional requirements.			DEQ3B/RS-01: Shall give details, to Contract A, all relevant information of Rolling Stock as asked for.			
Contract A (CMV2)		CONSTRUCTION / INSTALLATION STAGE		Contract B (RS)		
Nil.			Nil			
Contract A (CMV2)		TESTING & COMMISSIONING STAGE		Contract B (RS)		
DEQ3B/RS-02: Shall conduct joint tests, with Contract B, demonstrating that the Equipment is compliant to Rolling Stock requirements.			DEQ3B/RS-02: Shall attend the joint tests with Contract A and confirm suitability of Equipment as relevant to Rolling Stock requirements during testing and commissioning.			
Contract A (CMV2)		MAINTENANCE STAGE		Contract B (RS)		



Mumbai Metro Interface Sheet	Contract A	Diesel CMV (DEQ)	Contract B	Rolling Stock (RS)	Rev # :	
					Date:	
	Nil.			Nil		



N2. Indicative Interface Sheet for Diesel CMV2 (DEQ 9-03B) and Depot Electrical & Mechanical (DEM)

Mumbai Metro Interface Sheet	Contract A	Diesel CMV (DEQ)	Contract B	Depot Electrical & Mechanical (DEM)	Rev #
					Date
Approved by :	Diesel CMV2 (DEQ 9-03B) Lead Contract		Depot Electrical & Mechanical (DEM) Participating Contract		First issue:
GC issued by :					
Checked by :					
General Interface details between the Diesel CMV2 (DEQ3B) and Depot Electrical & Mechanical (DEM)					
Contract A (DEQ3B)		DESIGN STAGE		Contract B (DEM)	
DEQ3B /DEM-01: Shall provide the electrical requirements, if any, for the CMV2.			DEQ3B /DEM-01: Shall collect the details from Contract A and provide the electrical facilities at the suitable location.		
Reference documents:			Reference documents:		
Contract A (DEQ3B)		CONSTRUCTION / INSTALLATION STAGE		Contract B (DEM)	
DEQ3B /DEM-02: Shall jointly check the availability of power requirements for CMV2 provided by Contract B.			DEQ3B /DEM-02: Shall provide the electrical requirements for CMV in Depot.		
Reference documents:			Reference documents:		
Contract A (DEQ3B)		TEST & COMMISSIONING STAGE		Contract B (DEM)	
DEQ3B /DEM-03: Contract-A shall conduct test run jointly with Contract-B			DEQ3B /DEM-03: Contract-B shall co-ordinate with Contract-A		
Reference documents:			Reference documents:		
Contract A (DEQ3B)		MAINTENANCE STAGE		Contract B (DEM)	
Nil			Nil		
Reference documents:			Reference documents:		



N3. Indicative Interface Sheet for Diesel CMV (DEQ) and Track Work (TWK-02 and TWK-03)

Mumbai Metro Interface Sheet	Contract A	Diesel CMV (DEQ)	Contract B	TWK-02 and TWK-03	Rev # :
					Date:
Approved by:	Diesel CMV (DEQ) Lead Contract		Track Work (TWK-02 and TWK-03) Participating Contract		First issue:
GC issued by:					
Checked by:					
General Interface details between Diesel CMV (DEQ) and Track Work Systems (TWK-02 and TWK-03)					
Contract A (DEQ)		DESIGN STAGE		Contract B (TWK-02 and TWK-03)	
DEQ3B/TWK-01: Shall ask and collect, from Contract B, all relevant information (track details etc.) to incorporate in the design of CMV to meet with its functional requirements.			DEQ3B/TWK-01: Shall provide to Contract A all relevant track parameters and design details concerning the track as asked for by Contract A.		
Contract A (DEQ)		CONSTRUCTION / INSTALLATION STAGE		Contract B (TWK-02 and TWK-03)	
Nil			Nil		
Contract A (DEQ)		TEST & COMMISSIONING STAGE		Contract B (TWK-02 and TWK-03)	
DEQ3B/TWK-02: Shall conduct joint tests demonstrating that CMV is perfectly adapted to the track.			DEQ3B/TWK-02: Shall provide necessary support to Contract A during the tests.		



N4. Indicative Interface Sheet for Signaling & Train Control, Platform Screen Doors & Telecommunication Systems (STPT) and Diesel CMV2 (DEQ3B)

Mumbai Metro Interface Sheet	Contract A	STPT	Contract B	DEQ	Rev # :
					Date:
Approved by:	Signalling & Train Control, Platform Screen Doors and Telecommunication Systems (STPT) Lead Contract		Diesel CMV (DEQ3B) Participating Contract		First issue:
GC issued by:					
Checked by:					
General Interface details between Signalling & Train Control, Platform Screen Doors & Telecommunication Systems (STPT) and Diesel CMV (DEQ)					
Contract A (STPT)		DESIGN STAGE		Contract B (DEQ)	
STPT/DEQ3B-01: Contract A shall determine compatible power supply equipment, cables and connectors required for Mobile Train Radio Equipment(s) in CMV by Contract B.			STPT/DEQ3B-01: Contract B shall provide CMV DC power source for mobile radio(s) to Contract A.		
Contract A (STPT)		CONSTRUCTION / INSTALLATION STAGE		Contract B (DEQ)	
STPT/DEQ3B-02: STPT shall provide and install mobile radio, power supply equipment, antenna, cables and connectors required for STPT mobile radio(s) in CMV.			STPT/DEQ3B-02: DEQ shall provide the required facilities for mobile radio (s) and coordinate with STPT for successful installation of mobile radio(s).		
Contract A (STPT)		TEST & COMMISSIONING STAGE		Contract B (DEQ)	
STPT/DEQ3B-03: Shall demonstrate working of mobile Radio in CMV			STPT/DEQ3B-03: Shall confirm working of mobile Radio in CMV.		



N5- Indicative Interface Sheet for Asset Management System (CAMS) and Diesel CMV (DEQ)

Mumbai Metro Interface Sheet	Contract A	CAMS	Contract B	Diesel CMV (DEQ)	Rev #	
					Date	
Approved by:	Common Asset Management System (CAMS) Lead Contract		Diesel CMV2 (DEQ3B) Participating Contract		First issue:	
GC issued by:						
Checked by:						
General Interface details between the Asset Management System (CAMS) and Diesel CMV2 (DEQ3B).						
Contract A (CAMS)		DESIGN STAGE			Contract B (DEQ)	
CAMS/DEQ3B-01: Shall provide main Asset Management common platform software and license /licenses to Contract B.			CAMS/DEQ3B-01: Shall ensure DEQ Asset data can be communicated with the main Common Asset Management Platform Software using compliant license/licenses with it provided by Asset Management System to fulfill the common template issued by Asset Management System.			
Contract A (CAMS)		CONSTRUCTION / INSTALLATION STAGE			Contract B (DEQ)	
AMS/DEQ3B-02: Shall provide the connectivity arrangements for Asset Management common platform Software at the design locations decided by MMRC.			AMS/DEQ3B-02: Shall agree and do the needful.			
Contract A (CAMS)		TEST & COMMISSIONING STAGE			Contract B (DEQ)	



Mumbai Metro Interface Sheet	Contract A	CAMS	Contract B	Diesel CMV (DEQ)	Rev #	
					Date	
<p>AMS/DEQ3B-03: The Contractor shall jointly test the functionality of Asset Management System Software according to the needs of Contract B.</p>			<p>AMS/DEQ3B-03: Shall agree and do the needful.</p>			



APPENDIX 6- Drafting and CAD Standards

6 DRAFTING AND CAD STANDARDS

6.1 Introduction

- 6.1.1 All submissions shall be made to the Employer's Requirement in a format reviewed without objection by the Employer's Requirement and in accordance with the requirements in the Contract.
- 6.1.2 Paper and drawing sizes shall be "A" series sheets as specified in BS 3429.
- 6.1.3 The documents shall be submitted in the following software unless otherwise stated, for the various electronic submissions required. The following software compatible for use with Intel-Windows based computers shall be used, unless otherwise stated.

Document Type	Electronic Document Format
Text Documents	MS office Professional (latest version)
Spread Sheets	MS office Professional (latest version)
Data Base Files	MS office Professional (latest version)
Presentation Files	MS office Professional (latest version)
Programs	Primavera (P6) /M S Project (latest version)
AutoCAD Graphics	AutoCAD 2016 OR latest
Photographic	Adobe Photoshop CC (2015.5) OR latest
CADD Drawings	AutoCAD 2016 OR latest

- 6.1.4 Media for Electronic File Submission: One copy shall be submitted, unless otherwise stated, in .pdf on CD-ROM / DVD / USB Stick / Pen Drive.

6.1.5 Internet File Formats/Standards

- 6.1.5.1 All the data formats or standards must be supported by Microsoft Internet Explorer or other web browser (latest version) running on latest version of Windows.
- 6.1.5.2 The following lists the file types and the corresponding data formats to be used on the Internet. The Contractor shall comply with them unless prior consent is obtained from the Employer's Requirement for a different Data format:

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)
Video	Window video (.avi)
Sound	Wave file (.wav)

The hard copy of all documents shall be the Contractual copy.



6.2 Building Information Modelling (BIM)

- 6.2.1 "The Civil Contractor shall provide the BIM model of Civil works to the System Contractors for their reference, review, updates and further 3D modelling of the Systems". The process may include regular meetings where both the BIM Coordinators from all parties and relevant design decision making. The Project Manager may attend when necessary.
- 6.2.2 Upon award of the system Contract, the Design Model developed up to Tender award by the civil Contractor of Civil models shall be provided to successful system contractor(s) for reference and further 3D modelling of their respective contract scope.
- 6.2.3 The BIM Model of the Equipment shall be well coordinated for foundation, trenches, cable ducts and any other parts of civil model to be provided by the Depot Civil Contractor.
- 6.2.4 Wherever Civil & Architecture Model of the Depot Building is not available, the Contractor shall submit the BIM model of the Equipment in Revit, after finalization of the design, to the Project Manager.
- 6.2.5 Asset information of the Equipment to be provided as per Clause 4.8, Chapter 4, Section VI-A, Part 2 of the RFP.

6.3 General Requirements

6.3.1 General

- a) The Contractor shall adopt a title block similar to that used in the Drawings for all drawings prepared under the Contract.
- b) Each drawing shall be uniquely referenced by a drawing number and shall define both the current status and revision of the drawing.
- c) The current status of each drawing shall be clearly defined by the use of a single letter code as follows:
- P - Preliminary Design Drawing
 - D - Detailed Design Drawing
 - B - As Built Drawing

6.3.2 Types of Drawing

- a) "Design drawings" mean Preliminary or Detailed Design drawings.
- b) "As-built drawings" show the Works exactly as constructed or installed. They are usually prepared by amending the working drawings to take in to account changes necessitated by site conditions and described in Site drawings. These drawings shall be completed on a regular basis as the works progress and shall not be left until completion of the entire works.

----- End of Appendix 6 -----



APPENDIX 7- List of Deliverables

7 Schedule of Items to be submitted by Contractor:

This Appendix of Part 2, Section VI-A compiles the principal documents to be submitted to and obtained 'Notice of No Objection' from the Project Manager within the timelines shown below. This list is not exhaustive, and the Contractor is reminded to satisfy itself of the requirements for all submissions whether they are included in this Appendix or not.

Sr No [Col 1]	Item [Col 2]	Clause [Col 3]	Timeline for Submission/ Finalization [Col 4]
1	Detailed Works Program	2.2	Within 21/42 days of the Effective Date
2	Interface Management Plan	3.3	Within 21/42 days of the Effective Date
3	Preliminary Design Drawings & Documents.	3.4	Within 28/49 days of the Effective Date
4	Detailed Design Drawings	3.4	Within 42/70 days of the Effective Date
5	Design Submission	3.4	Within 42/70 days of the Effective Date
6	Project Implementation Plan	3.5	Within 42/112 days of the Effective Date
7	Vendor Approvals	2.6 of Section III	Within 21/56 days of the Effective Date
8	Quality Plan	3.7	Within 56/112 days of the Effective Date
9	RAMS Plan	3.8	Within 56/112 days of the Effective Date
10	Training Plan	3.6	Within 56/112 days of the Effective Date
11	Operation and Maintenance Manual	3.9	Within 30 days before delivery of the Equipment
12	Training Manual	Chapter 11	Within 30 days before delivery of the Equipment
13	As Built/ Manufactured Drawings	5.7	Within 14 days after delivery of Equipment
14	Spare parts Catalogue	13	Within 14 days after delivery of Equipment.
15	Bi-Monthly Progress Report	2.9	Within 10 days after the end of Bi-monthly Period
16	Monthly Interface Report		Within 10 days after the end of Monthly Period

Note: The Contractor shall submit the first draft of the above documents 30-60 days before the final date of submission indicated in Col 4.

----- End of Appendix 7 -----



APPENDIX 8- Vendor Approval Proposal

Check List for Vendor/ Sub-contractor approval.

Sr No	Description	Remarks
A	General	
1	Contract No	
2	Name of Work	
3	Name of Contractor	
B	Vendor Details	
1	Product/ Work details	
2	Name of the proposed Vendor / sub-contractor	
3	Address with contact details of the proposed Vendor / Sub-contractor	
4	Attach Company profile	
5	Date of incorporation of the Company	
6	Experience of the proposed Vendor/ Sub-contractor for the proposed scope of work	
7	Since when the proposed vendor's works have been used in the Equipment under procurement?	
8	Is there any deviation from the Contract conditions/ specifications?	
9	Quality accreditation/ certification of the work of proposed Vendor/ Sub-contractor (Attach Certificate)	
10	Does the proposed vendor/ Sub-contractor have required testing facilities at its works?	
C	Confirmation	
1	The vendor is proven for the work undertaken. (Enclose details of his experience)	
2	The work will be compatible with the main Equipment under the Contract.	
3	The proposed work complies with the Employer's requirements and the conditions of contract.	
All the statements, information and answers given above are true and no information has been suppressed. In case any information being found incorrect or misleading, MMRC will be at liberty to take suitable action as considered appropriate.		
Date:		
Place:		Name & Signature of the Authorized signatory of the Main contractor with company seal



BIDDING DOCUMENTS



MUMBAI METRO LINE 3 (COLABA-BANDRA-SEEPZ)

CONTRACT MM3-CBS-DEQ-9-03B

Design, Manufacture, Supply, Installation, Testing & Commissioning
of Catenary Maintenance Vehicle
for Project "Mumbai Metro Line-3"

Part 2

Employer's Requirements

Section VI-B

Technical Specifications

September – 2023

**Mumbai Metro Rail Corporation Ltd
MMRCL Line 3 Transit Office,
Wing A, Block E,
Bandra-Kurla Complex,
Bandra (East), Mumbai- 400 051, India.**



Bidding Documents

Composition of Documents

Part 1	Bidding Procedure
Section I	Instructions to Bidders
Section II	Bid Data Sheet
Section III	Evaluation and Qualification Criteria
Section IV-A	Bidding Forms
Section IV-B	Pricing Document
Section V	Eligible Source Countries of Japanese ODA Loans
Part 2	Employer's Requirements
Section VI-A	Employers Requirements – General Specifications
Section VI-B	Employer's Requirements – Technical Specifications
Part 3	Conditions of Contract and Contract Forms
Section VII	General Conditions of Contract (GC)
Section VIII	Particular Conditions of Contract (PC)brak
Section IX	Contract Forms
Part 4	Drawings
Section X	Drawings



Abbreviations

Abbreviation	Description
BS EN	British Standard European Norm
CMV	Catenary Maintenance Vehicle
dB	Decibels
DLP	Defect Liability Period
DIN EN	Deutsches Institut für Normung
E&M	Electrical & Mechanical
EN	European Standards
FAT	Factory Acceptance Test
GA	General Arrangement
IP	Ingress Protection Code
IS	Indian Standards
KE	Kinematic Envelope
MMRC	Mumbai Metro Rail Corporation
MTBF	Mean Time between Failures
MTTR	Mean Time to Failures
NoNO	Notice of No Objection
OCS	Over Head Catenary System
PLC	Programmable Logic Controller
SS	Stainless Steel
STPT	Signalling & Train Control, Platform Screen Doors and Telecommunication System
SWL	Safe Working Load
SoD	Schedule of Dimensions
TTR	Time to Repair
UTO	Unattended Train Operation
VDU	Visual Display Unit



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Technical Specifications

1. General Description of the Works

- (a) The Works shall comprise, but not limited to, the Design, Manufacture, Supply, Installation, Testing & Commissioning of one (01) No. of 8-wheeler Catenary Maintenance Vehicle (named hereinafter as CMV), to be located at Metro Depot of Mumbai Metro Line 3 Project.
- (b) The supply shall include all equipment and accessories even if not particularly mentioned but are considered necessary for satisfactory completion of the Work to meet with the specified operating conditions.

1.1 Project and Permanent Works

- (a) The Mumbai Metro line 3 comprises of 33.6 Km long underground metro rail with 26 underground and one at-grade stations. The traction system will be 25 KV single phase, 50Hz, AC overhead catenary system. The track will be of Standard Gauge (1435 mm) with axle load capacity of 17 Tons.
- (b) There will be one depot at one end of Line 3 to stable, maintain and despatch the CMV and the trains. Line 3 will be provided with Communication-based Train Control signalling system. The system is designed for GoA4 level Unattended Train Operations (UTO).
- (c) The Rolling Stock will be of 3.2 mts. wide air-conditioned cars. The metro trains, of 8-car configuration (DM+T+M+M+M+M+T+DM), are capable of sustaining a maximum service speed of 85 KMPH with a permissible speed of 95 KMPH.

1.2 Design Responsibility

The Contractor shall be responsible for the design of the permanent Works, which shall include but not be limited to the following-

- (a) The development of the design shall be carried out in conjunction with the information contained in the Drawings and shall be in accordance with the Employer's Requirements set out in the Contract. **The Contractor shall obtain design approval from the Project Manager before starting the manufacturing of the CMV to be supplied under the Contract.**
- (b) The Contractor shall be responsible for the development and completion of the design of any other items of the Works as stated in the Contract, including, without limitation, the updating and amendment of the Drawings from time to time.
- (c) The Contractor, coordinating with the Project Manager and Interfacing Contractors on all matters relating to design and documentation, shall retain full responsibility for managing such design and for the maintenance of all documentation associated with the design process.
- (d) The Contractor shall determine the appropriate materials, site conditions and installation criteria before adopting the design of the CMV.
- (e) The Contractor shall ensure that the information contained in the submissions has been coordinated with the overall requirements of the Works and the works of the Interfacing Contractors.



- (f) The information that is extracted from the Drawings and adopted by the Contractor in his design shall become the Contractor's design for which neither the Employer nor the Project Manager shall be responsible.
- (g) The Contractor's designs are required to be submitted to Project Manager for Notice of No Objection (NoNO). The Contractor shall make all due allowances for the requirements of the Project Manager's consent process in the Works Programme and in the timing of the Works.
- (h) Responsibility for the Contractor's design proposals submitted to the Project Manager shall remain with the Contractor who must provide sufficient resources to deal with subsequent questions, alterations etc. requested by the Employer. All communications with the Employer whether written or oral, must be copied/ recorded to the Project Manager.
- (i) The CMV shall be designed for trouble free working considering 15% overload factor.
- (j) The CMV shall be designed for more than 30-year design life for base frame and structural components as well as more than 15-year design life for mechanism, driving components, and other major components of the CMV. No major structural repairs and major component replacement shall normally be required during the respective design life.
- (k) All steel used by the Contractor shall be established to have adequate corrosion resistance.

1.3 General Design Requirements:

The following general requirements on Equipment design shall apply to all equipment:

- (a) The CMV shall be designed to suit the Track and SOD of the Line to be provided in the Project. The relevant tentative parameters of Track are given in Table-1 below. The Contractor shall reconfirm the required parameters from the Interfacing Contractors before finalization of the design of the CMV.

TABLE-1: TENTATIVE TRACK PARAMETERS

Sr No	Track Parameters:	
1	Gauge	1435 mm
2	Max Axle load	17 tons
3	Alignment and SOD	As per details given in Sec X, Part 4.

- (b) Standards & Codes of Practice: Work related to the production of the CMV shall comply with the relevant Indian Standards or European Standards, Codes of Practice and latest Statutory Requirements of India, as given in Table 2 below.

Table 2- List of Standards & Codes of Practice

Sr No	Standard	Description
1	BS EN ISO 4413:2010	Hydraulic fluid power. General rules and safety requirements for systems



2	IS 8623/1977	Factory built assembly switch gear and control gear
3	IS 4460/1967	Specifications for gears
4	IS 3028	Sound Level
5	ISO 1217	Displacement compressors- Acceptance tests-09/1996.
6	ISO 1711	Assembly tools for screws and nuts - Technical Specification - Hand operated wrenches and sockets
7	BS 5378	Safety colours and safety signs
8	BS EN 287	Approval testing of welders for fusion welding.
9	BSEN 288	Specification and approval of welding procedures for metallic materials
10	BS 5304	Code of practice for safety of machinery
11	BS 5395	Stairs, ladders and walkways
12	BS 5950	Structural use of steelwork in building
13	BSEN 60073	Specification for coding of indicating devices and actuators by colours and supplementary means
14	EN 60204	Electrical equipment
15	BSEN 60529	Specification for degrees of protection provided by enclosures (IP code)
15	EN 954-1	Safety for Control System
16	IS 325	Electric Motor
17	ISO 9001-3:1991	Guideline for the Application of ISO-9001 to the Development, Supply and Maintenance of Software.

- (c) The CMV shall be designed and/or selected to allow intermittent operation without over stressing, damaging or interfering in any way whatsoever with other equipment in the Depot.
- (d) The Contractor shall, to the extent that he is responsible for the design or for the selection of components, recognize and implement all safety requirements and ensure that the design and performance of the equipment are compatible with the appropriate international safety standards and ambient conditions specified.

1.4 Protection Features of CMV

The Contractor shall design the CMV to ensure the following Protection and Safety features in the CMV:

- (a) CMV shall be "fail-safe" and "overload protected". The CMV shall incorporate all necessary safety devices to protect the equipment, operators, and all other people and things in the vicinity of the CMV. No failure of the CMV shall cause or give rise to any damage or catastrophe of any nature whatsoever.
- (b) The electrical components, control panel and Switch Boards if applicable shall have IP 56 for equipment inside the enclosed space and IP 66 protection level for equipment in the area open to environment.
- (c) Moving parts of the CMV shall be efficiently lubricated to ensure quiet operation as well as durable and reliable life. Lubrication points shall be clearly identified for easy replenishment with minimum removal of other CMV components.



- (d) CMV design shall take into account considerations of fire protection, minimum maintenance requirements and ease of access for cleaning, routine maintenance and general disassembly.
- (e) The CMV shall have the provision of following Protection Features:
 - i) Alarm/ indication for low fuel.
 - ii) Protection against low oil level in hydraulic system.
 - iii) Provision of auto parking brake.
 - iv) Provision of dead man switch.
 - v) No traction with parking brakes on.
- (f) The engine shall give audible and visual alarms to the driver in the cab in the event of any of the following and it shall automatically shut down when the conditions are above the pre decided levels.
 - i) engine over-speed
 - ii) low engine lubrication oil pressure
 - iii) high cooling water temperature
 - iv) high transmission oil temperature
 - v) air filter clogging.
- (g) The CMV body shall be electrically bonded to rail potential.

1.5 Safety Features of CMV:

The Contractor shall also identify all safety aspects related to the use, operation, maintenance and storage of the CMV including, but not limited to, the following aspects (as applicable) for its high safety performance and specify the actions to be taken in each case of failure:

- (a) Uncontrolled Equipment functions,
- (b) Fire hazard elimination and containment,
- (c) Failure of hydraulic, electric or pneumatic systems (whatever is applicable),
- (d) Electrical earthing issues,
- (e) Electrocutation (where applicable),
- (f) Safety instructions and control measures for hazardous situations,
- (g) Working in confined spaces,
- (h) Any other safety aspect.

1.6 Use of drawings and data

- (a) All data in concern with the rolling stock and other systems written in this specification is for reference purposes only and is required to be confirmed before the design stage.
- (b) The compatibility of the CMV with the rolling stock characteristics and other systems is the responsibility of the Contractor and he shall obtain the required data/ documents from the Interfacing Contractors.
- (c) The drawings included in RFP define the operating conditions and are provided for indicative purpose only. These may be adapted by the Contractor only after consultation with the Project Manager.

1.7 Finish and Painting

- (a) **Surface Treatment:**



- (i) The surface treatment of the CMV shall be suitable for the working environment under the climatic conditions of Mumbai.
- (ii) External surfaces shall be subjected to brushing, degreasing and sand/ shot/ grit blasting. Thereafter a coat of anti-corrosion paint shall be applied. The thickness of this coat after drying shall not be less than 60 microns.
- (iii) Hollow parts shall be treated prior to assembly.

(b) Painting:

- (i) External and related parts shall be, after the surface treatment, given two coats of polyurethane lacquer with a dry unit thickness of at least 60 microns. The second coat shall be applied over the first coat when it is approximately half dry. The Contractor may use better solutions of latest technology with NoNO from the Project Manager.
- (ii) The Contractor shall touch up at site any paint as may be necessary.
- (iii) The paint colour scheme shall match the general colour aesthetics of Mumbai Metro Line 3 Project and shall be submitted to the Project Manager for his notice of No Objection.
- (iv) All rubbing parts or those to remain polished shall be covered with a coating designed to protect them from oxidation until such time as the CMV enters the service.

(c) Identification:

- (i) A plate indicating the following shall be fixed on the CMV at a suitable location.
 - Name of manufacturer
 - Important technical particulars
 - Year of Manufacture
 - Serial Number
 - A logo of MMRC as per the design and details of MMRC shall be affixed at suitable location(s) on the CMV.
- (ii) The Contractor shall submit the proposed scheme of identification to the Project Manager for his NoNO.

1.8 Training

- (a) The Contractor shall provide comprehensive training on Operation & Maintenance of the CMV to the Employer's staff to enable its safe and efficient operation.
- (b) The Contractor shall arrange to impart training on Operations & Maintenance of CMV to Employer's staff up to 6 persons for a minimum duration of 48 hours (@ 8 hours per day) at Mumbai Metro Line 3 Depot.

1.9 Noise Level:

The noise level of the CMV during its operation shall be as per the standard international norms. Minor variation to above limits is acceptable on the discretion of Employer.

1.10 Major Items of Supply from Sub-Contractors/Manufacturers:



The Contractor shall, in respect of the major bought items and sub-contracted services, as indicated below, propose the sub-contractors/ vendors/ manufacturers of these items/ services during design stage through Vendor Approval Form given in Appendix 8 of section VI-A, General Specifications, for Project Manager's Notice of No Objection. The vendors/ sub-contractors shall have adequate experience and shall have proved their performance in the past.

The following are the major items of supply or services in the CMV:

- (a) Wheel set
- (b) Bogie
- (c) Diesel Engine
- (d) Transmission System
- (e) Crane
- (f) Lifting & Swivelling Platform
- (g) Brakes
- (h) Diesel generating system.
- (i) Pantograph.
- (j) Any other item as decided during the design stage.

1.11 Functional Guarantees- Reliability, Availability, Maintainability

(a) General

- (i) The collection of data with respect to functional guarantees shall commence from the time of issuance of Operational Acceptance Certificate.
- (ii) The Response time to attend to the breakdowns shall be maximum 48 hours. In case where the Response time ends between 2200 hrs to 0800 hrs next day, the same shall be treated to have been extended up to 0800 hrs next day.
- (iii) The Contractor shall give remote guidance to the Employer's maintenance staff for checking and attending to minor defects where feasible in consultation with the Employer's Representative.

(b) Availability

The CMV is expected to meet the RAMS target of 96% availability (maximum 15 days non-availability in a year subject to maximum of 4 days in any quarter) on Contractor's account i.e., poor design, workmanship, installation, and maintenance. The figures of availability shall be calculated from the date of operational acceptance of the CMV excluding the downtime planned for Preventive Maintenance Services. The figures of availability shall be maintained for each quarterly period and on a yearly period (each commencing from the date of Operational acceptance).

(c) Reporting of Failures:

Complaints can be lodged by the Employer's representative on phone, fax, e-mail, SMS, WhatsApp message or per bearer at contact details given by the Contractor. The responsibility to keep the failure reporting contact details current shall rest with the Contractor.

(d) Calculations of Availability:

Total CMV Down Time (in days): A

CMV Down Time for preventive maintenance during the quarter (in days): B



Net down time for the plant (in days): A - B = C

100% Availability for the quarter (in days): D

Actual availability (in days): D-C = E

CMV Availability (in %) = $\frac{E}{D} \times 100$

(e) Penalties:

A penalty of 1% of the quarterly contracted amount of payment for maintenance during DLP may be applicable per day of the downtime in excess of the maximum allowed downtime during the quarter within the maximum allowed downtime per year if the downtime is considered by the Employer on Contractor's account. The amount of penalty may be raised to 2% of the quarterly invoice value per day of the downtime after the cumulative downtime from the date of Operational Acceptance reaches twice the maximum allowed downtime for the year. In addition, pro-rata deduction of maintenance charges for the days the Equipment is not available for service shall be made from the quarterly contracted amount of AMC for the period penalty is applied.

2. Technical Particulars- CMV

2.1 Maintenance Vehicle

The Contractor shall furnish fully equipped CMV designed for operation in Mumbai Metro Line 3 Project. The CMV shall be suitable for the main line, underground, elevated, at grade and depot area, the general characteristics of these are given in Table below:

Characteristic of the section

Item: Unit	Main Line in tunnel	Depot & Main line at level
Track type	Ballast less	Ballasted
Track rail	UIC 60	UIC 60
Maximum cant	110 mm (S.G.)	---

2.2 Indicative Characteristics of The CMV Are Given as Under:

- (a) The vehicle shall be dimensioned to meet the requirement of Kinematic profile of MMRC system.
- (b) The vehicle shall be able to move bi-directionally at the same regular speed.
- (c) The vehicle shall be able to operate at full speed without breaching the Kinematic profile fixed for the line.
- (d) The vehicle shall be powered by adequately rated water-cooled diesel engine to meet all requirements for its operation.

2.3 Scope of Work of CMV

- (a) The Works shall comprise (but not limited to) the design, manufacture, inspection, testing, transportation, delivery, installation, testing & commissioning of 1 no of 8-Wheeler Catenary Maintenance Vehicle for operation on Standard Gauge (1435 mm) electrified (25 kV AC) route of Mumbai Metro Line 3.
- (b) The Car shall be used for periodical inspection, patrolling and maintenance of traction Overhead Catenary System (OCS). It shall also be used for attending sites of break-down for restoration of damaged OCS.



- (c) It shall be a self-propelled vehicle capable of moving bi-directionally at a maximum speed of 60 kmph on the Mumbai Metro Line 3.
- (d) It shall be capable to haul an 18 m. long well wagon with a gross load of 60 tons up to a speed of 25 kmph on the Mumbai Metro Line 3.
- (e) It shall be capable to stop, start and haul a wagon with gross load of 60 tons on the ramp of the tunnel having 4% gradient.
- (f) It shall be provided with weatherproof AC cab with full visibility for bi-directional working.
- (g) It shall be provided with standard operational needs for bi-directional operation, i.e., warning lights, head lights and automatic couplers (with electrical head) on both ends matching the same provided on Metro trains of MMRC System. The details of Coupler are provided in Section X.
- (h) The vehicle shall be equipped with air-brake system acting on all wheels with emergency and parking brakes and all safety devices necessary to provide a safe working environment, including temporary grounding devices.
- (i) The vehicle shall be provided with all necessary tools and accessories to make them complete operational units.
- (j) The scope of supply shall include all accessories to make the CMV fully functional, first fill of oil/ grease/ fuel, with sufficient quantity of lubricants for commissioning, and a set of special tools and test equipment for CMV.
- (k) The Contractor shall associate in the installation of Mobile Train Radio Equipment on board as per the details given in this Specifications (Clause No. 3.20) and in interface with STPT (Signalling & Telecom) Contractor.
- (l) The Contractor shall fulfil the IT requirements & develop BIM model as per clause 2.3.3 (c), Chapter 2, and Clause 6.2 of Appendix 6, Section VI-A, Part 2.
- (m) The Contractor shall submit RAMS Plan in accordance with Clause 3.7, Chapter 3, Section VI-A, Part 2.
- (n) Supply of resources, materials, tools, plant and manpower for delivery, unloading at Site, testing, commissioning and Guarantee testing of the CMV.
- (o) Submission of required documents and certificates for speed and safety certification with RDSO and CMRS before commencement of the Defects Liability Period. MMRC shall take necessary action for certification of CMV from RDSO. The Contractor shall coordinate with the Employer for all technical clarifications and shall provide all assistance in getting the certifications from the statutory authorities.
- (p) The Contractor shall carryout maintenance of CMV during DLP of 24 months.
- (q) The supply of the vehicle shall include DLP Spares (consumables and spare parts) adequate for 2 years of operation and maintenance during the DLP Period as considered by the OEM. The cost of DLP spares quoted in the Bid shall be included in the total Contract Price of the CMV. In case the supplies fall short of the requirements, additional supplies required to meet with the shortfall shall be made free of cost by the Contractor.



- (r) The contractor shall follow the Schedule of dimension of MMRC of latest version. The Contractor shall keep the dimensions within the kinematic profile of the Metro car given in Section X.

3. Technical Particulars:

3.1 GENERAL

The Vehicle shall be self-propelled with a lifting platform and Crane with interchangeable basket which can carry maintenance personnel for Overhead Catenary System erection and maintenance. In addition to this, crane shall be provided with interchangeable basket to lift/ remove heavy traction equipment at site. The Crane with hook should be capable of lifting/ removing a minimum of 1 ton weight from a distance of 5 meters and interchangeable basket should be capable of carrying 500 Kg.

3.1.1 Dimensional and Operating Requirement

The vehicle shall be designed for use on Mumbai Metro Line 3 corridor having following parameters: -

a)	Track Gauge	1435 mm
b)	Minimum radius of curve	120 mm for main line and 100 mm for Depot
c)	Maximum super elevation	120 mm
d)	Maximum moving dimensions (With panto, platform in lowered condition)	as per the Kinematic profile and SOD
e)	Maximum gradient	4%
f)	Maximum height of CMV (With panto, platform in lowered condition)	3845mm
g)	Maximum Axle load	17 tons
h)	Maximum running speed	60 kmph
i)	Speed with swivelling platform in raised condition	10 kmph
j)	Pay load	Min. 14 tons
k)	Period of continuous running at 60 kmph on generally tangent track	5 h
l)	Performance in monsoon and rainy conditions	Unrestricted

The disposition of equipment & storage space shall be such as to ensure equal axle loads. Design shall be such as to afford easy inspection and maintenance. Guiding principle in selection of assemblies should be the easy availability of wearing components.

3.1.2 Driving Cab:

- (a) The car shall be provided with driving cab at both ends. The driver's cab shall be of all welded construction with roof and sides adequately stiffened to prevent deflection and rattling. The entire roof shall have double panelling with heat insulation in between and shall be waterproof against heavy rain fall. The driving cabs shall have an independent entry from outside of the car on both sides.



- (b) Driving cabs shall be provided with complete operating and driving control and dashboard. The general layout and arrangement of equipment in driver's cab shall follow UIC CODEX 651 with respect to dimensions, safety features, furnishing, lighting, ventilation, noise level, field of view, driver's desk, seat etc.
- (c) Spotlights shall be provided at suitable locations. The cab shall be so arranged as to afford the driver good vision for operation. All controls, brake handle, hand brake / parking brake, indication lamps / meters shall be within the easy access and view of the driver. The cab shall be provided with control equipment and instruments/ gauges.
- (d) Only one cab shall be active at a time with automatic BP changing from active cab.
- (e) Speed Indicator/ Recorder: Speed indicator and recording equipment with software of up to minimum 80 km/h range, an axle box mounted having opto-electronic speed sensor should be provided.
- (f) The cab of the car shall be fitted with horns for both end driving of about 120-125 dB with different tone which should sound in harmony when blown together. They shall be operated at 3 to 8 kg/cm² pressure and be of sufficient size and intensity so that they are audible from a distance of 1 km. They shall be controlled by a valve provided on driver's control stand.
- (g) Two fixed look-out glasses of uniform size shall be provided in the end wall of driver's compartment, and these shall be of glazed with clear, colourless, safety glass of minimum 6.3 mm thickness. The glass windows shall be shattering proof, protected with expanded metal or BRC wire mesh (having least obstruction to visibility). The wind shield shall extend up to the ceiling level so as to give clear view of overhead equipment.
- (h) Fixed sun-visors of approved design shall be provided outside the glazed windows, and a pneumatic type of screen wiper with a long handle for manual operation shall be provided on each of the two lookout windows.
- (i) Driver's seat shall be ergonomically designed. Adequate leg space shall be provided for the driver when he is seated.
- (j) Sitting space in the driving cabs for minimum 4 persons in addition to the driver shall be provided. For this purpose, a foldable cushion sheet shall be provided. The storage layout and sitting arrangement inside the cab should be submitted to project Manager for his NoNO. The cab should be so designed that it has adequate space for personal and equipment.
- (k) All controls, speedometer, brake handle, hand brake, Vigilance control device / Dead man's device, switch for horn and indication lamps/ meters shall be within easy access and view of the driver and shall be separate for each cab.
- (l) 2 nos., 220 V sockets for hand signals should be provided in each cab. OHE Voltage sensing device shall be provided in both the cabs.
- (m) Flasher lights, search lights, marker & taillights should be provided at both ends of the cab.



- (n) The cab shall be equipped with ceiling light and fans. Full width, splinter proof glass wind shield protected with expanded metal or BRC wire mesh (having least obstruction to visibility). The wind shield shall extend up to the ceiling level so as to give clear view of overhead equipment. Two points for mobile charging (220V) shall be provided in driver's cab.
- (o) Inter Communication facility shall be provided for communication between cabs and working platform through hand free sets with its own battery.
- (p) Both the cabs shall be provided with 10-inch TFT monitor connected with outdoor night vision camera to monitor pantograph and the activities of the Lifting platform and Crane.
- (q) During the reverse movement of CMV to view the obstruction at rear side, CCTV camera and display monitor at the cab of the opposite end may be provided. The switching on of rear side headlight should be interlocked with reverse movement.

3.1.3 Pantograph:

- (a) The car shall be provided with an easily removable Dummy type pantograph of the make and model used in MMRC rolling stock of MML3.
- (b) The pantograph shall be without foot insulators & over one of the axles. The panto-pan of the Pantograph shall be similar to that of MMRC rolling stock. Care shall be taken that panto does not foul with another vehicle when attached on the panto side.
- (c) Height and stagger gauge of approved design shall also be provided. The pantograph pan shall be solidly earthed by two distinct and separate earths. It shall be provided with a proper arrangement to keep it locked down when not in use. The pantograph is not meant for energizing.
- (d) For detailed drawings & design regarding pantograph and Panto-pan of MMRC Rolling stock, the contractor shall interface with Rolling Stock Contractor to confirm the design before manufacturing of the CMV.

3.1.4 Equipment to be provided in CMV.

- (a) The vehicle has to be fitted with following equipment by the contractor:
 - (i) One hydraulic Crane having capacity of 1 ton load at a distance of 5 meters with interchangeable bucket suitable for 2 persons with their tools, with a capacity of maximum of 500Kg. Details of the Crane and bucket are given in para 3.1.11.
 - (ii) The platform shall be of lifting and swivelling type. Details of the lifting platform are given in para 3.1.12. Suitable space and arrangements for keeping and carrying Catenary and Contact Wire drum shall be made for maintenance purpose.
 - (iii) One silent type generating set of adequate power rating with acoustic enclosure of minimum 40 KVA for lighting/ general utility shall be provided. The DG set should provide three-phase as well as single-phase supply.
 - (iv) Compressor for the line tools with adequate delivery capacity of say, 1.5 cum/ min at 10 to 11 kgs/cm² output capacity shall be provided.
- (b) Besides above, platform must be fitted with 2 earthing rods connected to the main frame of the vehicle and to the rails. The platform shall be fitted with sockets for



electrical tools (5 kW) for lighting and two search lights. A guiding device during unrolling operation of the platform shall be provided.

- (c) In addition to above the vehicle shall also have:
- (i) Earmarked space for easy loading, unloading and keeping a dry-type transformer and at least four nos. OHE Masts/ structures (in two-above-two formations). Dry-type transformer is of weight 7550 kg and Dimensions 2490 X 1200 X 2531 mm (without enclosure) and Masts are of size 9.5 meter long and 300mm X 300mm width.
 - (ii) Safety collapsible railing or any other safety measures must be provided so as to ensure safety of the staff in open area of the vehicle while the vehicle is in motion.
 - (iii) Free space for carrying other tools and equipment required for maintenance.
 - (iv) Enough space to accommodate safely and adequately guarded 10-12 staff members in the open area of vehicle while the vehicle is in motion.

3.1.5 Body shell and Under Frame

The main structural frame has to be strong and sturdy, made of reinforced steel rolled sections folded plates or pressed sheets with front and rear head stocks fitted with Rolling Stock Automatic Coupler (with electrical head) to be provided. Necessary interface with Rolling Stock Contractor shall be done for coupler arrangement.

3.1.6 Engine and Transmission

The Engine & Transmission assembly shall preferably be from a single manufacturer supplied as integrated arrangement.

3.1.7 Engine

The diesel engine must ensure the following:

- (a) Exhaust fumes low pollution (conforming to Bharat Stage BS-III B, or equivalent or better)
- (b) Should be able to operate in sandy and dusty atmosphere.
- (c) Water Cooled to meet temperature and dust prevailing in Mumbai.
- (d) The power will be at least 2 x 340 HP minimum.
- (e) Electric equipment will be 24 V DC.
- (f) Fuel tank will be about 600 litres minimum. The capacity of fuel tank shall be commensurate with engine capacity sufficient for vehicle running up to 6 hours without refilling.
- (g) The engine shall be capable of starting and hauling the vehicle in fully loaded condition with the trailing load (maximum 60 tons) over the route of Mumbai Metro Line 3. The contractor has to submit design calculation to meet these criteria.
- (h) The make of engine shall be of a proven one for similar applications and documentary support shall be given for the same. The vendor of the engine and its design shall be submitted for approval of MMRC.
- (i) It is desirable that speed governor may be provided to limit the vehicle speed at 25 kmph during regular use. However, a provision may also be provided to run the vehicle at maximum speed when needed.

3.1.8 Transmission



The vehicle must be equipped with hydraulic transmission:

- (a) Hydraulic transmission for running up to 60 km/h.
- (b) Hydrostatic transmission up to 10 km/h for moving during maintenance, device to disengage the hydro-mechanic transmission when hydrostatic transmission is in operation.
- (c) The make of transmission shall be a proven one for similar applications and documentary support shall be given for the same.
- (d) The vendor of the transmission and its design shall be submitted for approval of MMRC.

3.1.9 Braking Systems

- (a) The vehicle must be equipped with proven compressed air brake including: -
 - i) Automatic brake
 - ii) Direct brake
 - iii) Emergency brake
 - iv) Parking brake acting on the two axles actuated by an electrical signal.
- (b) The parking brakes shall be capable of stabling the vehicle in steepest slope on MMRC network.
- (c) It shall also be possible to couple the vehicle with Metro Train if needed to be hauled, with continuous braking. The Contractor shall interface with Rolling Stock Contractor for braking system.

3.1.10 Lighting

- (a) External lighting includes:
 - i) Two central headlights fixed on the top of the vehicle.
 - ii) Two orientable search lights fixed on each side wall of the cab.
 - iii) One number of adjustable lights may be provided on the lifting platform also, so that shadow of platform may not affect working while platform is in raised condition.
- (b) For illumination during night inspection, plug points (230 and 420 volts) shall be provided for fixing portable lights. All lights should be of LED type including headlights.
- (c) There shall be provision that with the removal of engine ignition key, the flood lights are also switched off. This is required to avoid draining of batteries after the work is completed.

3.1.11 Crane with interchangeable bucket.

The Vehicle shall be equipped with a crane with interchangeable basket. Their features must be as follows:

- (a) Nominal load of Crane with basket shall be 500 Kg and it should easily and conveniently carry two workers of normal built with their tools in bucket. The safe working load shall legibly be stamped on a non-vital part of the Bucket. An authentic test certificate shall be supplied.
- (b) Horizontal reach for the workers in the Basket from the track axis should be up to 8.50 meters. Vertical reach for the workers in the Basket from rail level should be up to 12 meters.



- (c) The crane shall conform to EN 12999:2007 or latest version or equivalent.
- (d) When using Hook instead of basket, it should be able to lift heavy traction equipment load of 1 ton minimum from a distance of 5 meters. The safe working load shall legibly be stamped on a non-vital part of the hook. An authentic test certificate shall be supplied.
- (e) The basket control should be in the basket itself.
- (f) The basket has to be fitted with a control panel for the hydrostatic transmission for controlling movements.
- (g) All the hydraulic movements have to be secured by a hand backup pump and platform frame of the vehicle.
- (h) The basket must be fitted with plugs for electrical tool (5KW), with lighting and two search light.
- (i) The wiring of the crane and bucket shall be carefully designed so that during complete movement and rotation of the unit, it does not get entangled with any other object of the CMV.
- (j) In case of short circuiting of the wiring, abnormal movement shall not take place. Each circuit shall be protected with MCB of suitable rating. Fail safe design of bucket control shall be elaborated during design stage.
- (k) The make of the crane shall be proven one for similar applications and documentary support shall be given for the same.
- (l) The vendor of the crane shall be having quality certification of ISO:9001 and its design shall be submitted for approval of MMRC.

3.1.12 **Lifting and swivelling Platform:**

There shall be one platform on the car as under:

- (a) Lifting platform capable of carrying 4 to 5 persons with their tools. It shall have capacity of lifting minimum 500 kg.
- (b) The minimum height of the platform shall be 3 meters and extendable up to 5.5 meters. The platform shall be capable of 180-degree rotation. The vendor of the lifting platform and its design shall be submitted for approval of MMRC.
- (c) The raising and lowering of platform shall be gradual and not sudden or too fast.
- (d) Suitable safety measures including interlocks between various equipment, access doors, line equipment shall be followed to ensure safety on roof/ platform.
- (e) Speed of 10 kmph should be governed by means of speed governor at the time of using platform.

3.1.13 **Anti-Theft Measure for Diesel Tank & Fuel Gauge:**

A steel wire mesh should be provided in the filler neck to prevent theft of diesel. The filler cap should be lockable with padlock. Cab should be provided with digital fuel gauge & low-level alarm/ indication. Prismatic/ sight glass with level marking should be provided in diesel tank for monitoring of level of fuel.

3.2 **MECHANICAL DESIGN**

3.2.1 General



- (a) The vehicle shall be of welded light weight construction strictly within Kinematic Envelop & MMRC SOD with crane panto and platform in lowered condition both in static and dynamic conditions.
- (b) The weight of the car shall be kept as low as possible consistent with adequate strength and hauling requirements.
- (c) The structure shall withstand end load applied in conjunction with full payload. Under such loading no permanent deformation should occur and stresses should remain below the yield point.
- (d) The design shall be sufficiently rigid to withstand stresses imposed by lifting with overhead or breakdown cranes or by jacks applied to the headstocks. The superstructure shall be designed as a tubular girder for the purpose of withstanding vertical loading, but the inner sheeting of the roof and walls shall not be stress-bearing members.

3.2.2 Under frame and Cabin

- (a) The structure shall be of corrosion resistant low alloy high tensile steel. The entire body structure framing shall be sheathed with steel sheets and welded to the main members. The cabin shall be in full contact with frame members and shall be evenly applied without bulges or depressions that might appear after painting. Concavity or convexity in excess of 1.5 mm in a length of 2.5 m and in this proportion for shorter lengths, shall not be accepted.
- (b) The design of the Cabin shall be such as to provide continuous free air space between the outer sheathing and the interior panelling and ceiling for free circulation of air all round.
- (c) The cabin shall be thoroughly braced and firmly secured to the under frame by welding. Attention should be paid to eliminate water or dust pockets in floor and other structural members.

3.2.3 Headstock:

These shall be of robust design suitable for rolling stock automatic coupler with electrical head.

3.2.4 Coupler:

Each vehicle should be provided with one automatic coupler with electric head on either ends of cars of suitable make, same as that used in Rolling Stocks of Mumbai Metro Line 3.

3.2.5 Draw Gear Member:

- (a) The members provided for carrying the trimmer casting shall be of strong and rigid construction capable of transmitting buffing forces under the most adverse conditions. They shall be braced together to the main sills in such a manner as to form, in conjunction with the flooring system between the transom and headstock, a rigid assembly capable of withstanding all cross-racking forces, which may occur in service. The design shall, as far as possible, ensure that the load is applied symmetrically above the neutral axis of the longitudinal and is concentric to them.



- (b) Draw and Buff gear: The vehicle shall be provided with arrangement for fitment of MMRC rolling stock couplers in such a way that the vehicle shall be couplable with existing rolling stock of MMRC.

3.2.6 Lifting Pads:

- (a) As the vehicle shall be subjected to repeated lifting in workshop by lifting jacks in service, suitable lifting pads shall be provided and marked in a readily distinguishable manner on the car body so as to make sure that car body does not get deformed with the passage of time.
- (b) The lifting points shall be clearly indicated and provided on bogie and car body.

3.2.7 Bogie:

- (a) The vehicle shall have two 2-axle bogies of well proven design and RDSO approved design. It shall be of robust welded design suitable for taking the brake gear, final drive, suspension etc.
- (b) The bogie shall be capable of withstanding the maximum static and dynamic stress under loaded conditions & load up to 25% in excess of maximum gross load and to meet the performance requirements. The design shall provide primary and secondary suspension. The design shall ensure that the sperling ride index value does not exceed 4.0 at a maximum speed of 60 kmph plus 10%.
- (c) The general design of the bogie shall permit easy access to running gear and brake gear and to final drive in the case of powered bogie when in position under the car body and shall permit easy replacement of brake blocks without a need of special arrangement on the track.
- (d) The suspension systems shall be of two-stage type with suitable spring and damping arrangement. Springs for primary and secondary suspensions shall be designed to cater for actual service conditions. Calculations for determining the spring characteristics and damping values in various modes shall be submitted to MMRC for approval. Any alternate design proposed will be submitted to MMRC for review and approval.
- (e) Effective measures shall be adopted to minimize the weight transfer while starting, stopping and during runs. The Bidder shall furnish detailed calculation for weight transfer and adhesion efficiency for the powered bogie. Safety straps of adequate size or alternate measures shall be provided to ensure supports in the event of failure of links, hangers or other components.

3.2.8 Wheel and Axles:

- (a) Diameter of the new wheel on the tread measured at 63.5 mm from wheel gauge face- 915 mm.
- (b) The Wheels of CMV shall be similar to existing Rolling stock so that maintenance will be easy and no additional planning is required.
- (c) The manufacturer shall provide the RDSO approved UST pattern of free axle and wheel and axles assembled on complete wheel. He will also provide training for UST of axle.



- (d) The wheel and axle shall be compatible with the Pit wheel lathe Machine of the respective lines for maintenance etc. The Contractor shall interface with Pit Wheel Lathe Contractor for suitability of the Wheel set.
- (e) Axles shall conform to IRS R43 or IRS R16. The wheel shall conform to IRS-R19. Only solid multi wear type wheel shall be used.
- (f) The wheel shall be machined to the profile showing RDSO sketch no 91146. Axle design shall be finalized in consultation with axle box manufacturers and MMRC approval shall be taken. Contractors has to interface with concerned interfacing contractors for ensuring the correct design inputs for developing their design and submit to Project Manager for approval before manufacturing.

3.2.9 **Axle Box:**

- (a) Grease lubricated axle boxes with roller bearings shall be provided on all axles. The roller bearing shall be designed to suit 17 Tonne axle load.
- (b) Bearing well proven in rail traction in Indian railways shall only be acceptable. The bearing shall be of reputed and proven make.
- (c) Special attention shall be given to the design of labyrinth seal at the ends of the axle boxes to prevent ingress of water and dirt.

3.2.10 **Cabin:**

- (a) One door (entry and exit) will be provided at the rear end of the cabin to enable ease in entrance of operator.
- (b) Body side windows shall be provided on both sides of the cabin.
- (c) The roof will be designed to form a satisfactory chord to the super structure considered as a girder to take a concentrated load of four men standing close together at any point and pantograph. Proper safety arrangements shall be made for the person working on cabin roof.
- (d) The door footstep assembly shall be of mild steel and have compreg board (RDSO spec C-9407 latest). The edges shall be protected with metallic treads. Any other suitable anti slip arrangement can also be considered.
- (e) Door hand holds of stainless-steel tubes with malleable cast iron brackets shall be provided on either side of all body side doors and shall be so fitted as to clear the side walls sufficiently to prevent injury to knuckles. Hand holds shall also be within the car profile so that mechanized car washing is not hindered.
- (f) All doors shall be fitted with reliable locks to be operated from outside and inside. Hasps for external padlocking shall also be provided on all doors opening out of the car.
- (g) Details of Doors, windows & roof of both driver's cabins shall be got approved from the Project Manager.

3.2.11 **Noise Suppression:**

The Bidders shall indicate any noise suppression features incorporated in the design. The noise level should not be more than 75 dB inside the driving cabs.

3.2.12 **Corrosion Protection:**



- (a) Sheets and plates used for car construction shall be suitably treated against corrosion before fabrication. Sub-assemblies and vehicle after fabrication shall be treated against corrosion as per UIC Code 842-5 after they are manufactured.
- (b) In addition to above, the vehicle design shall be such as to minimize the incidence of corrosion. The Bidder may suggest any better corrosion protection system that he may have adopted with success in vehicles manufactured by him.
- (c) The Bidder shall note that car floors are washed at time. Hence the floor construction should be such that it does not permit water to seep through the floor and cause corrosion to trough floor and under frame members.

3.2.13 Extra fittings: Doorsteps shall be provided at all body side doors.

3.2.14 Ceiling & panelling: -

Side wall panelling shall be constructed so as to facilitate attention to window shutters, runners and interior steel surface of the body panels. The interior panel on the ceiling will be of a suitable material, preferably non-asbestos. The ceiling in compartments shall be of 2 mm thick NPTC to RDSO spec. No. C- K 511 (Latest) or non-asbestos limpet sheet to RDSO spec. No C-K601 (Latest). The ceiling of Engine Room shall be of 1 mm thick mild steel sheet.

3.2.15 Flooring:

Floor construction arrangement shall consist of aluminium chequered plates of approved quality laid over compreg board to RDSO Specs C-9407 screwed on the trough floors. Floor construction should be such as not to permit water seepage through floor.

3.2.16 Trap Doors

Suitable trap doors shall be provided on the flooring for attention of under-slung equipment during service. The design of trap door shall be such that it can be conveniently lifted when attention to equipment is required but strong enough to withstand normal person's loading. The leakage-proof trap door shall remain in level to the floor of the car.

3.2.17 Anti pilferage measures:

While securing compartment fittings, anti-pilferage measures shall be incorporated.

3.2.18 Interior Finish and Furnishings:

The interior finish and furnishing must be to the best standards and shall combine an excellent and clean appearance with durability and serviceability. The interior surfaces, such as walls partitions, bulk heads etc. shall be rounded and joints shall be avoided. All surfaces liable to frequent handling shall be finished with materials suitable for periodical washing or cleaning and shall be of a colour which will not show up stains. The materials used for finishing and furnishing shall be suitable for use under all climatic conditions and shall be fire-proof, non-hygroscopic and vermin and insect proof.

3.2.19 Seals and gaskets:

The seals and gaskets used for arresting oil leakage shall be such that there is no possibility of oil leakage.



3.3 Material:

3.3.1 Panelling:

The interior panelling in the cabin shall consist of 1 mm honeycomb stainless steel material to AISI 409M. The interior panelling in the compartment shall consist of 3 mm thick or equivalent or better resin bonded thermosetting laminated plastic sheets of approved shades. The laminated plastic sheets shall match the quality rating of decorative thermosetting synthetic resin bonded laminated sheet. Sidewall partitions of Engine Room shall be 1 mm thick M.S. Sheets or equivalent or better.

3.3.2 Driver's Cabin:

"Steel step iron" shall be provided below the entrance to driver's compartment and shall be so located as to provide a convenient foothold without infringement of maximum moving dimensions. Doors shall be provided in Driver's cabin for complete isolation so that when working on stand still position, smoke is not filled inside driver's cabin.

3.3.3 Exterior Painting:

The colour scheme for interior and exterior of the vehicle and particulars for marking and number plates shall be submitted to Project Manager for his NoNO.

3.4 Braking system:

3.4.1 The car shall be fitted with fail safe type compressed air brakes (single pipe or twin pipe as required) which shall have graduated application and release. The brake system shall be of UIC approved type and shall meet all UIC requirements.

3.4.2 Air brake system of approved make as provided on Indian Railways should be provided in order to achieve high reliability, low weight, better sensitivity and easy maintainability.

3.4.3 Brake system shall be provided with automatic slack adjuster built into the brake cylinder.

3.4.4 Adequate safety straps shall be provided below the moving components of the brake rigging and other components to prevent falling on the track in the event of failure of any component.

3.4.5 Parking brake capable of holding fully loaded vehicle along with maximum trailing load on 4% down gradient in MMRC network under wet condition shall be provided.

3.4.6 In addition, a separate braking reservoir of adequate size and a non-return valve be provided for braking only. Suitable drain valve/ cocks shall be provided to drain off the condensate in the reservoir(s). An automatic drain valve shall be provided in addition to manually operated drain valves/ cocks.

3.4.1 Air dryer of approved make should be provided.

3.4.7 The Contractor shall be required to supply the detailed drawings, specifications and testing procedure for rubber components/parts of all the valves/ cocks used in the brake system and shall guarantee for satisfactory working of the components at least till the Warranty/Defect Liability period. The Contractor shall also get the brake schematic approved by the Project Manager.

3.4.8 The MR pressure & break pipe pressure should be matching that on the of rolling stock. This will help in safe braking at the time of towing failed CMV with help of train. The brake system must be compatible with that of MMRC rolling stock so that the



vehicle can be coupled with MMRC trains in case of failures/ emergency. Standalone VCD of approved make shall be provided.

3.4.9 The emergency braking distance (EBD) for fully loaded car from maximum Speed of 60 km/h shall not be more than 300m.

3.5 Compressor:

3.5.1 The car shall be provided with a suitable air-cooled compressor, directly driven by the diesel engine. The capacity of the compressor at idling speed of engine shall be adequate to meet the requirement of braking, horn and wipers when operated simultaneously. The Contractor shall give a technical justification for the compressor capacity such that the requirements of braking, wipers, horns and other accessories including the trailing load are fully met. The bed plate of compressor unit shall be sufficiently strong to withstand the vibrations during run. Main reservoir of adequate capacity shall be provided.

3.5.2 A filter of adequate capacity shall be provided at the compressor's inlet to protect the machine from dirt and dust entering into it. Additional filters, if considered necessary, by the suppliers for particular valves shall be provided in the system.

3.5.3 The compressor shall be provided with suitable governor/ unloader to cut-in and cut-out at suitable pressures levels. In addition, a safety valve of sufficient capacity shall be provided to safeguard the system against overcharging.

3.5.4 Suitable inter-cooler and after-cooler shall be provided to cool the compressed air delivered by the compressor.

3.6 Fire Extinguisher, First Aid Equipment & Electric Shock Treatment:

Two CO₂ type fire extinguishers each of 5 kg capacity shall be provided in the cabs. Adequate space shall be provided for keeping a first aid box and one stretcher. Design/drawings shall be furnished for provision of space for first aid box and display of Electric shock treatment chart to Project Manager for his NoNO.

3.7 Piping:

3.7.1 The tubes shall be of stainless steel in annealed condition to ASTM A269 Gr. TP 304 (SEAMLESS & ANNEALED) of hardness in the range of 75-80 HRB. They shall be free of scratch, and smooth inside and outside. The tests on the tube such as chemical test, flaring test, hardness test, bending test, etc., shall be as per ASTM A269. Pipe fittings used for air brake system shall be stainless steel as per RDSO Spec.No. 04-ABR (Latest Revision). It will be preferable if sizes of pipes are limited to a minimum. Sharp bends must be avoided and where necessary, connections shall be used.

3.7.2 Double ferrule pipe fitting consisting of body, front ferrule, back ferrule and nut shall be provided. The material for nut, body shall be Stainless Steel ASTM A 479 TP 304 (Bar stock) and ASTM A182 F 304 (Forgings). The ferrule and back ferrule shall be made from stainless steel to ASTM A276 TP 316 SS. Pipes, ducts and conduits shall conform to an identification colour scheme, which shall be approved by the project Manager after the contract is awarded.

3.7.3 Chart showing the colour for identification of pipes shall be displayed in cab at a prominent place where it is likely to be needed for reference.



3.8 Lubrication:

Flexible pipes used for lubrication purposes shall be of special quality to withstand the climatic conditions.

3.9 Cardon Shaft:

The Cardon Shaft shall be of robust design and well proven in performance capability, suitable for transmitting rated horsepower and maximum torque encountered during operation. Bidder shall submit complete data as per Annexure- A attached to Bid Form 1, Section IV-A, Part 1 as applicable to transmission system offered.

3.10 Axle Drive Gear Box with Powered Axle:

- (a) One of the axles of each bogie will be powered.
- (b) Proven axle drive gearbox of suitable gear ratio, complete with powered axles & torque reaction arm shall be offered. The Bidder shall take care that the offered power equipment is well matched with the axle drive and meets the performance requirement.
- (c) The axle drive gearboxes shall be robust in construction and designed to transmit continuous rated horsepower/ maximum torque transmission capacity of the axle drive gearbox at start.
- (d) The input flange of the axle drive shall be oil injection mounted.
- (e) The power axle shall conform to IRS specification R-43.
- (f) Drive gear should have oil level glass for visual checking.
- (g) Drive gear should have suitable lubrication system for lubrication of gears and bearings at slow speed.

3.11 Auxiliary Alternator:

- (a) Engine mounted auxiliary alternator of adequate capacity with rectifier for the speed range between idle and maximum of engine speed shall be provided to supply 24 V DC for charging the batteries provided for engine starting and control.
- (b) One additional charger (230/ 415V AC to 27.5 V DC fed from Genset) should be provided to manually charge the 24 V battery from Gen set in case battery gets discharged due to any reasons.
- (c) External Socket shall also be provided for easy charging of the batteries externally.
- (d) 230 V supply shall be available for charging of Handsets of Mobile.

3.12 Battery:

- (a) 24V, 450 Ah lead acid batteries conforming to IS: 7624/RDSO Specification: MP.0.24.00.65 (Rev 00) Dec'09 or latest shall be provided for engine starting controls & lighting. It shall cater to all auxiliary electrical load of the CMV for five hours in case of auxiliary alternator failure. External batteries charging terminals will be provided on either side of the vehicle.
- (b) 110V DC, 120 Ah Tubular batteries for lights, fans, main control circuit conforming to relevant RDSO/IS/specification Latest revision shall be provided.
- (c) It is desired to have a warning system to indicate that the battery is about to drain out so as to warn the operator and save battery for further starting of Engine.



- (d) The location of the batteries shall be such that there is no danger of their getting damaged due to tools and equipment inadvertently falling on them. Terminals for charging the batteries from external charging equipment shall also be provided.
- (e) The battery shall be charged by the engine driven alternator/rectifier and voltage regulator.
- (f) Rectifier-Regulator conforming to IEC: 60571 shall be underframe mounted. Crimping sockets required for interconnecting and output cables shall be supplied along with the equipment. The rectifier regulator box with protection level IP 55 (Hose proof) shall have an openable front cover which shall be capable of being closed and locked. This box shall be electro-galvanized and painted grey. The regulator shall have provision of potentiometers for currents and voltage setting for adjustments depending upon service conditions.
- (g) A socket for charging the battery from an external source shall be provided. Battery should be draw out type mounted in movable crate to facilitate maintenance of battery. Float type electrolyte level indicator should be provided in battery for monitoring of electrolyte level.

3.13 Control and Gauges:

- 3.13.1 Car shall be provided with driving control cab for bi-directional operation of vehicle. Adequate control equipment including gauges, instruments, and safety devices shall be provided for safe and satisfactory operation of the CMV. The equipment and controls shall be so arranged in the driving console so that they facilitate easy access for operation and maintenance.
- 3.13.2 Interlocks shall be provided such that CMV can be operated from one cab only at a time. The driver should be able to start or shut down the engine from the cab being operated.
- 3.13.3 Power ON/OFF indication for power pack shall be provided on control panel of driving cab.
- 3.13.4 All gauges shall be of proven and reliable design. Graduations of the gauges shall be in metric units. The following gauges, instruments and safety devices shall be provided:
 - (a) **Diesel Engine**
 - (i) Engine starting switch/push button.
 - (ii) Lube oil pressure gauge
 - (iii) Lube oil temperature gauge
 - (iv) Cooling water temperature gauge
 - (v) Battery charge/discharge Ammeter
 - (vi) Engine hour meter and engine speed indicator
 - (vii) Engine throttle control
 - (viii) Operating control for reversing
 - (ix) Engine stop switch/push button.
 - (x) Emergency stop (Engine)
 - (xi) Fuel level indicator
 - (xii) Radiator water level indicator



(b) Transmission

- (i) Transmission oil temperature gauge
- (ii) Transmission oil pressure gauge
- (iii) Forward/Reverse/Neutral indicator.

(c) Other Gauges/Switches

- (i) Main reservoir pressure gauge:
- (ii) Brake Cylinder pressure gauge
- (iii) Duplex type indicating brakes of both the bogies.
- (iv) Brake pipe gauge
- (v) Vehicle speed indicator cum recorder (in Driving cab)
- (vi) Switch for horn
- (vii) Switch for wiper
- (viii) Brake Application indicator.

(d) The following safety devices shall be provided:

- (i) Water temperature too high- Engine to idle & Transmission to neutral.
- (ii) Transmission oil temperature high- Engine to idle & Transmission to neutral.
- (iii) Low lube oil pressure- Engine to shut down and Transmission to neutral.
- (iv) Engine speed too high- Engine to shut down & Transmission to neutral.
- (v) Radiator water level too low- Engine to shut down & Transmission to neutral.
- (vi) Emergency engine stop- Fuel supply to engine cut off & Transmission to neutral.
- (vii) Emergency brake application- Engine to idle & Transmission to neutral.
- (viii) Vigilance Control Device (VCD) generally conforms to RDSO Specification No. 0.34.00.00 (Rev. 04) Dec 2008.
- (ix) OHE On/ Off indicator inside the driving cab.

(e) The following Audio-Visual Signals or Reference panel lights shall be provided in the driver's cab:

- (i) Lube oil temperature too high
- (ii) Radiator water temperature too high
- (iii) Engine lube oil pressure low.
- (iv) Engine shut down by safety relay.
- (v) Forward/ Reverse proving lamp.
- (vi) Engine starting.
- (vii) Battery charging.

3.13.5 The control system shall have the provision for connecting the Vigilance Control Device. When the device operates, the engine should come to idle and simultaneously the declutching of transmission and application of brakes should take place.

3.14 Piping

All pipe joints will be as per standard practice. Schematic piping to suit the engine shall be in accordance with the relevant drawings. Flexible pipes shall be provided at the locations prone to vibrations.



3.15 Lubrication

Grease nipples shall conform to IS specification No.4009 Latest. All the grease nipples & adapters, wherever used, shall be tack welded to prevent them from unscrewing and falling off in service.

3.16 Fire Extinguisher:

Arrangement shall be made to keep 2 nos. of CO2 type fire extinguishers in each of the Cab. These should be properly mounted and held by clamp/ holder.

3.17 Electrical Equipment:

3.17.1 **Illumination:** Driving cab, staff cabin shall be provided with level of illumination at least 30 lux at the working plane level (1 m above the floor level).

3.17.2 The electrical circuitry shall be such that tail, cab and car lights, fans and the plug points for inspection lamp, get the electric supply at the rated voltage from the generator when the engine is running and from the storages battery when the engine is not running.

3.17.3 The changeover of supplies shall be automatic for which resistance and resistance cut-in relays may be employed. Complete schematic of electrical circuitry with above provisions shall be got approved from employer before execution.

3.17.4 **Taillight:** Tail lamp (Red aspect) of LED type 24 V 15W as per RDSO's Specification No. RDSO/PE/SPEC/TL/0119-2000 (with latest revision) shall be provided at each end to comply with General & Subsidiary Rules of Indian Railways.

3.17.5 **Marker Light:** Marker light of LED type (White aspect) as per RDSO's Specification No. ELRS/ SPEC/ PR/ 0022 (Rev-1) Oct. 2004 shall be provided on both ends of the CMV.

3.17.6 **Flasher light:** One flasher light each of LED type as per RDSO's Specification No.ELRS/ SPEC/LFL/0017 (Rev-1) Sept, 2004 shall be provided on the roof at both ends of the CMV.

3.17.7 The cab lights shall be capable of being switched on by a switch on the driver's panel.

3.17.8 Electrical fans 110V shall be provided in cab. The fans shall be provided with suitable guards and their location will be finalized with a Notice No Objection from the Project Manager during design stage.

3.17.9 Electrical equipment on cars, like lamps, lamp holders, switches, fans, wires and cables, etc. shall conform to IRS/ Indian Standards Specifications, as applicable. All electrical wires and equipment used on the CMV shall be suitable to withstand tropical climatic conditions. All Electrical wiring in the CMV shall be done with e-beam cables conforming to RDSO's Specification No ELRS/SPEC/ ELC/0019 Rev.- 1 dated 06.07.2010 with latest amendment. Cable markers used for identification of the cables shall last for the life of the cables. Suitable means shall be provided to illuminate instruments, gauges, switches etc. in the operating car and adequate shading of the lights shall be allowed to avoid any glare or distraction to the driver. Luminescent illumination of the desks will be preferred.

3.17.10 **Circuitry:** The load shall be suitably distributed based on standard practice.

3.17.11 **Head Light:** Twin Beam head lights shall be provided at both ends. The head light shall conform to RDSO's Specification No. ELRS/SPEC/PR/0024 (Rev-1) Oct.'2004



- or latest. The operating voltage of head light shall be 24 V DC. 24 V DC supply for twin beam head light shall be taken from 110/24 DC-DC convertor. DC-DC Convertor shall be as per RDSO's Specification No. ELRS/ SPEC/ DC-DC Convertor/0021 Rev.1 or latest (Recommended to go for LED type head light).
- 3.17.12 **Work Lamp:** CMV shall be provided with four nos. of sufficient illumination LED type work lamps and capable of swivelling on universal joint type supports. Also, the light fittings shall have IP 65 protection.
- 3.17.13 **Generator/ Alternator:** An engine mounted DC generator or an alternator with rectifier and regulating equipment of suitable capacity shall be provided to deliver power at 27.5 V d.c. The output of the generator shall cater for battery charging for diesel engine starting (battery voltage 24V) & head lights, search lights, cab lights, taillights, plug points, fans, wiper, panel illumination, control and safety circuits. The maximum power demand will be required when the vehicle is stationary and with engine running at low idling speed. A suitable capacity of about 40kVA, single & three phase, 415V, silent diesel generating set as per CPCB norms for power supply to Crane/ Lifting Platform/ Lighting etc. shall be provided with car.
- 3.17.14 Three number portable search lights, 240V, 500W complete with fitting/ lamp & 10-meter cable etc. shall be provided with the car.
- 3.17.15 **Earthing Arrangement of CMV:** All metallic parts of CMV including working platform, shell structure and bogie shall be integrated electrically to ensure proper earthing of the vehicle through wheel to rail. The body of the lifting motors, control panel, swivelling motors at platform and other electrical equipment shall be connected to earth with proper earth brush arrangement.
- 3.17.16 **Tools:**
- (a) Each car shall be supplied with a complete kit of tools and spare parts required by a driver in an emergency and for normal working of the car. These will be arranged in a sturdy and lockable toolbox provided in a cab and provided at no extra cost. The list of special tools and standard tools for the CMV is given in Appendix A to this section.
 - (b) The complement of tools to be provided for use in Maintenance Depot shall include tools necessary for maintenance and repair of the entire car including specified equipment for auxiliary and ancillary equipment. All special tools shall be listed and catalogued illustrating the method of application.
 - (c) The Contractor shall also supply all the testing kits necessary for proper maintenance of CMV.
 - (d) The Contractor shall have the facility of maintenance support in India. The Contractor shall have to submit the undertaking of maintenance support facility for the life of the Equipment.
 - (e) If components of foreign make are used in CMV, then it should be ensured that they have indigenous service facilities in India.
- 3.17.17 **Maker's Test Certificate:** Copies of manufacturer's test certificates guaranteeing the performance of the car shall be supplied in duplicate along with the delivery of car.



3.18 Tests

3.18.1 Weighment:

- (a) Each complete vehicle in working order with full complement of fuel, oil, sand, water shall be weighed 4 times successively and vertical load exerted by each wheel on the track shall be measured, with due regard as to the accuracy of the measuring equipment. The Weighment shall be done in presence of the Project Manager nominated by the Employer. The pre-Weighment run shall be over a section of track containing difference of levels. No alteration or adjustment shall be made to the car after passing over this section of track and before Weighment. The arithmetic mean of the values taken during 4 successive Weighment shall be the value of measurements.
- (b) After Weighment, a check shall be made to ensure the following:
 - (i) Total weight is within +/- 1% of the nominal weight.
 - (ii) Axle load is within +/- 2% of nominal axle load.
 - (iii) The difference between the two-wheel loads of any axle is not more than 4% of the axle load.
- (c) The manufacturer should preferably have in-house facility and adequate skills to carry out squeeze test. The completed vehicle shall be subjected to squeeze test as per standard to ensure that it shall withstand a maximum end load of 100T without any signs or permanent distortion.

3.18.2 The Project Manager shall have the power to:

- (a) Adopt any means he may think advisable to satisfy himself that the materials for fittings specified are actually used throughout the construction.
- (b) Take samples for such tests as he may consider necessary by an approved Metallurgist selected by him, whose report shall be final and binding on the contractors.
- (c) Visit at any reasonable time and without prior notice the contractor's works to inspect the progress and quality of the work and the contractor shall provide free of charge all equipment and labour required by him for this purpose.
- (d) Reject any material or fittings that do not conform to the relevant specification or good practice, which shall be marked in a distinguishable manner and shall be disposed of in such a manner as the Inspecting Officer directs. Such rejected parts shall be replaced by the contractor without extra charge.

3.18.3 Tests of materials and fittings shall as far as possible be carried out at the works of the manufacturers of the materials or fittings. The Contractor shall provide such additional materials or fittings as may be required or arrange for test pieces to be incorporated in forgings and castings as required by the Inspecting Officer and for their removal in his presence for test purposes. All tests in the works of the Contractors and their sub-Contractors shall be at the cost of the Contractors.

3.18.4 The CMV shall not be dispatched or packed until it has been passed by the Project Manager during FAT. Such passing shall in no way exonerate the Contractor from their obligation in respect of quality and performance of the car.

3.18.5 In the event of dispute between the Employer/ Project Manager and the Contractor, the decision of the Project Manager shall be final and binding on the Contractor subject to decision of the Arbitral Tribunal.



3.18.6 Radiographic testing of steel castings:

All steel castings wherever used, and welding joints shall be subjected to radiographic/ ultrasonic testing after manufacture/ repair to a suitable scheme/ standard suggested/ approved by RDSO/ MMRC.

3.18.7 Acceptance Tests:

Besides the checking and testing carried out during manufacture and before dispatch of the vehicle, it shall be subjected to the following tests before final acceptance.

(a) **Performance capability tests:**

The vehicle shall be subjected to tests to establish its performance based on the supply by the Contractor against the specification. The Contractor shall at his own expense provide the services of competent Engineers/ Supervisors and supporting staff during the performance capability tests of the car.

(b) **Riding Quality Test:**

The riding quality tests shall be conducted at a speed which is 10% higher than the maximum specified operating speed, on a section of mainline track over which there are no temporary speed restrictions, and which is considered by MMRC as being in a generally run down condition for main line standards but without speed restrictions. The tests shall be conducted from a reasonably low speed, which is considered safe by MMRC, upwards in steps of 10-15 km/h to establish the performance at the specified speed.

(c) The car shall be suitable for track being provided in the tunnel and at level ground of main line as well as in Depot area of Line 3. Cross section of track in tunnel and rail cross-section is attached for reference. Contractor has to interface with Track Contractor for ensuring the correct design inputs for developing their design and submit to Project Manager for approval before manufacturing.

(d) **Acceptance criteria:**

The vertical acceleration shall not exceed 0.3 g both in vertical and lateral modes in tare and loaded condition at maximum speed. The Sperling ride index shall not exceed 4 in both vertical and lateral modes under tare and loaded conditions.

(e) **Interfaces:**

The Contractor shall be required to interface (for preparation of the design and execution of the works) with the contractors of Rolling Stock, Track, Civil, OCS, PSS, Depot E&M and others concerned.

3.19 **Provisional Speed Certificate:**

The Contractor shall interface with concerned statutory authorities to obtain the certificates viz provisional speed certificate, and final speed certificate after oscillation trials at his cost (reimbursable on submission of documentary proof). It shall also be ensured that there are no infringements to Schedule of Dimension of Line 3 of Mumbai Metro.

The Contractor shall also provide all necessary assistance for getting approval of Commissioner of Metro Rail Safety for CMV.



3.20 Provision of Mobile Train Radio Equipment

- (a) An on-board Mobile Train Radio Equipment (MTRE) shall be supplied by STPT Contractor along with accessories and connected cables for installation in the Cabin of CMV. The main components of the MTRE are as given in Table 01 below:

Table 01- List of Components of MTRE with details

SR. NO	Item and Description	WEIGHT (In Kg.)	DIMENSSIONS H x W x D (mm)
1	Transceiver Module with Control Head	1.50	60 x 188 x 198
2	Transceiver Trunnion (for Mounting Purpose)	0.25	80 x 177 x 54
3	Telephone Style Handset- 2 Nos.	0.25	206 x 61 x 52
4	Radio Speaker with Mounting Bracket- 2 Nos.	0.30	125 x 125 x 81
5	Magnetic Mount Antenna- 2 Nos.	0.25	205 x 72 x 72
6	DC-DC Converter- 2 Nos.	0.47	128 x 85 x 63

- (b) The following items shall also be supplied by STPT Contractor:
- (i) Radio Hand Portables- 2 Nos
 - (ii) All associated radio equipment cables (including antenna cables), connectors and accessories.
- (c) The Mobile Train Radio Equipment along with all its accessories shall be installed along with the associated cabling work by the Contractor at suitable locations in interface with and under the supervision of STPT Contractor. The Contractor shall provide suitable brackets for these items in the Cabin. The Contractor shall co-ordinate with STPT Contractor to ensure that the installed radio equipment is easily accessible for maintenance purposes.
- (d) Power supply cable from 110 V DC supply point to DC-DC Converter shall be provided by the Contractor.
- (e) The Contractor shall provide 230 V AC sockets for charging of hand portables.
- (f) Grounding of Radio Terminal and DC-DC Converter shall be carried out by the Contractor.
- (g) The Contractor shall co-ordinate with STPT Contractor on the power supply requirement for charging of Radio System and Radio Hand Portables even when the CMV is switched off.
- (h) Given below is the responsibility matrix for Communication system provision.

Table 02- Responsibility Matrix for Communication system provision

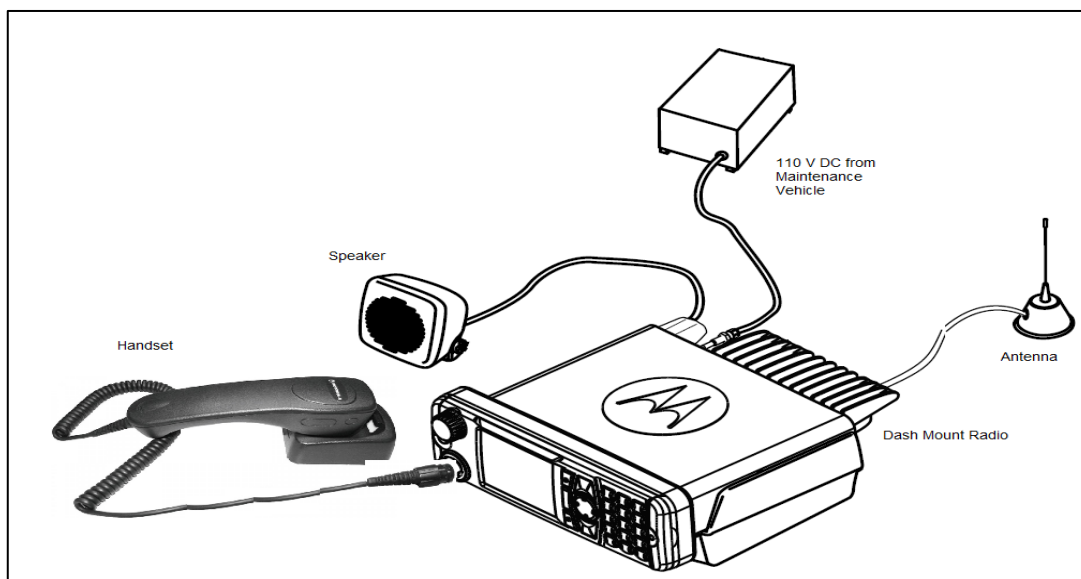


SR. NO.	DESCRIPTION	DESIGN	SUPPLY	SITE INSTALLATION
RADIO SYSTEM COMPONENTS				
1	MTM-5200 Transceiver Module with Control Head	STPT	STPT	CMV
2	MTM-5200 Transceiver Trunion (for Mounting Purpose)	STPT	STPT	CMV
3	IMPRESS Telephone Style Handset	STPT	STPT	CMV
4	Radio Speaker with Mounting Bracket	STPT	STPT	CMV
5	Magnetic Mount Antenna	STPT	STPT	CMV
6	DC-DC Converter	STPT	STPT	CMV
7	Accessory Connection Kit	STPT	STPT	STPT
INTERFACE CABLES				
8	Interface Cable between Radio and Speaker	STPT	STPT	CMV
9	Interface Cable between Radio and Magnetic Mount Antenna	STPT	STPT	CMV
10	Battery Power Cable between Radio and DC-DC Converter Box	STPT	STPT	CMV
11	Power Cable between MV Power Source & DC-DC Converter Box	STPT	CMV	CMV
12	Grounding Cable Between Radio Terminal & Nearest Grounding Point	STPT	CMV	CMV
13	Grounding Cable between DC-DC Converter & Nearest Grounding Point	STPT	CMV	CMV

(i) Below is the tentative Tetra Dash mount radio single Line diagram:

Line Diagram of radio System





3.21 List of Standards for Electrical Equipment and Fittings

The electrical equipment should comply to the following IS or latest:

Sr. No	Standard	Detail
1	IS :7624-1975	Specification for Lead Acid Starter Batteries for Diesel Locos and Rail Cars
2	IS: 6848-1979 VRLA Batteries to RDSO specification No. RDSO/PE/SPEC/AC-0009-2008/ Latest revision.	Lead Acid batteries for train lighting and air conditioning services
3	IS: 6965-1979	Specifications for switches for use in Railway Coaching Stock
4	IS: 6680-1972	Specification for railway carriage fans
5	IS: 2494-1974	Specification for V- Belts for industrial purposes
6	IS: 1293 -1967	Three pin plugs and socket outlets
7	IS: 2062-1984	Structural steel (fusion welding quality)
8	IRS: E 45-1977	Indian Railways Standard Specifications for modified train lighting system and code of practice for wiring in coaching stock
9	IRS - E 52-1980	Indian Railways Standard Specifications of brushless alternator including rectifying and regulating equipment for 24 V d.c. train lighting system used on BG and MG coaches



10	IRS-M-41-1971	Corrosion resistant structural steel required for rolling stock (provisional)
11	ELRS/Spec/PR/002 4 Rev-1 Sept 2004	Provisional specification for locomotive/EMU head light projector.
12	C-K511 OR C-K601 (Latest revision)	C-K511 schedule of technical requirements for natural fibre thermosetting composite (NFTC) sheet for roof panelling of railway passenger coaches. C-K-601 – STR for non asbestos limpet sheet for roof ceiling.
13	WD-01-HLS (Latest revision)	Schedule of Technical requirements for helical coil spring for coaching and wagon.
14	C-K514 (Latest revision)	Schedule of technical requirements for decorative thermosetting synthetic resin bonded laminated sheet.

3.22 Checks and Tests:

Following checks and tests shall be carried out by the Project Manager:

3.22.1 In Manufacturer's Plant

- (a) Contractor shall submit Test Protocol for Notice of No Objection from the Project Manager to conduct FAT at the manufacturer's works along with the invitation for inspection. FAT shall be carried out prior to shipment in order to ensure that the supply is in accordance with the technical specifications and with the approved design documents.
- (b) All quality checks shall be carried out, as required, during manufacture on the Contractor's premises.
- (c) provision of protection and safety devices shall also be checked.
- (d) The Contractor shall provide all documents pertaining to FAT to the Engineer for verification before FAT.
- (e) CMV shall be dispatched only after issuing of Dispatch Clearance Certificates from Project Manager.

3.22.2 Checks at Site

After delivery, operating tests shall be carried out to check that the CMV is suitable to fulfil the stipulated requirements as under:

- (i) Driving Test on Rails- within depot premises, at Ramp portion of Line 3 and inside tunnel.
- (ii) Functioning of different systems and sub-systems such as lights, brakes, horn, etc.
- (iii) Functioning of safety items and protection features
- (iv) Check for availability of prescribed accessories, tools and plants.
- (v) Other tests as decided during the design stage.



Appendix 1

Special tools for each CMV			
Sr no.	Item Description	Remarks	Qty
1	Digital Clamp meter with V,A&R measuring facility	Reputed Make	1
2	Hydrometer	General Purpose	2
3	Spanner set with extension, socket screwdriver bits of - + posidrivetorxdrive head and hexagonal socket	General Purpose make snap on/Force	1
4	Wire Stripper	1.5-25 sq. mm	1
5	Crimping Tool	1.5-25 sq. mm	1
Standard tools in toolbox for each CMV			
Sr no.	Item Description	Size	Qty
1	"D" Spanner set (13 Nos of various Sizes)	36-41, 30-32, 24-27, 25-28, 21-23, 20-22, 18-19, 16-17, 14-15, 12-13, 10-11, 8-9, 6-7	1 set
2	Ring Spanner (12 Nos of various sizes)	30-32, 24-27, 21-23, 20-22, 18-19, 16-17, 14-15, 12-13, 10-11, 8-9, 6-7, 5-6	1 set
3	Pipe Wrench	12"	1
4	Allen Key	Set	1
5	Plumb Bob	1	1
6	Centre Punch	1	1
7	Screw wrench	12"	1
8	Measuring tape	50 m.	1
9	Allen Key (inch)	Set	1
10	Allen Key (mm)	Set	1
11	Combination pliers (standard, nose-small and long)	6'	3
12	Round Nose Plier	1	1
13	Hammer	200 and 800 g.	2
14	Hacksaw Frame (with 20 blades)	1/2" X1	1
15	Screw Driver Set Big	1	1 set
16	Screw Driver set small (for control wiring)	1	1 set



17	Screw Driver	6', 10'12'	3nos
18	Round File	1	1
19	Flat File	1	1
20	Chisel	6"	1
21	Pipe Wrench	12"	1
22	Flat file	1	1
23	Rawal Plug	1	1
24	Line tester	1	1
25	Stubby Screw driver	1	1



BIDDING DOCUMENTS



MUMBAI METRO LINE 3 (COLABA-BANDRA-SEEPZ)

CONTRACT MM3-CBS-DEQ-9-03B

Design, Manufacture, Supply, Installation, Testing &
Commissioning of Catenary Maintenance Vehicle
for Project "Mumbai Metro Line-3"

PART 3

Conditions of Contract and Contract Forms

Section VII	General Conditions of Contract (GC)
Section VIII	Particular Conditions of Contract (PC)
Section IX	Contract Forms

September – 2023

**Mumbai Metro Rail Corporation Ltd
MMRC Line 3 Transit Office,
Wing 'A', 'E' Block,
Bandra-Kurla Complex,
Bandra (East), Mumbai 400 051, India**



Bidding Documents

Composition of Documents

Part 1	Bidding Procedure
Section I	Instructions to Bidders
Section II	Bid Data Sheet
Section III	Evaluation and Qualification Criteria
Section IV-A	Bidding Forms
Section IV-B	Pricing Document
Section V	Eligible Source Countries of Japanese ODA Loans
Part 2	Employer's Requirements
Section VI-A	Employers Requirements – General
Section VI-B	Employer's Requirements – Technical Specifications
Part 3	Conditions of Contract and Contract Forms
Section VII	General Conditions of Contract (GC)
Section VIII	Particular Conditions of Contract (PC)
Section IX	Contract Forms
Part 4	Drawings
Section X	Drawings



BIDDING DOCUMENTS



MUMBAI METRO LINE 3 (COLABA-BANDRA-SEEPZ)

CONTRACT MM3-CBS-DEQ-9-03B

Design, Manufacture, Supply, Installation, Testing & Commissioning of
Catenary Maintenance Vehicle
for Project "Mumbai Metro Line-3"

Part 3

Conditions of Contract and Contract Forms

Section VII

General Conditions of Contract (GC)

September – 2023

**Mumbai Metro Rail Corporation Ltd
MMRC Line 3 Transit Office,
Wing A, Block E,
Bandra-Kurla Complex,
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A. Contract and Interpretation

1. Definitions

1.1 The following words and expressions shall have the meanings hereby assigned to them:

“Base Date” means the date 28 days prior to the latest date for submission of the Bid, when Single-Stage Bidding procedure is used.

“Base Date” means the date 28 days prior to the latest date for submission of the Second Stage Bid, when Two-Stage Bidding procedure is used.

“Commissioning” means operation of the Facilities or any part thereof by the Contractor following Completion, as provided in GC Sub-Clause 25.1 (Commissioning) hereof, for the purpose of carrying out Guarantee Test(s).

“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 Precommissioning 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 GC Clause 24 (Completion) hereof.

“Construction Manager” means the person appointed by the Contractor’s Representative in the manner provided in GC Sub-Clause 17.2.4.

“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).

“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.

“Contractor” means the person(s) whose Bid to perform the Contract has been accepted by the Employer and is named as



Contractor in the Contract Agreement, and includes the legal successors or permitted assigns of the Contractor.

“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.

“Contractor’s Representative” means any person nominated by the Contractor and approved by the Employer in the manner provided in GC Sub-Clause 17.2 (Contractor’s Representative and Construction Manager) hereof to perform the duties delegated by the Contractor.

“day” means calendar day .

“Defect Liability Period” means the period of validity of the warranties given by the Contractor commencing at Operational Acceptance 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 GC Clause 27 (Defect Liability) hereof.

“Dispute Board” (DB) means the person or persons appointed by agreement between the Employer and the Contractor to make a decision with respect to any dispute or difference between the Employer and the Contractor referred to him or her by the Parties pursuant to GC Sub-Clause 45.1 (Dispute Board) hereof.

“Effective Date” means the date of fulfillment of all conditions stated in Article 3 (Effective Date) of the Contract Agreement, from which the Time for Completion shall be counted.

“Employer” means the person **named as such in the PC** and includes the legal successors or permitted assigns of the Employer.

“Employer’s Requirements” means the document entitled employer’s requirements, as included in the Contract, and any additions and modifications to such document in accordance with the Contract. Such document includes Drawings, Specifications, and any other documents specifying the purpose, scope, and/or design and/or other technical criteria, for the Facilities.

“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.

“GC” means the General Conditions hereof.

“Guarantee Test(s)” means the test(s) specified in the Contract 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 to the Contract Agreement titled Functional Guarantees, in accordance with the provisions of GC Sub-Clause 25.2 (Guarantee Test) hereof.

“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, precommissioning, commissioning, operations, maintenance, the provision of operations and maintenance manuals, training, etc. as the case may require.

JICA” means Japan International Cooperation Agency.

“Letter of Acceptance” means the letter of formal acceptance, signed by the Employer, of the Letter of Bid, including any annexed memoranda comprising agreements between and signed by both Parties. If there is not such letter of acceptance, the expression “Letter of Acceptance” means the Contract Agreement and the date of issuing or receiving the Letter of Acceptance means the date of signing the Contract Agreement.

“Mandatory Spare Parts” means spare parts required up to Operational Acceptance of the Facilities (or any part of the Facilities where the Contract provides for acceptance of the Facilities in parts).

“month” means calendar month.

“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 GC Clause 28 (Functional Guarantees) hereof and shall include deemed acceptance in accordance with GC Clause 25 (Commissioning and Operational Acceptance) hereof.



“Party” means the Employer or the Contractor, as the context requires, and “Parties” means both of them.

“PC” means the Particular Conditions.

“Performance Security” means the security (or securities, if any) under GC Sub-Clause 13.3 (Performance Security).

“Plant” means permanent plant, equipment, machinery, apparatus, materials, 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 GC Sub-Clause 7.3 hereof), but does not include Contractor’s Equipment.

“Precommissioning” means the testing, checking and other requirements specified in the Contract that are to be carried out by the Contractor in preparation for Commissioning as provided in GC Clause 24 (Completion) hereof.

“Project Manager” means the person appointed by the Employer in the manner provided in GC Sub-Clause 17.1 (Project Manager) hereof and **named as such in the PC** to perform the duties delegated by the Employer.

“Provisional Sum” means a sum which is specified in the Contract as a provisional sum, for the supply of any Plant and Installations Services or other services, included and so designated in the Price Schedules (Schedule No.5).

“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.

“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.

“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 GC Clause 8 (Time for Commencement and Completion) and in accordance with the relevant provisions of the Contract.

“year” means 365 days.

2. Contract

2.1 Subject to Article 1.2 (Order of Precedence) of the Contract



Documents

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:

- (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 recorded 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 hand-written, type-written, 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 as of the Base Date), 38 Cours Albert 1^{er}, 75008 Paris, France.

3.3 Entire Agreement

Subject to GC Sub-Clause 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 GC Sub-Clause 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 different 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 PC**.
- 5.2 The ruling language of the Contract shall be that **stated in the PC**.
- 5.3 The language for communications shall be the ruling language unless otherwise **stated in the PC**.
- 6. Corrupt or Fraudulent Practices**
- 6.1 If the Employer determines, based on reasonable evidence, that the Contractor has engaged in corrupt, fraudulent, collusive or coercive practices, in competing for or in executing the Contract, then the Employer may, after giving fourteen (14) days notice to the Contractor, terminate the Contractor's employment under the Contract and expel him from the Site, and the provisions of GC Clause 42 shall apply as if such expulsion had been made under GC Sub-Clause 42.2.1 (c).
- 6.2 Should any employee of the Contractor be determined, based on reasonable evidence, to have engaged in corrupt, fraudulent, collusive or coercive practice during the execution of the Contract, then that employee shall be removed in accordance with GC Sub-Clauses 17.2.5.

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, and the manufacture (including procurement, quality assurance, construction, installation, associated civil works, Precommissioning 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 Section VI, Employer's Requirements. Such specifications include the provision of supervision and engineering services; the supply of labor, materials, equipment, spare parts (as specified in GC Sub-Clause 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 to the Contract Agreement titled Scope of Works and Supply by the Employer, or any other requirements specified in the Contract.

- 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 PC** and the provisions, if any, **specified in the PC**. 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. 7, which shall be added to the Contract Price. The price of such spare parts shall include the purchase price therefor 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 PC**, and without prejudice to GC Sub-Clause 26.2 hereof, the Contractor shall thereafter proceed with the Facilities in accordance with the time schedule specified in the Appendix to the Contract Agreement titled Time Schedule.
- 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 PC** or within such extended time to which the Contractor shall be entitled under GC 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 Base Date. 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 GC Sub-Clause 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 GC Sub-Clause 10.1 hereof.

- 9.5 Any Plant and Installation Services that will be incorporated in or be required for the Facilities and other supplies shall have their origin as specified under GC Clause 3.8 (Country of Origin). Any Subcontractors retained by the Contractor shall be from a country as specified in GC Clause 3.8 (Country of Origin).
- 9.6 If the Contractor is a joint venture (JV) 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 JV. The composition or the constitution of the JV shall not be altered without the prior consent of the Employer.

10. Employer's Responsibilities

- 10.1 All information and/or data to be supplied by the Employer as described in the Appendix to the Contract Agreement titled Scope of Works and Supply by the Employer, shall be deemed to be accurate, except when the Employer expressly states otherwise, and the Contractor shall not be liable for the consequences of any discrepancies, errors, omissions or inaccuracies in such information and/or data.
- 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 to the Contract Agreement titled Scope of Works and Supply by the Employer. 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).

- 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 Precommissioning, Commissioning and Guarantee Tests, all in accordance with the provisions of the Appendix to the Contract Agreement titled Scope of Works and Supply by the Employer, at or before the time specified in the program furnished by the Contractor under GC Sub-Clause 18.2 hereof and in the manner thereupon specified or as otherwise agreed upon by the Employer and the Contractor.
- 10.6 All costs and expenses involved in the performance of the obligations under this GC Clause 10 shall be the responsibility of the Employer, save those to be incurred by the Contractor with respect to the performance of Guarantee Tests, in accordance with GC Sub-Clause 25.2.
- 10.7 In the event that the Employer shall be in breach of any of his obligations under this Clause, the additional cost incurred by the Contractor in consequence thereof shall be determined by the Project Manager and added to the Contract Price.

C. Payment

- 11. Contract Price**
- 11.1 The Contract Price shall be as specified in Article 2 (Contract Price and Terms of Payment) of the Contract Agreement.
- 11.2 Unless an adjustment clause is **provided for in the PC**, 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.



11.3 Subject to GC 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.

12. Terms of Payment

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 to the Contract Agreement titled Terms and Procedures of Payment, 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 to the Contract Agreement titled Terms and Procedures of Payment, 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 to the Contract Agreement titled Terms and Procedures of Payment, 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 twenty-eight (28) days of the receipt of the Letter of Acceptance, provide a security in an amount equal to the advance payment calculated in accordance with the Appendix to the Contract Agreement titled Terms and Procedures of Payment, 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 twenty-eight (28) days of the receipt of the Letter of Acceptance, provide a security for the due performance of the Contract in the amount **specified in the PC**.

13.3.2 The Performance 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 the form provided in Section IX, Contract Forms, corresponding to the type of bank guarantee **stipulated by the Employer in the PC**, or in another form acceptable to the Employer.

13.3.3 **Unless otherwise specified in the PC**, 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 three hundred and sixty five (365) days after Operational Acceptance of the Facilities; provided, however, that if the Defects Liability Period has been extended on any part of the Facilities pursuant to GC Sub-Clause 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.

13.3.4 The Employer shall not make a claim under the Performance Security, except for amounts to which the Employer is entitled under the Contract. The Employer shall indemnify and hold the Contractor harmless against and from all damages, losses and expenses (including legal fees and expenses) resulting from a claim under the Performance Security to the extent to which the Employer was not entitled to make the



claim.

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 GC Sub-Clause 14.1 above, the Employer shall bear and promptly pay:
- (a) all customs and import duties for the Plant specified in Price Schedule No. 1; and
 - (b) other domestic taxes such as, sales tax and value added tax (VAT) on the Plant specified in Price Schedules No. 1 and No. 2 and that is to be incorporated into the Facilities, and on the finished goods, imposed by the law of the country where the Site is located.
- 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 Base Date in the country where the Site is located (hereinafter called "Tax" in this GC Sub-Clause 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 GC 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 non-transferable license (without the right to sub-license) to the Employer under the



patents, utility models or other intellectual property rights owned by the Contractor or by a third Party from whom the Contractor has received the right to grant sub-licenses, and shall also grant to the Employer a non-exclusive and non-transferable right (without the right to sub-license) 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 GC 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 GC 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 GC 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 GC 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 fourteen (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 a 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 & Construction Manager

17.2.1 If the Contractor's Representative is not named in the Contract, then within fourteen (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 fourteen (14) days, the Contractor's Representative shall be deemed to have been approved. If the Employer objects to the appointment within fourteen (14) days giving the reason therefor, then the Contractor shall appoint a replacement within fourteen (14) days of such objection, and the foregoing provisions of this GC Sub-Clause 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 GC Sub-Clause 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 GC Sub-Clause 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, a suitable person shall be appointed 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 GC Sub-Clause 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 GC Sub-Clause 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 twenty-one (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 twenty-eight (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 precommission 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 to the Contract Agreement titled Time Schedule, 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 specified in the PC pursuant to Sub-Clause 8.2 and any extension granted in accordance with GC 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 GC Sub-Clause 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 GC Sub-Clause 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 GC Sub-Clause 8.2, any extension thereof entitled under GC Sub-Clause 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 to the Contract Agreement titled List of Major Items of Plant and Installation Services and List of Approved Subcontractors, specifies major items of supply or 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 GC Sub-Clause 19.1.
- 19.3 For items or parts of the Facilities not specified in the Appendix to the Contract Agreement titled List of Major Items of Plant and Installation Services and List of Approved Subcontractors, 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 subcontract to be assigned to the Employer under GC Sub-Clause 19.5 (if and when applicable), or in event of termination by the Employer under GC Sub-Clause 42.2.



19.5 If a Subcontractor'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.

Subject always to GC 10.1, 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.

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 Base Date 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 GC 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 to the Contract Agreement titled List of Documents for Approval or Review, for its approval or review as specified and in accordance with the requirements of GC Sub-Clause 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.

GC Sub-Clauses 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 fourteen (14) days after receipt by the Project Manager of any document requiring the Project Manager's approval in accordance with GC Sub-Clause 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 fourteen (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.

- 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 GC Sub-Clause 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 GC Sub-Clause 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 GC Sub-Clause 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 GC Sub-Clause 20.3.

If the Project Manager requests any change in any already approved document and/or in any document based thereon, the provisions of GC Clause 39 shall apply to such request.

21. Procurement

21.1 Plant

Subject to GC Sub-Clause 14.2, the Contractor shall procure and transport all Plant in an expeditious and orderly manner to the Site.

21.2 Employer-Supplied Plant

If the Appendix to the Contract Agreement titled Scope of Works and Supply by the Employer, 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 GC Sub-Clause 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 GC Sub-Clause 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 GC 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.
- 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 facsimile or email, 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 GC Sub-Clause 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 GC Clause 40.

22. Installation

22.1 Setting Out/Supervision

- 22.1.1 Bench Mark: 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.

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

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.

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.

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.

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

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.

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.

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

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.

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

No work shall be carried out on the Site on locally recognized days of rest, or outside the normal working hours **stated in the PC**, unless:

- (a) otherwise stated in the Contract;
- (b) the Project Manager gives consent; or
- (c) the work is unavoidable, or necessary for the protection of life or property or for the safety of the Facilities, in which case the Contractor shall immediately advise the Project Manager.

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.

This Sub-Clause shall not apply to any work which is customarily carried out by rotary or double-shifts.

22.2.6 Facilities for Staff and Labor

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.

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 Plant.

22.2.7 Health and Safety

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.

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.

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.

The Contractor shall throughout the Contract (including the Defects Liability Period): (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 Subcontractors 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 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.

The Contractor shall include in the program to be submitted for the execution of the Facilities under GC Sub-Clause 18.2 an alleviation program for Site staff and labor and their families in respect of STI and 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 GC Sub-Clause and the related specification. For each component, the program shall detail the resources to be provided or utilized and any related subcontracting proposed. The program shall also include provision of a detailed cost estimate with supporting documentation. Payment to the Contractor for preparation and implementation of this program shall not exceed the Provisional Sum dedicated for this purpose.

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 PC**.

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, genders, 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 Foodstuffs

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 for the maintenance of 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 impede 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 GC Sub-Clause 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 GC Sub-Clause 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 GC Sub-Clause 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 GC Sub-Clause 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 seven (7) days after receipt of the notice from the Contractor under GC Sub-Clause 24.1, the Employer shall supply the operating and maintenance personnel specified in the Appendix to the Contract Agreement titled Scope of Works and Supply by the Employer for Precommissioning of the Facilities or any part thereof.

Pursuant to the Appendix to the Contract Agreement titled Scope of Works and Supply by the Employer, the Employer shall also provide, within the said seven (7) day period, the raw materials, utilities, lubricants, chemicals, catalysts, facilities, services and other matters required for Precommissioning 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 GC Sub-Clause 24.2, the Contractor shall commence Precommissioning of the Facilities or the relevant part thereof in preparation for Commissioning, subject to GC Sub-Clause 25.

24.4 As soon as all works in respect of Precommissioning 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 fourteen (14) days after receipt of the Contractor's notice under GC Sub-Clause 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 GC Sub-Clause 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 GC Sub-Clause 24.4.

If the Project Manager is satisfied that the Facilities or that part thereof have reached Completion, the Project Manager shall, within seven (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 seven (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 fourteen (14) days after receipt of the Contractor's notice under GC Sub-Clause 24.4 or within seven (7) days after receipt of the Contractor's repeated notice under GC Sub-Clause 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.



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 GC Sub-Clause 24.5, or immediately after the date of the deemed Completion, under GC Sub-Clause 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 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 to the Contract Agreement titled Functional Guarantees. 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 PC** 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 GC Sub-Clauses 28.2 and 28.3 shall not apply.

25.3 Operational Acceptance

25.3.1 Subject to GC Sub-Clause 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 PC pursuant to GC Sub-Clause 25.2.2 above or any other period agreed upon by the Employer and the Contractor; or
- (c) the Contractor has paid the liquidated damages specified in GC Sub-Clause 28.3 hereof; and
- (d) any minor items mentioned in GC Sub-Clause 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 GC Sub-Clause 25.3.1 has 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 seven (7) days after receipt of the Contractor's notice, issue an Operational Acceptance Certificate.

25.3.4 If within seven (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.

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 PC pursuant to GC Sub-Clause 8.2, or within such extended time to which the Contractor shall be entitled under GC 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 GC Clause 40, the Contractor shall pay to the Employer liquidated damages in the amount **specified in the PC** 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 PC** as a percentage rate of the Contract Price. Once the “Maximum” is reached, the Employer may consider termination of the Contract, pursuant to GC Sub-Clause 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 GC 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 GC Sub-Clause 26.2, the failure by the Contractor to attain any milestone or other act, matter or thing by any date specified in the Appendix to the Contract Agreement titled Time Schedule, and/or other program of work prepared pursuant to GC Sub-Clause 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 GC Clause 40, the Employer shall pay to the Contractor a bonus in the amount **specified in the PC**. The aggregate amount of such bonus shall in no event exceed the amount **specified as “Maximum” in the PC**.

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 in respect of the Facilities (or, where Operational Acceptance of any part of the Facilities occurs, of such part) shall commence upon the date of Operational Acceptance and expire twelve (12) months thereafter.

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 GC Clause 27 shall not apply to:

- (a) any materials that are supplied by the Employer under GC Sub-Clause 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 GC Sub-Clause 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 GC 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 fourteen (14) 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 a defect is made good under this GC 27, the Defect Liability



Period for the item which has been made good shall extend for a period of twelve (12) months from such making good. However, in no event shall the Defect Liability Period extend beyond twenty-four (24) months after the date of Operational Acceptance of the Plant or the relevant part thereof.

27.9 Except as provided in GC 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 fraud, or criminal or willful action of the Contractor.

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 to the Contract Agreement titled Functional Guarantees, 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 to the Contract Agreement titled Functional Guarantees, 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 GC Sub-Clause 42.2.2.

28.3 If, for reasons attributable to the Contractor, the Functional Guarantees specified in the Appendix to the Contract Agreement titled Functional Guarantees, 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 to the Contract Agreement titled Functional Guarantees.

28.4 The payment of liquidated damages under GC Sub-Clause 28.3 shall completely satisfy the Contractor's guarantees under GC Sub-Clause 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 GC Sub-Clause 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 GC Sub-Clause 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 twenty-eight (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 twenty-eight (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) neither Party shall be liable to the other Party, 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, which may be suffered by the other Party in connection with the Contract, other than specifically provided as any obligation of the Party in the Contract; and
- (b) the aggregate liability of the Contractor to the Employer, whether under the Contract, in tort or otherwise, shall not exceed the amount resulting from the application of the multiplier **specified in the PC**, to the Contract Price or, if a multiplier 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 Operational Acceptance 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 GC Clause 32 (Care of Facilities) hereof until Operational Acceptance 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 Operational Acceptance of the Facilities pursuant to GC Clause 25 or, where the Contract provides for Operational Acceptance of the Facilities in parts, until the date of Operational Acceptance 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 GC 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 GC 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 GC 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 GC 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 GC 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 GC Sub-Clause 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 GC Sub-Clause 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 GC 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 GC Sub-Clause 38.1, the provisions of GC Sub-Clause 38.3 shall apply.

33. Loss of or Damage to Property; Accident or Injury to Workers;

33.1 Subject to GC Sub-Clause 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



Indemnification

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 GC Sub-Clause 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 twenty-eight (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 twenty-eight (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 GC Clause 34.
- 33.4 The Party entitled to the benefit of an indemnity under this GC 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 to the Contract Agreement titled Insurance Requirements, 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 Operational Acceptance 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 to the



Contract Agreement titled Insurance Requirements.

- 34.2 The Employer shall be named as co-insured under all insurance policies taken out by the Contractor pursuant to GC Sub-Clause 34.1, except for the 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 GC Sub-Clause 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 to the Contract Agreement titled Insurance Requirements, 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 twenty-one (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 to the Contract Agreement titled Insurance Requirements, 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 twenty-one (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 GC Sub-Clause 34.5.
- 34.6 If the Contractor fails to take out and/or maintain in effect the



insurances referred to in GC Sub-Clause 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 GC 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 GC 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 GC Sub-Clause 35.1, the Project Manager shall promptly consult with the Employer and Contractor to 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 GC Sub-Clause 35.1 shall be paid by the Employer to the Contractor as an addition to the Contract Price.

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 GC Sub-Clause 35.1, the Time for Completion shall be extended in accordance with GC Clause 40.

36. Change in Laws and Regulations

36.1 If, after the date twenty-eight (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 PC pursuant to GC Sub-Clause 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 fourteen (14) days after the Party became or should have become aware of 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 GC 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 GC 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 GC Sub-Clauses 32.2, 38.3 and 38.4.

37.6 If the performance of the Contract is substantially prevented, hindered or delayed 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 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 GC Sub-Clause 38.5.

37.7 In the event of termination pursuant to GC Sub-Clause 37.6, the rights and obligations of the Employer and the Contractor shall be as specified in GC Sub-Clauses 42.1.2 and 42.1.3.

37.8 Notwithstanding GC Sub-Clause 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 GC Sub-Clause 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;
- (b) replacing or making good any Contractor's Equipment or other property of the Contractor so destroyed or damaged;
- (c) replacing or making good any such destruction or damage to the Facilities or the Plant or any part thereof;

and so far as may be required by the Employer, and as may be necessary for completion of the Facilities.

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 GC 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 GC Sub-Clause 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 GC Clause 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 GC Sub-Clauses 38.3 or 38.5, the rights and obligations of the Employer and the Contractor shall be specified in GC 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 GC 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 or which is necessitated by reason of any act, omission or breach of the Contract by the Employer or its contractors of any tier. The Employer may at its



discretion approve or reject any Change proposed by the Contractor, provided that the Employer shall approve any Change necessitated by reason of any act, omission or breach of the Contract by the Employer or its contractors of any tier or proposed by the Contractor to ensure the safety of the Facilities.

39.1.3 Notwithstanding GC 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 GC 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 the Employer

39.2.1 If the Employer proposes a Change pursuant to GC Sub-Clause 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; or
- (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 GC Sub-Clause 39.2.2 (a), the Contractor shall, with proper expedition, proceed with the preparation of the Change Proposal, in accordance with GC Sub-Clause 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 GC 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 fifteen percent (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 fourteen (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 fourteen (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 fourteen (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 GC Sub-Clause 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 sixty (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 GC Sub-Clause 45.3.

39.3 Changes Originating from Contractor

If the Contractor proposes a Change pursuant to GC Sub-Clause 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 GC Sub-Clause 39.2.1.

Upon receipt of the Application for Change Proposal, the Parties shall follow the procedures outlined in GC 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 PC pursuant to GC Sub-Clause 8.2 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 GC Clause 39;
- (b) any occurrence of Force Majeure as provided in GC Clause 37, unforeseen conditions as provided in GC Clause 35, or other occurrence of any of the matters specified or referred to in paragraphs (a), (b) and (c) of GC Sub-Clause 32.2;
- (c) any suspension order given by the Employer under GC Clause 41 hereof or reduction in the rate of progress pursuant to GC Sub-Clause 41.2;
- (d) any changes in laws and regulations as provided in GC Clause 36;
- (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;
- (f) any delay on the part of a Subcontractor, provided such delay is due to a cause for which the Contractor himself would have been entitled to an extension of time under this sub-clause;
- (g) delays attributable to the Employer or caused by customs; or
- (h) any other matter specifically mentioned in the Contract;

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.

In this respect the Parties hereby expressly agree that it shall be fair and reasonable to extend the Time for Completion irrespective of any delaying factors attributable to the Contractor which operate or operated concurrently with any of the factors mentioned in (a) to (h) of this GC 40.1.

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 GC Sub-Clause 45.3.

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 this GC Sub-Clause 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 GC Sub-Clause 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 ninety (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 twenty-eight (28) days of receipt of the notice, order the resumption of such performance or request and subsequently order a change in accordance with GC 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 GC Clause 39 or, where it affects the whole of the Facilities, as termination of the Contract under GC Sub-Clause 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 to the Contract Agreement titled Terms and Procedures of Payment, 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 GC Sub-Clause 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 fourteen (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 GC Sub-Clause 10.2, or failure to obtain any governmental permit necessary for the execution and/or completion of the Facilities,

then the Contractor may by 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 GC Clause 41, then the Time for Completion shall be extended in accordance with GC Sub-Clause 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 GC Sub-Clause 42.1.

42.1.2 Upon receipt of the notice of termination under GC Sub-Clause 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 GC Sub-Clause 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 GC Sub-Clause 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 GC Sub-Clause 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 GC Sub-Clause 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 GC Clause 43; or
- (c) if the Contractor, in the judgment of the Employer has engaged in corrupt, collusive, coercive, or fraudulent practices, as defined in GC 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 GC Sub-Clause 41.2, the progress of Contract performance for more than twenty-eight (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; or
- (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 GC Sub-Clause 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 fourteen (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 GC Sub-Clause 42.2.

42.2.3 Upon receipt of the notice of termination under GC 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 GC Sub-Clause 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 GC Sub-Clause 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 GC Sub-Clause 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 GC Sub-Clause 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 GC Sub-Clause 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 the Contractor

42.3.1 If:

- (a) the Employer has failed to sign the Contract Agreement within one-hundred and eighty (180) days after receipt of the Letter of Acceptance by the Contractor, has failed to fulfill any conditions listed



in Article 3 (Effective Date) of the Contract Agreement, if applicable, within the stated period, 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 to the Contract Agreement titled Terms and Procedures of Payment, 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 GC Sub-Clause 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 fourteen (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 twenty-eight (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 twenty-eight (28) days of the said notice, the Contractor may by a further notice to the Employer referring to this GC Sub-Clause 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 GC Sub-Clause 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 GC 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 GC Sub-Clause 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 GC Sub-Clauses 42.3.1 or 42.3.2, the Employer shall pay to the



Contractor all payments specified in GC Sub-Clause 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 GC Sub-Clause 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 GC Sub-Clause 42.3.

42.4 In this GC 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 GC 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 to the Contract Agreement titled Terms and Procedures of Payment.

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 Claims

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 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 twenty-eight (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 twenty-eight (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 Sub-Clause 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 Sub-Clause, 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 forty-two (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 twenty-eight (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 forty-two (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 GC Clause 40, and/or (ii) the additional payment (if any) to which the Contractor is entitled under the Contract.

The requirements of this Sub-Clause are in addition to those of any other Sub-Clause which may apply to a claim. If the Contractor fails to comply with this or another Sub-Clause 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 Sub-Clause.

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 GC Clause 45 hereof.

45. Disputes and Arbitration

45.1 Appointment of the Dispute Board

Disputes shall be referred to a DB for decision in accordance with GC Sub-Clause 45.3. The Parties shall appoint a DB by the date **stated in the PC**.

The DB shall comprise, as **stated in the PC**, 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 DB shall comprise three persons, one of whom shall serve as chairman.

If the Parties have not jointly appointed the DB twenty-one (21) days before the date stated in the PC and the DB 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 PC**, the members shall be selected from those on the list, other than anyone who is unable or unwilling to accept appointment to the DB.

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 DB 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 Sub-Clause.

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 DB (including each member) shall expire at the end of the Defect Liability Period, as specified in GC Clause 27.

45.2 Failure to Agree on the Composition of the 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 DB by the date stated in the first paragraph of GC Sub-Clause 45.1;
- (b) either Party fails to nominate a member (for approval by the other Party) of a DB 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 DB by such date; or
- (d) the Parties fail to agree upon the appointment of a replacement person within forty-two (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 PC** shall, upon the request of either or both of the Parties and after due consultation with both Parties, appoint this member of the DB. 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 DB for its decision, with copies to the other Party and the Project Manager. Such reference shall state that it is given under this Sub-Clause.

For a DB of three persons, the DB shall be deemed to have received such reference on the date when it is received by the chairman of the DB.

Both Parties shall promptly make available to the DB all such additional information, further access to the Site, and appropriate facilities, as the DB may require for the purposes of making a decision on such dispute. The DB shall be deemed to be not acting as arbitrator(s).

Within eighty-four (84) days after receiving such reference, or within such other period as may be proposed by the DB and approved by both Parties, the DB shall give its decision, which shall be reasoned and shall state that it is given under this Sub-Clause. 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 with the performance of the Facilities in accordance with the Contract.

If either Party is dissatisfied with the DB's decision, then either Party may, within twenty-eight (28) days after receiving the decision, give notice to the other Party of its dissatisfaction and intention to commence arbitration. If the DB fails to give its decision within the period of eighty-four (84) days (or as



otherwise approved) after receiving such reference, then either Party may, within twenty-eight (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 Sub-Clause, and shall set out the matter in dispute and the reason(s) for dissatisfaction. Except as stated in GC Sub-Clauses 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 Sub-Clause.

If the DB 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 twenty-eight (28) days after it received the DB'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 GC Sub-Clause 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 (56th) 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

Any dispute between the Parties arising out of or in connection with the Contract not settled amicably in accordance with GC Sub-Clause 45.4 above and in respect of which the DB's decision (if any) has not become final and binding shall be finally settled by arbitration. Arbitration shall be conducted as follows:

- (a) if the Contract is with foreign Contractors (or if the lead partner is a foreign Contractor, in case of a JV), international arbitration with proceedings administered by the International Chamber of Commerce (ICC) and conducted under the ICC Rules of Arbitration, by one or more arbitrators appointed in accordance with said arbitration rules.
- (b) if the Contract is with domestic Contractors, arbitration with proceedings conducted in accordance with the laws



of the Employer's country.

The place of arbitration shall be a neutral location determined in accordance with the applicable rules of arbitration; and the arbitration shall be conducted in the language for communications defined in GC Sub-Clause 5.3 (Law and Language).

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 DB, relevant to the dispute. Nothing shall disqualify representatives of the Parties and 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 DB to obtain its(their) decision, or to the reasons for dissatisfaction given in its notice of dissatisfaction. Any decision of the DB shall be admissible in evidence in the arbitration.

Arbitration may be commenced prior to or after completion of the Facilities. The obligations of the Parties, the Project Manager and the DB shall not be altered by reason of any arbitration being conducted during the execution of the Facilities.

45.6 Failure to Comply with Dispute Board's Decision

In the event that a Party fails to comply with a DB 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 GC Sub-Clause 45.5. GC Sub-Clauses 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 DB in place, whether by reason of the expiry of the DB's appointment or otherwise:

- (a) GC Sub-Clauses 45.3 and 45.4 shall not apply; and
- (b) the dispute may be referred directly to arbitration under GC Sub-Clause 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 (“DB”) 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 DB 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 seventy (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 GC Sub-Clause 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 DB'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 DB'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 DB under GC Sub-Clause 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 twenty-eight (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 Operational Acceptance Certificate is issued for the whole of the Facilities.

With effect from the first day of the calendar month following the month in which Operational Acceptance Certificate is issued for the whole of the Facilities, 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 two 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, faxes and telexes: a receipt shall be required for each item in excess of five percent 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 twenty-four (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 PC 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 fifty-six (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 DB; 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 GC Sub-Clause 12.3.

If the Member does not receive payment of the amount due within seventy (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 forty-two (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 DB 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. 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 DB shall visit the site at intervals of not more than one hundred forty (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 DB, the period between consecutive visits shall not be less than seventy (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 DB, the Employer and the Contractor, or in the absence of agreement, shall be decided by the DB. The purpose of site visits is to enable the DB to become and remain acquainted with the progress of the Contract 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 co-ordinated by the Employer in co-operation 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 DB 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 DB one copy of all documents which the DB may request, including Contract documents, progress reports, variation instructions, certificates and other documents pertinent to the performance of the Contract. All communications between the DB and the Employer or the Contractor shall be copied to the other Party. If the DB 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 DB in accordance with GC Sub-Clause 45.3, the DB shall proceed in accordance with GC Sub-Clause 45.3 and these Guidelines. Subject to the time allowed to give notice of a decision and other relevant factors, the DB 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 DB 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 DB 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 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 DB, among other things, to:
 - (a) establish the procedure to be applied in deciding a dispute,
 - (b) decide upon the DB'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 DB 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 DB shall not express any opinions during any hearing concerning the merits of any arguments advanced by the Parties. Thereafter, the DB shall make and give its decision in accordance with GC Sub-Clause 45.3, or as otherwise agreed by the Employer and the Contractor in writing. If the DB 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.





BIDDING DOCUMENTS



MUMBAI METRO LINE 3 (COLABA-BANDRA-SEEPZ)

CONTRACT MM3-CBS-DEQ-9-03B

Design, Manufacture, Supply, Installation, Testing &
Commissioning of Catenary Maintenance Vehicle
for Project “Mumbai Metro Line-3”

Part 3 Conditions of Contract and Contract Forms

Section VIII Particular Conditions of Contract (PC)

September – 2023

Mumbai Metro Rail Corporation Ltd
MMRCL Line 3 Transit Office,
Wing A, Block E,
Bandra-Kurla Complex,
Bandra (East), Mumbai- 400 051, India.



Bidding Documents

Composition of Documents

Part 1	Bidding Procedure
Section I	Instructions to Bidders
Section II	Bid Data Sheet
Section III	Evaluation and Qualification Criteria
Section IV-A	Bidding Forms
Section IV-B	Pricing Document
Section V	Eligible Source Countries of Japanese ODA Loans
Part 2	Employer's Requirements
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Part 3	Conditions of Contract and Contract Forms
Section VII	General Conditions of Contract (GC)
Section VIII	Particular Conditions of Contract (PC)
Section IX	Contract Forms
Part 4	Drawings
Section X	Drawings



Section VIII. Particular Conditions

Notes on Particular Conditions

The Particular Conditions (PC) complement the General Conditions (GC) to specify data and contractual requirements linked to the special circumstances of the country, the Employer, or the overall project.

Whenever there is a conflict, the provisions herein shall prevail over those in the GC.



PARTICULAR CONDITIONS OF CONTRACT (PC)

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PARTICULAR CONDITIONS OF CONTRACT (PC)

These Particular Conditions of Contract add, amend, modify or delete Clauses contained in the General Conditions of Contract (Section VII), and shall take precedence over those contained in the General Conditions of Contract.

PC 1. Definitions	
PC 1.1	<p>Construction Manager shall mean the Contractor's Production Manager or his nominated subordinate Manager for manufacturing the Equipment to be supplied under the Contract.</p> <p>Contract Price shall be the Grand Summary in Schedule No. 6.</p> <p>Contractor's Representative shall mean the official/ Manager nominated by the Contractor and approved by the Employer in accordance with GC 17.2 of General Conditions of the Contract for all functions to be carried out as indicated in Clause 17.2.2.</p> <p>The Employer is Mumbai Metro Rail Corporation Ltd. (MMRC).</p> <p>The Project Manager or his Authorised Representative is the General Consultant for Mumbai Metro Line 3, AECOM Asia Company limited, Louis Berger Group Inc., Egis Rail and PADECO Co. Ltd. Consortium (commonly referred to as MAPLE).</p>
PC 1.1	<p>Add the following to GC 1.1:</p> <p>Engineer means the technical representative of the Project Manager/ Employer of Mumbai Metro Line 3 project authorised to interact with the Contractor for Facilities.</p> <p>Equipment is synonymous with Catenary Maintenance Vehicle, Plant, Plant & Equipment, M&P, Machine, Machinery.</p> <p>Final Payment shall mean the last payment made to the Contractor for the work done by the Contractor in pursuance of the Contract.</p> <p>Interim Payment shall mean all payments made to the Contractor for satisfactory compliance with a part of the Contractor's obligations in pursuance of the Contract other than the Final Payment.</p> <p>Performance Certificate means the Performance Certificate issued by the Project Manager on completion of all obligations of the Contractor in the Contract.</p> <p>Proprietary Information means any information or data including without limitation any written, printed or electronic documents, manufacturing, technical, registration and business information, sales, distribution and marketing data, samples, models, intellectual or industrial property including any patent, invention, copyright, design (whether or not it may be registered), trade secret, circuit layout design or tight in relation to circuit layouts, applications for registration of any such items, rights to confidential information, technical information, processes, techniques and know-how.</p> <p>Site Engineer shall mean the Engineer nominated by the Contractor for Installation, Testing & Commissioning of the Facilities.</p>



PC 1.2	<p>Insert the following:</p> <p>Abbreviations:</p> <p>AICPI- All India Consumer Price Index CIP- Carriage and Insurance Paid to CMRS- Commissioner of Metro Safety FOR-Free on Rail/Road MMRC- Mumbai Metro Rail Corporation Ltd OEM- Original Equipment Manufacturer Eqpt- Equipment RDSO- Research, Design & Standards Organization WPI- Wholesale Price Index</p>
PC 2. Contract Documents	
PC 2.1	<p>Add the following at the end of Clause:</p> <p>The Costs of Stamp Duties and similar charges (if any) imposed by Law in connection with entry into the Contract Agreement shall be borne by the Contractor.</p>
PC 5. Law and Language	
PC 5.1	The Contract shall be governed by and interpreted in accordance with the laws of Republic of India.
PC 5.2	The ruling language of the Contract is English.
PC 7. Scope of Facilities	
PC 7.3	<p>The period for supply of Spare Parts required for the Operation and Maintenance of the Facilities shall be up to 12 years after issue of Operational Acceptance Certificate. The price of such Spare Parts and Consumables shall be added to the Contract Price corresponding to the value of spares/ consumables ordered during the execution of Contract.</p> <p>Contractor shall carry sufficient inventories to ensure an ex-stock supply of all spares for the Plant. Spare parts and components (other than consumable spares) shall be supplied as promptly as possible, but at the most within six (6) months of placing the order. In addition, in the event of termination of the production of spare parts, advance notification for a minimum period of 6 months shall be made to the Employer of the pending termination, to permit the Employer to procure the needed requirement. Following such termination, the Contractor will furnish to the extent possible and at no cost to the Employer the blueprints, drawings and specifications of the spare parts, if requested.</p>
PC 7.4	<p>Add a new Sub-Clause 7.4:</p> <p>The Contractor shall provide his own lifting facilities at the port, transshipment points and depot for loading and unloading heavy equipment. The Contractor shall, however, be allowed to use any necessary Depot facilities such as traction and non-traction power, test track, material handling facilities, water and compressed air for assembly, inspection, testing, trials, commissioning and repairs (if any) to Equipment, subject to availability. The Employer shall, however, not</p>



	<p>be responsible for the adequacy, reliability and safety of the facilities if provided to the Contractor with or without charges.</p> <p>The finished offshore manufactured plant as well as Spares, Jigs, Fixtures, Special tools and Testing and Diagnostic equipment, etc. required to be delivered directly in the MMRC depot at site from the Indian Port shall be considered on DDP (Delivered duty paid) basis. The responsibility, risks and liabilities arising on account of import and delivery of these goods at site, i.e., freight, transportation, Insurance, unloading, custom clearance, inland transportation, unloading at site as specified by the Employer, etc. lie with the Contractor.</p>
PC 8. Time for Commencement and Completion	
PC.8.1	The Contractor shall commence work on the Facilities from the Effective Date for determining Time for Completion as specified in the Contract Agreement.
PC 8.2	The Time for Completion of the Facilities shall be as per the Key dates given in Appendix 1, Section VI-A, General Specifications, Part 2.
PC 9. Contractor's Responsibilities	
PC 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 provided by the Employer, and on the basis of information that the Contractor could have prudently obtained from data made available to the Contractor by the Employer as of the Base Date. 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 its obligations under the Contract.
PC 9.7	<p>Add Clause 9.7:</p> <p>“The Contractor shall provide sufficient properly qualified operating and maintenance personnel for the work of Installation, Testing and commissioning including the Guarantee Testing. He shall also 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, to properly carry out Pre-commissioning, Commissioning and Guarantee Tests, all in accordance with the provisions of the Appendix 6 to the Contract Agreement titled “Scope of Works and Supply by the Employer”, at or before the time specified in the program furnished by the Contractor under GC Sub-Clause 18.2 hereof and in the manner thereupon specified or as otherwise agreed upon by the Employer and the Contractor.”</p>



PC 10. Employer's Responsibilities	
PC 10.2	<p>Insert the following sentences at the end of GC Sub-Clause 10.2:</p> <p>Access and Possession to the site may not be exclusive to the Contractor for the purpose of Installation, Testing and Commissioning of the Facilities. Shared access shall be provided for the above specified work.</p> <p>For the above work of the Facilities, the Contractor may set up his office or install a portable cabin on the site allotted to him for this work. The Contractor will be provided, subject to availability, a total space approximately up to 15 sq. m. at (or near) Aarey depot for the setting up of Contractor's site offices and stores at the rate of Re 1 per sq ft per month for working on the Facilities. This site office shall be built after obtaining the approval of Employer for its broad design.</p>
PC 10.5	<p>Replace GC Sub-Clause 10.5 with the following:</p> <p>The Contractor shall provide sufficient properly qualified operating and maintenance personnel. He shall also 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 Employer to properly carry out Pre-commissioning, Commissioning and Guarantee Tests, all in accordance with the provisions of the Appendix 6 to the Contract Agreement titled "Scope of Works and Supply by the Employer", at or before the time specified in the program furnished by the Contractor under GC Sub-Clause 18.2 hereof and in the manner thereupon specified or as otherwise agreed upon by the Employer and the Contractor.</p>
PC 11. Contract Price	
PC 11.2	<p>The Contract is a Fixed Price contract and shall not be adjusted for any Price Adjustment to the Contract Price. The Prices of Recommended Spares shall be adjusted for variation as per Clause No 2, Appendix 2. Section IX, Part 3.</p>
PC 13. Securities	
PC 13.2.1	<p>Replace PC 13.2.1 with as under:</p> <p>The Contractor shall, within twenty-eight (28) days of the receipt of the Letter of Acceptance, provide a security of an amount equal to 110% of the advance payment calculated in accordance with the Appendix to the Contract Agreement titled Terms and Procedures of Payment, and in the same currency or currencies.</p>
PC 13.3.1	<p>Replace GC Sub-Clause 13.3.1:</p> <p>The Contractor shall, within twenty-eight (28) days of the receipt of the Letter of Acceptance, provide a security for the due performance of the Contract for an amount equalling 10% of the Contract Price in the forms specified in these bidding documents.</p>
PC 13.3.2	<p>The Performance Security shall be in the form of a Bank Guarantee as per the Form CF3, Section IX, Contract Forms, Part 3 as applicable.</p>



	The Performance Security should be in the form of a Bank Guarantee issued or confirmed by a Scheduled Bank in India.
PC 13.3.3	The Performance Security shall be released as under: 42 days after receipt of request from the Contractor and on satisfactory completion of DLP.
PC 14. Taxes and Duties	
PC 14.2	This Sub-Clause is deleted.
PC 14.3	Replace GC Sub-Clause 14.3 with the following: Without prejudice to the Provisions made in Clause 1.2.4, 1.2.5, 1.2.6 & 1.2.7 of Section IV-B, Part 1, 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 provide necessary supporting documents, where admissible, to enable the Contractor to benefit from any such tax savings to the maximum allowable extent.
PC 15. License/Use of Technical Information	
PC 15.2	Insert the following sentences at the end of GC Sub-Clause 15.2: The Contractor declares that other than Licensed Proprietary Information, all material and information collected or developed by the Contractor or any Sub-Contractor throughout the performance of the Contract or related thereto, including the Design, Manuals, all documents, drawings, opinion papers, analyses, ideas data, assessments, pre-final copies and any other written or unwritten product of the Contract, will remain in the hands of the Contractor or applicable Sub-Contractor, without derogating from the right of unlimited use by the Employer at no additional cost to the Employer. Notwithstanding the foregoing, the Contractor agrees that if the Employer demonstrates that such Work Products are not applicable to other projects and were not independently developed by or for the Contractor without reference to this Contract or the Works hereunder, then the rights in such work products will belong solely to the Employer and will be deemed the Employer's Proprietary Information, and neither the Contractor nor anyone on its behalf will have any claim or right (including any intellectual property right) with respect thereto, except the right to indicate its name on the applicable work product. In this case the Employer will be entitled to make any reasonable use of the work product at its sole discretion. Any software or computer program developed for effective operation of the Facilities shall be handed over to the Employer/ Project Manager or kept in safe custody at the site for quicker restoration of the functioning of the Facilities.
PC 16. Confidential Information	
PC 16.2	Replace GC Sub-Clause 16.2 with the following: Contractor and Employer shall treat the details of the Contract as private and confidential, except to the extent necessary to carry out



	<p>their respective obligations under the Contract or to comply with applicable Laws. Each of them shall not publish or disclose any particulars of the Contract prepared by the other Party without the previous agreement of the other Party.</p>
PC 17. Representatives	
PC 17.1	<p>Insert the following sentences at the end of GC Sub-Clause 17.1:</p> <p>The Project Manager may from time-to-time assign duties and delegate authority to assistants and may also revoke such assignment or delegation. These assistants may include an Engineer, and/or Independent Inspectors appointed to inspect and/or test items of Facilities and/or materials.</p>
PC 20. Design and Engineering	
PC 20.3.1	<p>Replace GC Sub-Clause 20.3.1 with the following:</p> <p>The Contractor shall prepare or cause its Sub-Contractors to prepare and furnish to the Project Manager the documents required in the Employer's Requirement VI-A & VI-B, documents required to satisfy all regulatory approvals including documents required for CMRS and RDSO approval, where required, as built documents and Operation & Maintenance manuals for Approval or Review, for its approval or review as specified and in accordance with the requirements of GC Sub-Clause 18.2 (Program of Performance).</p> <p>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.</p>
PC 20.3.2 to 20.3.7	<p>GC Sub-Clauses 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.</p>
PC 20.3.5	<p>Replace GC Sub-Clause 20.3.5 with the following:</p> <p>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 the Contractor shall give notice of dissatisfaction to the Project Manager who shall give instructions as to whether and if so, how, performance of the Contract is to proceed.</p> <p>The Contractor shall proceed with the Contract in accordance with the Project Manager's instructions. The dispute shall be resolved through arbitration and the Contractor shall be reimbursed by the Employer, if the Arbitrator(s) uphold the Contractor's view on the dispute, 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 Arbitrator(s) shall decide.</p> <p>The Contractor shall proceed with the Contract in accordance with the Employer's instructions.</p>



PC 22. Installation	
PC 22.2.5	<p>Working Hours:</p> <p>Normal working hours will be from 9:00 AM to 6:00 PM with one-hour lunch break from 13:00 hrs to 14:00 hrs. Any change in Normal working hours shall be advised by the Project Manager or the Employer.</p> <p>Multiple shifts involving work at night or outside normal working hours is permitted for all operations provided temporary lighting equipment as per a layout issued with a Notice from the Project Manager, shall be provided, installed, maintained for the duration of the Contract and removed after completion of work by and at the expense of the Contractor.</p> <p>The Contractor shall allow in his construction programme for local festivals that are not included in the list of Maharashtra public holidays. No extra payment will be made to the Contractor for the provision of such measures.</p>
PC 22.2.8	<p>Replace GC Sub-Clause 22.2.8 with the following:</p> <p>Funeral Arrangements:</p> <p>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 at Contractor's own risk and cost. The Contractor shall indemnify both the Employer and Project Manager for any harms/loss.</p>
PC 23. Test and Inspection	
PC 23.2	<p>Replace GC Sub-Clause 23.2 with the following:</p> <p>The Employer and the Project Manager or their designated representatives shall be entitled to attend the aforesaid test and/or inspection, and that the Contractor shall bear all costs and expenses incurred in connection with such attendance including, but not limited to, all traveling and board and lodging expenses.</p>
PC 23.6	<p>Add the following as second Paragraph to GC Sub-Clause 23.6:</p> <p>If such rejection and retesting cause the Employer or Project Manager or their Representatives to incur additional costs, such costs shall be recoverable from the Contractor by the Employer and may be deducted by the Employer from any sum due, or to become due, to the Contractor.</p>
PC 23.7	<p>Replace GC Sub-Clause 23.7 with the following:</p> <p>In case of any dispute or difference of opinion, the work shall be continued as per the directions of the Project Manager and the matter may be referred, if required, to Arbitration.</p>
PC 24. Completion of the Facilities	
PC 24.2	<p>Delete sub-clause 24.2 and replace with the following:</p> <p>24.2: The Contractor shall provide operating and maintenance personnel as well as all raw materials, utilities, lubricants, chemicals, catalysts, facilities, services and other materials required for</p>



	commissioning of the Facilities or any part thereof.
PC 24.3	Replace the word in the clause ' Employer ' With the word Contractor '.
PC 24.5	Delete the Sub-Clause
PC 24.6	Delete the Sub-Clause
PC 25. Commissioning and Operational Acceptance	
PC 25.1.2	Replace GC Sub-Clause 25.1.2 with the following: The Contractor shall supply the operating and maintenance personnel for commissioning of the Facilities or any part thereof. The Contractor shall also provide the spares, lubricants, facilities, services and other matters required for commissioning of the Facilities or any part thereof.
PC 25.2.2	The Guarantee test of the Facility or the relevant part thereof needs to be completed within the period of 90 days from the date of completion.
PC 26. Completion Time Guarantee	
PC 26.2	The liquidated damages shall be as specified in Appendix 1, Contract Key Dates & Access Dates, Section VI-A, Part 2.
PC 26.3	No bonus will be given for earlier Completion of the Facilities or Part thereof.
PC 27. Defect Liability	
PC 27.2	Replace the first sentence in GC Sub-Clause 27.2 with the following: Defect Liability Period (DLP) The Defect Liability Period for the Facility shall commence from the date of issue of Operational Acceptance Certificate and expire twenty-four (24) months thereafter.
PC 27.7	Reasonable period of time shall be taken as 14 days.
PC 27.8	Replace GC Sub-Clause 27.8 with the following: If a defect is made good under this GC 27, the Defect Liability Period for the item which has been made good shall extend for a period of twenty-four (24) months from such making good. However, in no event shall the Defect Liability Period extend beyond forty-eight (48) months after the date of Operational Acceptance.
PC 27.10	Add new GC Sub-Clause 27.10: Upon satisfactory completion of DLP of the Contract, the Project Manager shall issue the Performance Certificate for the satisfactory performance of the Contract, stating the date on which the Contractor completed his obligations under the Contract. The Project Manager shall issue the Performance Certificate (Facilities) within 28 days after the latest of the expiry dates of the Defect Liability Period for Contract and on submission of the request for issue of the Performance Certificate along with all the Documents required under the Contract.



PC 30. Limitations of Liability	
PC 30.1 (b)	The multiplier of the Contract Price is: 1
PC 31. Transfer of Ownership	
PC 31.1	Replace GC Sub-Clause 31.1 with the following: 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 having delivered to the Site (MML3 Depot).
PC 34. Insurance	
PC 34.6	Delete 2nd sentence in this Sub-Clause 34.6.
PC 39. Change in the Facilities	
PC 39.2.7	Replace the last para of GC Sub-Clause 39.2.7 with the following: If the Contractor and the Project Manager cannot reach agreement within thirty (30) days from the date of issue of the Pending Agreement Change Order, then the matter may be referred to the Employer for determination whose decision shall be final.
PC 40. Extension of Time for Completion	
PC 40.2	Replace the 1st para of GC Sub-Clause 40.2 with the following: 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.
PC 42. Termination	
PC 42.2.5	Add the following at the end of Clause 42.2.5: In such case, the portion of the Advance payment as due to the employer shall be deemed as interest bearing Advance at an interest of 2 percentage points above the SBI Base Rate for the relevant period, compounded daily, for the duration, such amount was available with the Contractor.
PC 44. Claims, Disputes and Arbitration	
PC 44.1	Replace the last para with the following: 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 arbitration as per Clause PC 45.5.
PC 44.2	Add new Sub-Clause PC 44.2: Employer's Claims If the Employer considers himself to be entitled to any payment under any Clause of these Conditions or otherwise in connection with the Contract, and/or to any extension of the Defects Liability Period, the Employer or the Project Manager shall give notice and Particulars thereof to the Contractor. The notice shall be given as soon as practicable and no longer than



	<p>28 days after the Employer became aware, or should have become aware, of the event or circumstances giving rise to the claim. A notice relating to any extension of the Defects Liability Period shall be given before the expiry of Defects Liability Period.</p> <p>The Particulars shall specify the Clause or other basis of the claim and shall include substantiation of the amount and/or extension to which the Employer considers himself to be entitled in connection with the Contract.</p> <p>The Employer/ Project Manager shall determine,</p> <p>(i) the amount (if any) which the Employer is entitled to be paid by the Contractor, and/or</p> <p>(ii) the extension (if any) of the Defects Liability Period.</p> <p>This amount as at (i) above may be included as a deduction in the Contract Price and Payment Certificates. The Employer shall only be entitled to set off against or make any deduction from an amount certified in a Payment Certificate, deduct the same from Performance Security or to otherwise claim against the Contractor, in accordance with this Sub- Clause.</p> <p>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 arbitration as per clause PC 45.5.</p>
PC 45. Disputes and Arbitration	
PC 45.1	Replace GC Sub-Clause 45.1 with the following: There will be no Dispute Board appointed for this Contract.
PC 45.2	Deleted.
PC 45.3	Deleted
PC 45.4	Replace GC 45.4 with the following: In case of any dispute between the Parties arising out of or in connection with the Contract, both Parties shall attempt to settle the dispute amicably. In case of failure to reach a settlement on the full or a part of the dispute or if the Parties agree otherwise, the case shall be settled through Arbitration by a sole Arbitrator. Unless both Parties agree otherwise, arbitration may be commenced on or after the fifty-sixth (56 th) day after the day on which notice of intention to commence arbitration was given, even if no attempt at amicable settlement has been made.
PC 45.5	Replace GC Sub-Clause 45.5 with the following: Arbitration shall be conducted as per Indian Arbitration and Conciliation Act 1996 (as amended from time to time): The place of arbitration shall be any International Arbitration Centre located in India and the arbitration shall be conducted in the language for communications defined in GC Sub-Clause 5.3 (Law and Language).
PC 45.6	Deleted
PC 45.7	Deleted

----- End of Section VIII -----



BIDDING DOCUMENTS



MUMBAI METRO LINE 3 (COLABA-BANDRA-SEEPZ)

CONTRACT MM3-CBS-DEQ-9-03B

Design, Manufacture, Supply, Installation, Testing &
Commissioning of Catenary Maintenance Vehicle
for Project "Mumbai Metro Line-3"

Part 3 Conditions of Contract and Contract Forms

Section IX

Contract Forms

September – 2023

**Mumbai Metro Rail Corporation Ltd
MMRCL Line 3 Transit Office,
Wing A, Block E,
Bandra-Kurla Complex,
Bandra (East), Mumbai- 400 051, India.**



Bidding Documents

Composition of Documents

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Section V	Eligible Source Countries of Japanese ODA Loans
Part 2	Employer's Requirements
Section VI-A	Employers Requirements – General Specifications
Section VI-B	Employer's Requirements – Technical Specifications
Part 3	Conditions of Contract and Contract Forms
Section VII	General Conditions of Contract (GC)
Section VIII	Particular Conditions of Contract (PC)
Section IX	Contract Forms
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CF1- Notification of Award - Letter of Acceptance

(On letter head paper of the Employer)

(----- dd-mm-yyyy -----)

To: [-----name and address of the Contractor-----]

Subject: Notification of Award of Contract No. MM3-CBS-DEQ-9-03B

This is to notify you that your Bid dated (----date----) for execution of “**Design, Manufacture, Supply, Installation, Testing & Commissioning of Catenary Maintenance Vehicle**” for Project “Mumbai Metro Line-3.

(MM3-CBS-DEQ-9-03B) for the ‘Contract Price’ in the aggregate of (----amount in words and figures-----) (----name of currency-----), as corrected and modified in accordance with the Clause -----, Section I, Instructions to Bidders, is hereby accepted by Mumbai Metro Rail Corporation Limited (MMRC).

You are requested to furnish the Performance Security @ 10% of the Contract Price for the work of “Design, Manufacture, Supply, Installation, and Testing & Commissioning of **Catenary Maintenance Vehicle** within twenty-eight (28) days in accordance with the Conditions of Contract, using for that purpose the Performance Security Form, CF3, Section IX, Contract Forms, Part 3.

Authorized Signature:

Name and Title of Signatory:

Name of Employer:



CF2- Contract Agreement

THIS AGREEMENT is made the _____ day of _____,
2019

BETWEEN

- (1) Mumbai Metro Rail Corporation Ltd., a corporation incorporated under the laws of India and having its principal place of business at Mumbai Metro Rail Corporation Ltd, MMRCL Line 3 Transit Office, Wing 'A', 'E' Block, Bandra-Kurla Complex, Bandra (East), Mumbai- 400 051, India, (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 for the 'Design, Manufacture, Installation, and Testing & Commissioning of **Catenary Maintenance Vehicle** (hereinafter called “the Facilities”) and the Contractor has 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 Clause 2: General Conditions (“GC”)). 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 Appendices including hereto
- b) The Letter of Acceptance
- c) Addenda
- d) Letter of Technical Bid
- e) Letter of Price Bid
- f) Particular Conditions of Contract (Part 3, Section VIII)
- g) General Conditions of Contract (Part 3, Section VII)
- h) Employer’s Requirements (Part 2, Section VI-B)
- i) Employer’s Requirements (Part 2, Section VI-A)
- j) Pricing Document (Part-1, Section IV-B)
- k) Other completed Bidding Forms submitted with the Bid.
- l) Evaluation and Qualification Criteria (Part-1, Section III)
- m) Reference Drawings (Part 4, Section X)
- n) Pre-bid and post-bid clarifications and reply thereof
- o) Acknowledgment of Compliance with Guidelines for Procurement under Japanese ODA Loans
- p) Any other documents _____



- 1.2 Order of Precedence (Reference GC 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 GC 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 GC Clause 11)

The Employer hereby agrees to pay to the Contractor the Contract Price in the aggregate of (---- amount(s) in foreign currency (ies) in words and figures -----), and (---- amount in local currency in words and figures-----) in consideration of the performance by the Contractor of its obligations hereunder.

The Contract Price of the Contract shall be the aggregate of (----- amount(s) in foreign currency (ies) in words and figures -----), and (---- amount in local currency in words and figures -----) as specified in Schedule No. 6 (Grand Summary), or such other sums as may be determined in accordance with the terms and conditions of the Contract

2.2 Terms of Payment (Reference GC Clause 12)

The Contract Price shall be paid by the Employer to the Contractor at the times, in the manner, and in accordance with the provisions of Appendix 1 (Terms and Procedures of Payment) hereto.

The Employer shall instruct its bank to issue an irrevocable confirmed Letter of Credit made available to the Contractor for payments in foreign currencies in a bank in the country of the Contractor. The credit shall be for an amount of (---- *amount equal to the total named in Schedule 1 less the advance payment to be made for Plant and Equipment supplied from abroad* -----); and shall be subject to the Uniform Customs and Practice for Documentary Credits 1993 Revision, ICC Publication No. 600.

In the event that the amount payable under Schedule No. 1 is adjusted in accordance with GC 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 GC Clause 1)

The Effective Date from which the Time for Completion of the Facilities shall be counted is the date when the Letter of Acceptance is received and acknowledged by the Contractor.

Article 4. Communications

- 4.1 The address of the Employer for notice purposes, pursuant to GC Clause 4.1 is Mumbai Metro Rail Corporation Ltd, MMRCL Line 3 Transit Office, Wing 'A', 'E' Block, Bandra-Kurla Complex, Bandra (East), Mumbai 400 051, India.



4.2 The address of the Contractor for notice purposes, pursuant to GC Clause 4.1 is (----- Contractor's address -----).

Article 5. Appendices

5.1 The Appendices listed in the attached List of Appendices shall be deemed to form an integral part of this Contract Agreement.

5.2 Reference in the Contract to any Appendix shall mean the Appendices 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 _____

Signed by, for and on behalf of the Contractor _____

[Signature] _____

[Title] _____

in the presence of _____



APPENDICES

- APPENDIX 1 Terms and Procedures of Payment
- APPENDIX 2 Prices Adjustment
- APPENDIX 3 Insurance Requirements
- APPENDIX 4 Time Schedule
- APPENDIX 5 List of Major Items of Plant and Installation 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

1. In accordance with the provisions of GC Clause 12 (Terms of Payment), the Employer shall pay the Contractor in the following manner and at the following times, on the basis of the Price Breakdown given in the section on Price Schedules. Payments will be made in the currencies quoted by the Contractor. Applications for payment in respect of part deliveries may be made by the Contractor as work proceeds.

2. Terms of Payment

2.1. All payments against the work, except the Final payment, to Contractor's shall be made in accordance with GC Clause 12 within forty-five (45) days of the receipt of required documents. The final payment shall be made within fifty-six (56) days of the receipt of required documents. However, for MSMEs, the final payment shall be made as per the current provisions of MSME Act.

3. TERMS OF PAYMENT

3.1. Schedule No. 1. Plant and DLP spare parts to be supplied from abroad

In respect of plant and equipment supplied from abroad, the following payments shall be made:

- (i) Ten percent (10%) of the total DDP (Delivery at MMRCL Site) amount as an advance payment within twenty-one (21) days after receipt of invoice and an irrevocable advance payment security equivalent to 110% of the amount made out in favour of the Employer. The advance payment security may be reduced in proportion to the value of the plant and equipment delivered to the site, as evidenced by shipping and delivery documents.
- (ii) Seventy-five percent (75%) of the total or pro rata DDP (Delivery Duty Paid) amount, through LC upon completion of the following:
 - a) Receipt of signed/ certified commercial invoice of shipped items showing the description, quantity, and price of items shipped in duplicate.
 - b) Non-negotiable shipping documents / proof of dispatch (Bill of Lading/ Airway Bill).
 - c) Inspection Certificate issued by Employer's Representative after Factory Acceptance Test.
 - d) Insurance documents of shipped items.
 - e) Works Test Certificate.
 - f) Crate-wise packing list along with weight of each item in the list.
 - g) Certificate of country of origin issued by the appropriate authority.
 - h) Submission and issue of NoNO against all documents due till despatch of the Equipment.
- (iii) Ten percent (10%) of the total or pro rata DDP (Delivery at MMRCL Site) amount of total price of Schedule No. 1 upon issue of the Completion Certificate, within forty-five (45) days after receipt of invoice.
- (iv) Five percent (5%) of the total or pro rata DDP amount of total price of Schedule No. 1 shall be paid in 8 equal quarterly instalments upon satisfactory completion



of maintenance during the quarter of DLP, within forty-five (45) days after receipt of invoice.

3.2. Schedule No. 2. Plant and DLP spare parts to be supplied within the Employer's country

In respect of plant and equipment supplied from within the Employer's country, the following payments shall be made:

- (i) Ten percent (10%) of the total DDP (Delivery at MMRCL Site) amount as an advance payment within twenty-one (21) days after receipt of invoice, and an irrevocable advance payment security equivalent to 110% of the amount made out in favour of the Employer. The advance payment security may be reduced in proportion to the value of the plant and equipment delivered to the site, as evidenced by shipping and delivery documents.
- (ii) Seventy-five percent (75%) of the total or pro rata DDP (Delivery at MMRCL Site) amount, upon delivery at MMRCL Site within forty-five (45) days after receipt of invoice and on submission of the following documents:
 - a. Signed/ Certified commercial invoice of supplies delivered at Depot site showing the description, quantity, and price of items shipped in duplicate.
 - b. Non-negotiable shipping documents / proof of dispatch (Bill of Lading/ Airway Bill)
 - c. Inspection Certificate issued by Employer's Representative after Factory Acceptance Test.
 - d. Insurance documents of shipped items
 - e. Work Test Certificate.
 - f. Packing List.
 - g. Certified copy of Certificate of receipt of items at Depot site.
 - h. Submission of all documents due till delivery of the Equipment
- (iii) Ten percent (10%) of the total or pro rata DDP (Delivery at MMRCL Site) amount of total price of Schedule No. 2 upon issue of the Completion Certificate, within forty-five (45) days after receipt of invoice.
- (iv) Five percent (5%) of the total or pro rata DDP amount of total price of Schedule No. 1 shall be paid in 8 equal quarterly instalments upon satisfactory completion of maintenance during the quarter of DLP, within forty-five (45) days after receipt of invoice.

3.3. Schedule No. 3. Design Services

In respect of design services for both the foreign currency and the local currency portions, the following payments shall be made:

- (i) Ten percent (10%) of the total design services amount as an advance payment within twenty-one (21) days after receipt of invoice, and an irrevocable advance payment security equivalent to 110% of the amount made out in favour of the Employer.
- (ii) Ninety percent (90%) of the total or pro rata design services amount upon approval of design in accordance with GC Clause 20 by the Project Manager within forty-five (45) days the payments shall be made as % expressed below against each milestone in Table-1 below on receipt of Notice of No Objection from the Project Manager certifying the receipt and completeness of documents after receipt of invoice.



Table 1: Milestone

Item	Description	Percentage for Sub-Items
3.1	Submission and acceptance of the following: 1) Work Program 2) Interface Management Plan 3) Design drawings & Documents	60
3.2	Submission and acceptance of the following: 1) Project Implementation Plan 2) Quality Plan 3) RAMS Plan 4) BIM Submission	30
	Total	90

3.4. Schedule No. 4. Installation, Testing & Commissioning, and Other Services

In respect of installation services for both the foreign and local currency portions, the following payments shall be made:

- (i) Ten percent (10%) of the total installation services amount as an advance payment within twenty-one (21) days after receipt of invoice, and an irrevocable advance payment security equivalent to 110% of the amount made out in favour of the Employer. The advance payment security may be reduced in proportion to the value of work performed by the Contractor as evidenced by the invoices for installation services.
- (ii) Sixty percent (60%) of the Total Price quoted in Schedule No 4 for the Equipment on completion of Installation, Testing & Commissioning as per Clause 25.1 (excluding Guarantee tests), Section VII, Part 3 and on completion of training of O&M staff of the Employer as evidenced by the Employer's authorization of the Contractor's application shall be made within forty-five (45) days on receipt of invoice with documents as given below:
 - a) Signed/ certified commercial Invoice in duplicate,
 - b) Completion Certificate issued by the Project Manager,
 - c) Certificate of completion of training to Employer's O&M staff.
 - d) Submission of all documents due till commissioning of the Equipment
- (iii) Thirty percent (30%) of the total or pro rata value of installation services on issue of the Operational Acceptance Certificate and completion of all other obligations as per Clause 25, Section VII, Part 3 the Contract as evidenced by the Employer's authorization of the Contractor's application, within forty-five (45) days after the receipt of invoice.

In the event that the Employer fails to make any payment on its due date, the Employer shall pay to the Contractor interest on the amount of such delayed payment at the annual rate of two (2) percentage points above the SBI Base Rate of the currency (ies) of payment.



3.5. Payment Procedure

The procedures to be followed in applying for certification and making payments shall be as follows:

Application for Monthly Payment Certificate

The Contractor shall be entitled to submit to the Project Manager requests for monthly payments only upon the achievement of one or more of the Completed items described in the Schedules of Pricing Document (Section IV B, Part 1). At the beginning of each month, the Project Manager shall issue to the Contractor, certificate in respect of each Completed items achieved in the preceding month.

The Contractor shall submit a Statement in four copies to the Project Manager after the end of each month, in a form approved by the Project Manager, showing in detail the amounts to which the Contractor considers himself to be entitled, together with supporting documents which shall include the relevant report on progress. 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:

Any amount due in respect of Completed Items by the Project Manager under each Payment Schedule; (including Variations and items described in sub-paragraphs (a) to (e) below).

- (a) Any amounts to be added and deducted for changes in legislation and changes in cost, in accordance with Part-3, Section VII Clause 14 [Taxes and Duties] and Sub-Clause 14.4,
- (b) Any amount to be deducted as required for fulfilling statutory requirements,
- (c) Any other additions or deductions which may have become due under the Contract or otherwise, including but not limited to those with Part-3, Section VII under Clause 44 [Contractor's Claims]; and the deduction of amounts certified in all previous Payment Certificates.
- (d) Any amounts recoverable from the Contractor in accordance with the Contract for liquidated damages for not achieving key dates and or /milestones.
- (e) The Contractor shall not submit more than one request for interim payment per month. No monthly invoice will be accepted until the Employer has received and approved the Performance Security (as per the format given in Part-3 Section IX contract form CF3).

4. Issue of Monthly Payment Certificates

The Contractor shall agree with the person to whom the authority has been delegated by the Project Manager, the supplies/items completed in accordance with the Pricing Document (Part 1 Section IV B) and this Appendix-1. This sheet shall be signed and presented with the Contractors Monthly Payment Application.

Where quantities/items are specified against Price Schedule, the Project Manager shall ensure all quantities submitted for payment have been completed and are fit for purpose with no outstanding NCR's, etc.

All certified quantities should have supporting documents where specified and shall be submitted as part of the Contractor's application.



For payment against Foreign Currency portion as mentioned in Pricing Schedules contractor will have to produce proof of spending money in currency other than INR as part of supporting document with the application for monthly payment to the satisfaction of Project Manager.

Thereafter, the Project Manager shall, within 31 days of receiving a statement and supporting documents, deliver to the Employer, with a copy to the Contractor an Monthly Payment Certificate showing the amount which the Project Manager considers to be due; if no payment is considered to be due, the Project Manager shall promptly notify the Contractor accordingly.

Where only a part of the payment applied for is disputed, payment certificate shall be issued for the undisputed amount.

5. Issue of Final Payment Certificate

The Final Payment Certificate shall be prepared in accordance with the Contract after completion of the Contract in all respects as determined by the Project Manager (Refer GC Clause no 23, 24, 25, &26).

Within 28 days after receiving the Operational Acceptance Certificate in accordance with Part-3, Section-VII- GC Clause 25.3, the Project Manager shall issue, to the Employer, the Final Payment Certificate, which shall state:

- (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.

6. PAYMENT – INTERIM AND FINAL

(a) After certification by the Project Manager, payment of 100% of the certified monthly 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.

(b) Next 100% interim payment shall be made only after 100% payment of preceding monthly payment certified has been completed.

(c) The Employer shall pay the amount certified in the Final Payment Certificate within 45 days from the date of issue of the Certificate.

The Employer reserves the right to carry out a post payment audit and/or technical examination of the Facilities, and the Final account, including all supporting vouchers, abstracts, etc., and to make a claim on the Contractor for the refund of any excess amount paid to him, if as a result of such examination, any over-payment to him is discovered to have been made in respect of any work done or alleged to have been done by the Contractor, under the Contract. If any under-payment is discovered, the Employer shall pay the same to the Contractor. Such payments or recoveries, however, shall not be subject to any interest.



Appendix 2- Price Adjustment

1. Price Adjustment:

- 1.1 The portion of the contract for supply of Equipment is a fixed price contract and hence not subject to any Price Adjustment.

2. Price Adjustment on Recommended Spares:

- 2.1 Employer may exercise the option to procure individual Spares listed in the Schedule No 7, Price Schedule, Section IV-B, Part 1 and DLP Spares listed in Section IV-B, Part 1 at any time up to twelve (12) years from the date of issue of Operational Acceptance Certificate. The price quoted for these spares shall remain fixed till the issue of Operational Acceptance Certificate. Thereafter, the Procurement Price in such case shall be adjusted as under:

- a) Spares procured in Foreign Currency- at the rate of 2% increase per annum or part thereof
- b) Spares procured in local currency- adjusted on the basis of % change in WPI for Commodity Code 1318000000 (Machinery & Equipment) published by Economic Advisor, Ministry of Commerce & Industry, Govt of India at website <http://eaindustry.nic>.

The escalation in both the above cases shall be applicable on the quoted rates from the date of Operational Acceptance to the date of purchase order. The Base Date of WPI shall be of the month of date of Operational Acceptance Certificate.



Appendix 3- Insurance Requirements

Insurances to be Taken Out by the Contractor

In accordance with the provisions of GC 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 insurances 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.

Data to be filled in by Bidder based on Bidder's quote in pricing documents.

Amount [in currency(ies)]	Deductible limits [in currency(ies)]	Parties insured [names]	From [place]	To [place]

The Contractor shall insure the plants, Facilities, all material and Contractor's document for not less than the full replacement cost including costs of demolition, removal and professional fee and profit.

b) **Installation All Risks Insurance**

Covering physical loss or damage to the Facilities at the Site, occurring prior to Operational Acceptance of the Facilities, with 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.

Data to be filled in by Bidder based on Bidder's quote in pricing documents.

Amount [in currency(ies)]	Deductible limits [in currency(ies)]	Parties insured [names]

The Contractor shall insure the Works, plant, Material and Contractor's document including fire, theft, accidental damages and other natural calamities for not less than the full reinstatement cost including costs of demolition, removal and professional fee and profit.



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]

The Insurance shall cover for 0.8 million Indian rupees for any one incident and for unlimited number of incidents.

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 supply and installation of the Facilities. Comprehensive insurance in accordance with statutory requirements.

Automobile Liability should confirm to requirements of Indian Motor Vehicles Act.

e) **Workers' Compensation**

In accordance with the statutory requirements applicable in any country where the Facilities or any part thereof is executed. Each worker shall be insured as per "The Workmen's Compensation Act. 1923" and for not less than 0.8 million Indian rupees.

f) **Employer's Liability**

In accordance with the statutory requirements applicable in India where the Facilities or any part thereof is executed. Each worker shall be insured as per "The Workmen's Compensation Act. 1923" and for not less than 0.8 million Indian rupees per person and for 5 personnel of Engineer/ Employer.

g) **Professional Indemnity**

The Contractor shall provide insurance cover for not less than 3% (three percent) of the Contract Price. The cover is for the financial consequences of professional negligence, following a breach of professional duty by way of neglect, error or omission, additionally, cover is provided in respect of any legal and other costs and expenses incurred, occurring in connection with the design and construction of the temporary and permanent works of the Facilities.

h) **Other Insurances:**

The Contractor is also required to take out and maintain at its own cost the following insurances: **Not Applicable.**



The Employer shall be named as co-insured under all insurance policies taken out by the Contractor pursuant to GC Sub-Clause 34.1, except for the Workers' Compensation and Employer's Liability Insurances, and the Contractor's Subcontractors shall be named as co-insurers under all insurance policies taken out by the Contractor pursuant to GC Sub-Clause 34.1, except for the Cargo, 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.

Insurances - To be taken out by the Employer

The Employer will not take out any insurance during the performance of the Contract.

The Contractor shall at its own expense take out, including paying any additional dues for any claim and maintain in effect during the performance and including the Defect Liability Period of the Contract all insurances as stated in the Specification and Contract Agreement.



Appendix 4- Time Schedule

[The Contractor shall be required to submit with its Bid a detailed program, normally in the form of a bar chart, showing how and the order in which it intends to perform the Contract and showing the key events requiring action or decision by the Employer. The attached schedule shall adhere to the Time(s) for Completion as given in key dates in Appendix 1, Section VI-A, Part 2.

The whole of the works shall be completed and delivered in stages (key dates) within time stipulated as shown in Appendix 1, Section VI-A, Part 2.



Appendix 5- List of major items of Plant & Equipment

A list of major items of Plant and Installation Services is provided below.

The following Subcontractors and/or manufacturers are approved for carrying out the items of the Facilities indicated below. Where more than one Subcontractor are 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 GC 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 Installation Services	Approved Subcontractors/Manufacturers	Nationality



Appendix 6- Scope of Works and Supply (ies) by the Employer

- 1) Space for storage of the items of Equipment upon delivery at the Site shall be provided by the Employer.
 - 2) Any civil work necessarily required for installation of the Equipment and agreed to in the interface documents shall be provided by the Employer.
 - 3) Electricity for charging of batteries and compressed air, if required, shall be given free of cost for installation, testing, commissioning and maintenance purpose, if available with MMRC and in a position to be offered for use. However, the Contractor shall keep his arrangements ready and available for commissioning the Facilities.
 - 4) The Employer shall not supply any material or Equipment for the Works, unless found feasible by the Employer.
 - 5) Employer's operating and maintenance staff may be present during the installation and commissioning phase for training purpose.
-



Appendix 7- List of Documents for Approval or Review

The Contractor shall refer to Section VI-A and Section VI-B of Part 2 for all the submittals.



Appendix 8- Functional Guarantees

The Contractor shall design, manufacture and install the Equipment to provide the availability of the equipment for its intended functions as specified in Clause 1.11, Functional Guarantees, Section VI-B, Technical Specifications, Part 2.

The considerations listed below shall be guaranteed at each stage of the Contractor's works:

1. The attainment of the reliability, availability, and maintainability and safety requirements of the system will be verified by testing & commissioning and system demonstrations as required in the Technical Specification.
 2. The attainment of the operating performance requirements as required in Technical Specification shall be verified before Operational Acceptance.
 3. The design and commissioning of the Equipment shall ensure the various RAMS figures mentioned in **Clause 1.11**, Section VI-B, Part 2 with highest priority on safety.
-



CF3- Performance Security - Bank Guarantee

(To be stamped in accordance with the Stamp Act of the Country of Issuing Bank)
[Guarantor letterhead or SWIFT identifier code]

Beneficiary: Mumbai Metro Rail Corporation Ltd, MMRCL Line 3 Transit Office,
Wing 'A', 'E' Block, Bandra-Kurla Complex, Bandra (East) Mumbai 400 051, India

Date: (-----date of issue-----)

PERFORMANCE GUARANTEE No.: (-----guarantee reference number-----)

Guarantor: (-----name and address of place of issue-----)

We have been informed that (----- name of Contractor ----- or ----- name of the joint venture -----) (hereinafter called "the Applicant") has entered into Contract Agreement No. _____ dated _____ with the Beneficiary, for the execution of Design, Manufacture, Supply, Installation, Testing & Commissioning of **Catenary Maintenance Vehicle** (MM3-CBS-DEQ-9-03B) for the Mumbai Metro Line 3 Project (hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, a performance guarantee is required for execution of the Contract.

At the request of the Applicant, we as Guarantor, hereby irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of (-----amount of guarantee in words and in figures-----), such sum being payable in the types and proportions of currencies in which the Contract Price is payable, upon receipt by us of the Beneficiary's complying demand supported by the Beneficiary's statement, whether in the demand itself or in a separate signed document accompanying or identifying the demand, stating that the Applicant is in breach of its obligation(s) under the Contract, without the Beneficiary needing to prove or to show grounds for its demand or the sum specified therein.

This guarantee shall expire no later than the earlier of:

- (a) 42 days after DLP of the Contract including DLP, or
 - (b) Latest by date ----- (Date to be filled up by Employer after award of Contract).
- Consequently, any demand for payment under this guarantee must be received by the Guarantor at its office on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision ICC Publication No. 758 (or subsequent ICC Publication),

SIGNATURE AND SEAL OF THE GUARANTOR _____

NAME OF BANK _____

ADDRESS _____

DATE _____



CF4- Advance Payment - Bank Guarantee

(To be stamped in accordance with the Stamp Act of the Country of Issuing Bank)
[Guarantor letterhead or SWIFT identifier code]

Beneficiary: Mumbai Metro Rail Corporation Ltd, MMRCL Line 3 Transit Office,
Wing 'A', 'E' Block, Bandra-Kurla Complex, Bandra (East) Mumbai 400 051, India

Date: [date of issue]

ADVANCE PAYMENT GUARANTEE No.: [guarantee reference number]

Guarantor: [name and address of place of issue]

We have been informed that [name of Contractor or name of the joint venture] (hereinafter called "the Applicant") has entered into Contract Agreement No. _____ dated _____ with the Beneficiary, for the execution of "Design, Manufacture, Supply, Installation, Testing and Commissioning of **Catenary Maintenance Vehicle** (MM3-CBS-DEQ-9-03B) for the Mumbai Metro Line 3 Project.

Furthermore, we understand that, according to the conditions of the Contract, an advance payment in the sum of ----- (amount in words and figures) ----- is to be made against an advance payment guarantee.

At the request of the Applicant, we as Guarantor, hereby irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of (amount in words and figures) upon receipt by us of the Beneficiary's first demand in writing accompanied by a written statement stating that the Applicant is in breach of its obligation under the Contract because the Applicant used the advance payment for purposes other than toward the execution of the Works.

A demand under this guarantee may be presented as from the presentation to the Guarantor of a certificate from the Beneficiary's bank stating that the advance payment referred to above has been credited to the Applicant on its account number _____ at (name and address of Applicant's bank).

The maximum amount of this guarantee shall be progressively reduced in proportion to the value of each part-shipment or part-delivery of Plant and Equipment to the site, as indicated in copies of the relevant shipping and delivery documents that shall be presented to the Guarantor. This guarantee shall expire, at the latest,

- (a) upon the Guarantor's receipt of documentation indicating full repayment by the Applicant of the amount of the advance payment, or
(b) on the ___ day of _____ (42 days after completion of the Contract including DLP), whichever is earlier.

Consequently, any demand for payment under this guarantee must be received by the Guarantor at its office on or before one year from the date of expiry of the Guarantee.

This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 758.

SIGNATURE AND SEAL OF THE GUARANTOR _____

NAME OF BANK _____

ADDRESS _____

DATE _____



BIDDING DOCUMENTS



MUMBAI METRO LINE 3 (COLABA-BANDRA-SEEPZ)

CONTRACT MM3-CBS-DEQ-9-03B

Design, Manufacture, Supply, Installation, Testing &
Commissioning of Catenary Maintenance Vehicle
for Project "Mumbai Metro Line-3"

PART 4 Drawings

Section X List of Drawings

September – 2023

**Mumbai Metro Rail Corporation Ltd
MMRC Line 3 Transit Office,
Wing 'A', 'E' Block,
Bandra-Kurla Complex,
Bandra (East), Mumbai 400 051, India**



Bidding Documents

Composition of Documents

Part 1	Bidding Procedure
Section I	Instructions to Bidders
Section II	Bid Data Sheet
Section III	Evaluation and Qualification Criteria
Section IV-A	Bidding Forms
Section IV-B	Pricing Document
Section V	Eligible Source Countries of Japanese ODA Loans
Part 2	Employer's Requirements
Section VI-A	Employers Requirements – General Specifications
Section VI-B	Employer's Requirements – Technical Specifications
Part 3	Conditions of Contract and Contract Forms
Section VII	General Conditions of Contract (GC)
Section VIII	Particular Conditions of Contract (PC)
Section VIII-A	Special Conditions of Contract for Comprehensive Maintenance Service
Section IX	Contract Forms
Part 4	Drawings
Section X	Drawings



BIDDING DOCUMENTS



MUMBAI METRO LINE 3 (COLABA-BANDRA-SEEPZ)

CONTRACT MM3-CBS-DEQ-9-03B

Design, Manufacture, Supply, Installation, Testing &
Commissioning of Catenary Maintenance Vehicle
for Project "Mumbai Metro Line-3"

Part 4 Drawings

Section X Drawings

September – 2023

**Mumbai Metro Rail Corporation Ltd
MMRC Line 3 Transit Office,
Wing A, Block E,
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List of Drawings

Drg.No.	Drawing No.	Drawing Title
1	MML3-CBS/MMRC/IC/DEP/AR/106	Aarey Depot Masterplan
2	MM3-GC-SOD-GD-0161001	Kinematic Envelope of Rolling Stock
3	MM3-GC-TUN-CS-001	Typical cross-section of Tunnel
4	NH00001595536/NHD0001687961	Front Automatic Coupler
5	RDSO Sketch 91146	Worn Wheel Profile
6	Annexure 1	Vertical Alignment Details
7	SOD	Attached as Annexure 1

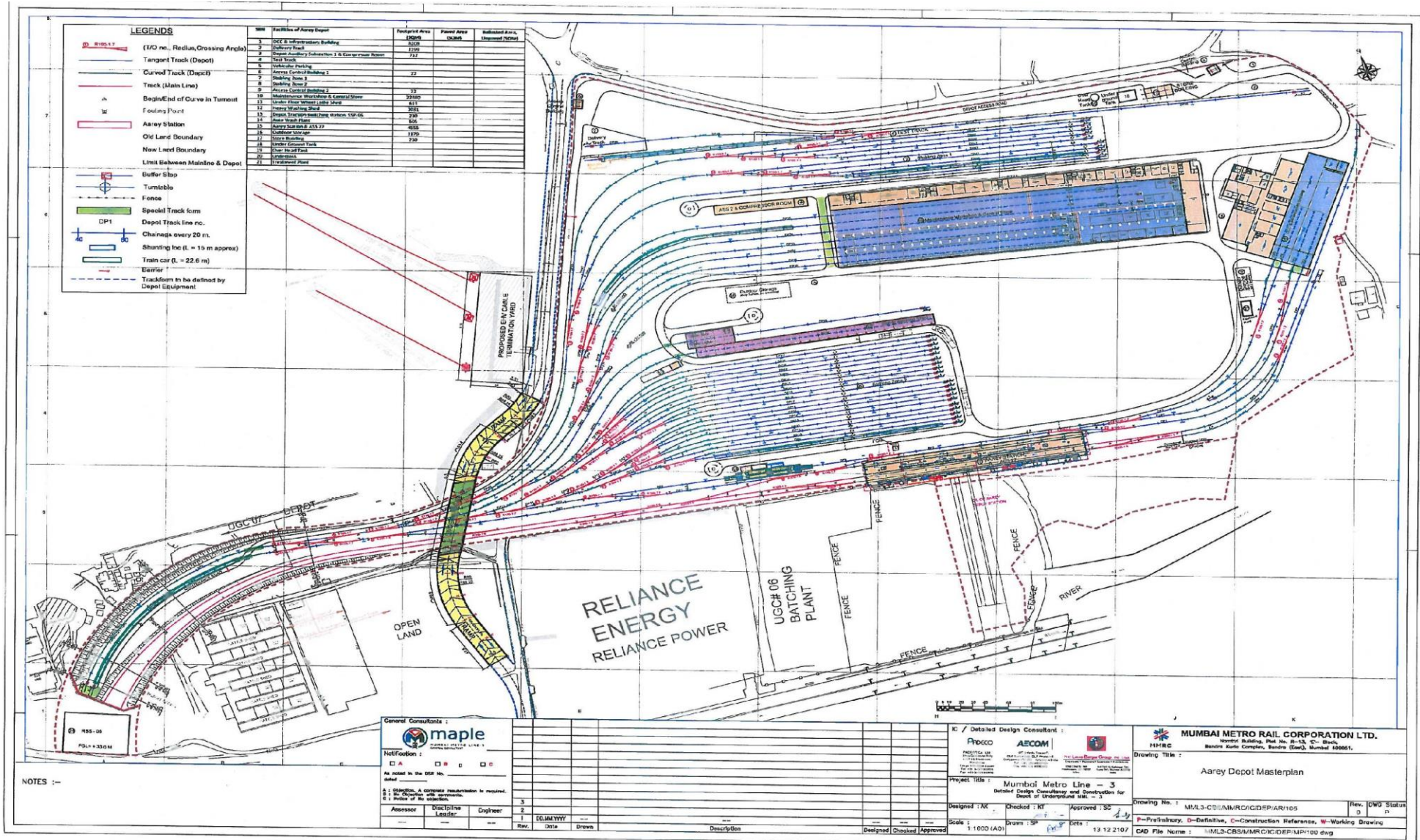


Aarey Depot Masterplan

Contract MM3-CBS-DEQ-9-03B

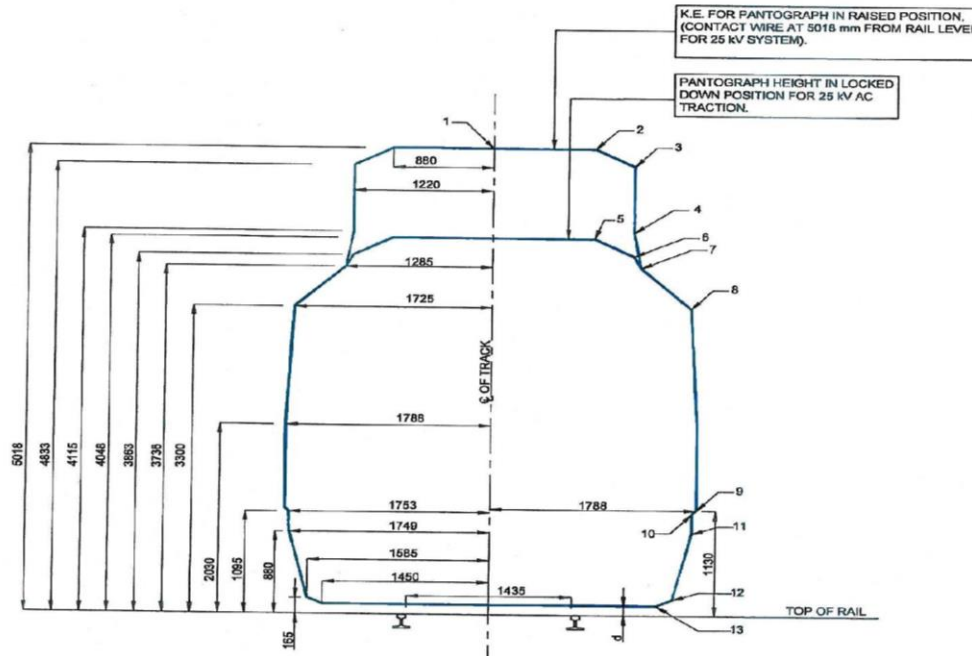
Part 4 - Drawings

Section X - Drawings



Kinematic Envelope

MMRC-1



CO-ORDINATES OF K.E		
	X	Y
1	0	5018
2	880	5018
3	1220	4833
4	1220	4115
5	880	4048
6	1220	3863
7	1285	3736
8	1725	3300
9	1785	1130
10	1753	1095
11	1749	880
12	1585	165
13	1450	d

NOTES:

1. ALL DIMENSION ARE IN mm UNLESS OTHERWISE STATED.
2. HORIZONTAL CLEARANCE DUE TO CURVES SHALL BE ADDED IF PLATFORM IN CURVE.
3. THE KINEMATIC ENVELOPE IS VALID FOR VEHICLES WITH SEALED WINDOWS AND DOORS CLOSED WHILE IN MOTION.
4. CONDUCTOR HEIGHT ABOVE RAIL LEVEL SHALL ALSO TAKE INTO CONSIDERATION PRESCRIBED ELECTRICAL CLEARANCES BETWEEN ALL LIVE OVERHEAD EQUIPMENT AND PANTOGRAPH / VEHICLE AND PARTS THEREOF.
5. A TYRE OR AN ATTACHMENT OF A WHEEL MAY PROJECT BELOW THE MINIMUM HEIGHT IS OF KINEMATIC ENVELOPE FOR DISTANCE OF 51 mm INSIDE AND 216 mm OUT SIDE THE WHEEL GAUGE FACE.
6. DIMENSION 'd' SHALL BE 75 mm (MINIMUM) FOR BOGIE MOUNTED EQUIPMENT FOR FULLY LOADED STATIC VEHICLE AND 102 mm (MINIMUM) IN FULLY LOADED CONDITION FOR BODY MOUNTED EQUIPMENT EXCEPT AS LAID DOWN AT ITEM 8 ABOVE, AND 50mm UNDER DYNAMIC CONDITION. REFERENCE : SOD PARA 1.5 AND SOD PARA 3.1.3(ii)
7. KINEMATIC ENVELOPE IS VALID FOR SPEED UPTO 95KMPH DESIGN SPEED AND UPTO 88KMPH OPERATING SPEED MAXIMUM

FIG. MMRC-1
 Ref. SOD Para 1.5 (a) & 3.1.3 (ii)



GENERAL CONSULTANCY SERVICES
 FOR MUMBAI METRO RAIL PROJECT, LINE 3
 COLABA- BANDRA-SEEPZ

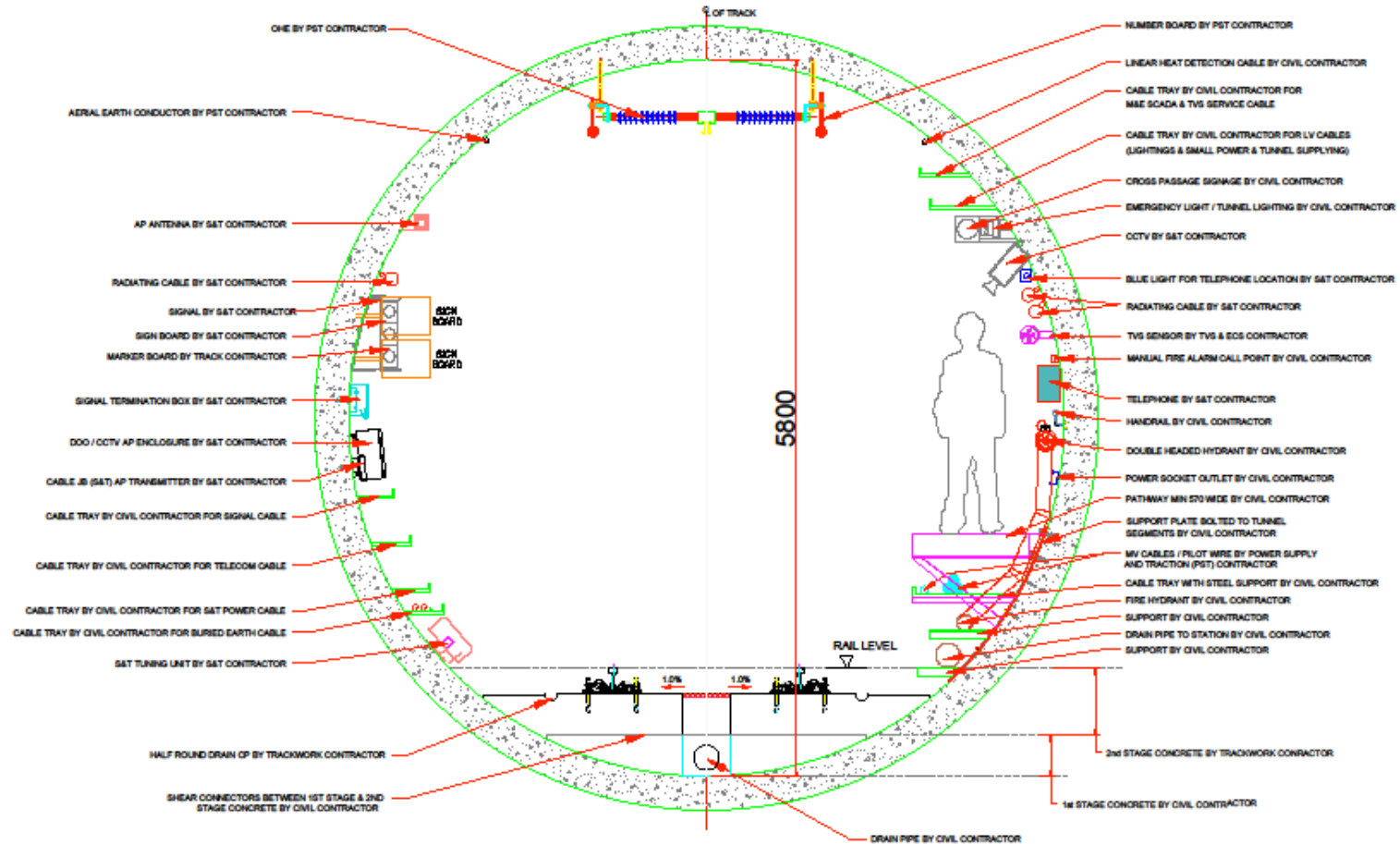
REV.	DATE	PREP.	APPR.	DESCRIPTION	DRAWN BY	CHKD BY	DATE	PROJECT
C	16-01-2018	MMV	RLM	COMMENT R200 08.02.17 INCORPORATED	MMV	MMV	16-01-2018	MUMBAI METRO LINE 3 COLABA-BANDRA-SEEPZ
B	02-06-2017	HSM	RLM	COMMENT R200 23.05.17 INCORPORATED	FOR RB	ISAC		
A	11-01-2017	KGB	RLM	FIRST ISSUE				

SCALE	DRAWING TITLE	DRAWING NO.
1:40 (AS SIZED)	KINEMATIC ENVELOPE: AT - GRADE AND ELEVATED SECTION ON LEVEL OR CONSTANT GRADE TANGENT TRACK	MM3-GC-SOD-GD-0161001

PRINTED ON: JUL-17



Tunnel Cross-Section (MM3-GC-TUN-CS-001)



TYPICAL TUNNEL CROSS-SECTION WITH SERVICES (INDICATIVE)

SCALE : 1/20



Front Automatic Coupler

1) *) erforderliche Contour des Ausschnitts im Untergestell zum Durchschleichen der Kupplungsstange / required outline of cutout in car body for insertion of coupler shank

Anschlussdose am Fahrzeug Interface dimension on vehicle

max. zulässiger Höhenausschlag / max. allowed vertical displacement

erdungsanschluss M10 earthing point M10

Abzug EL / connection to M10 x 2 ISO8434-1-L12

Abzug HBZ / connection M10 x 2 ISO8434-1-L12

Leitung D1 cable D1 M10x2

Leitung D2 cable D2 M10x2

X 1:2 Kuppelanzeige coupler indicator

Hubanzeige einbezogen / stroke indicator included

geforderter Seitenausschlag / requested horizontal displacement

Rückstellwinkel der Mittelstellung recentering angle of centering device

Theoretisches Kraft-Weg-Diagramm / Theoretical force-stroke diagram

Kraft force	Regenerativer Puffer Regenerative Buffer	Abschneiden shear-off
12000N		
Feder Spring		
600kN		
Zug Tension		
Bruch Compression		

Number: 23100569510_Z01_DE1_01_1

Position	Component	KG
0000	Scharfenberg coupler	450
0001	coupling head	56
0002	uncouple cylinder	3.5
0004	air pipe connection	1.5
0005	el. head operating gear	11.6
0006	coupler shank	180
0007	bearing bracket	67
0008	electric head	0
0010	centring device	68
0012	str. male st fitting	0.065
0013	pipe branch	1.05
0015	pneumatic part	5.59
0018	electrical part	3.79
0036	muff coupling	9.6
0043	earthing	2
0509	screw cap	0.006
0529	handle plug	0.002
0530	handle plug	0.003

1) Leitungen und Anschlussstecker von der Elektroaktkupplung zum Fahrzeug sind schematisch dargestellt / cables and connectors of the electrical coupling to the vehicle are shown schematically

Schaltplan: P 1091 (015: 23084470)
circuit diagram: P 1091 (015: 23084470)

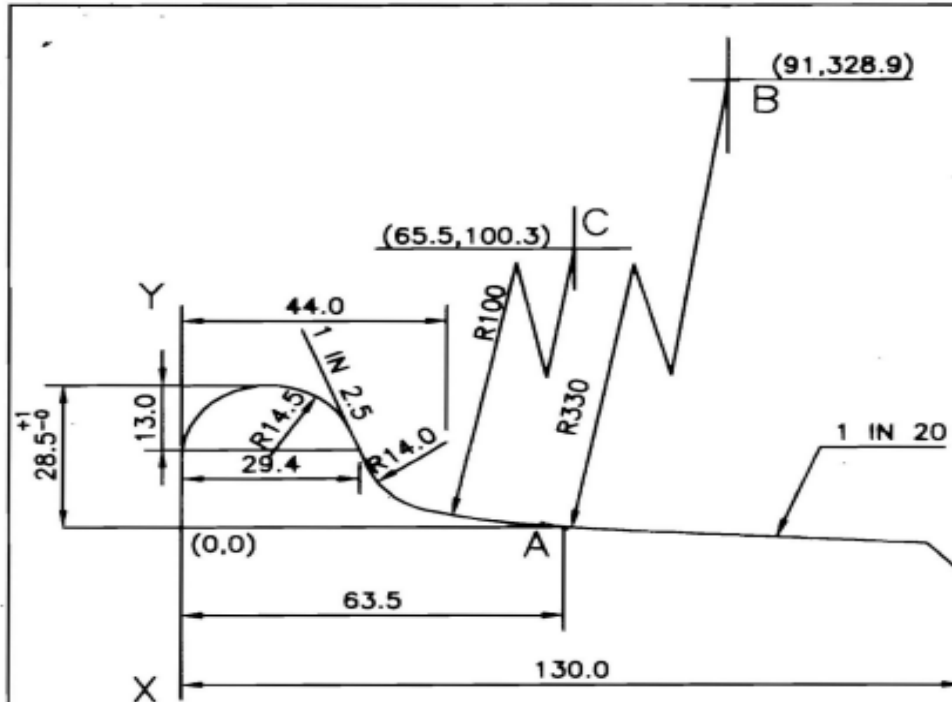
Pos: 509, 529, 530; Transportschuls (Kappen, Stopfen) / items 509, 529, 530; transport protection (caps, plugs)

Vor Gebrauch sind alle Anweisungen zu befolgen. Die Anweisungen sind in den Anleitungen des Herstellers zu finden. / Before use, please read the instructions carefully. The instructions are in the manufacturer's manual.

1. Vor dem Einfügen der Kupplungsstange in den Kuppelkopf...
2. Nach dem Einfügen der Kupplungsstange...
3. Vor dem Einfügen der Kupplungsstange...
4. Vor dem Einfügen der Kupplungsstange...

Page 4 of 23

Worn Wheel Profile



PROCEDURE OF DRAWING:-

1. DRAW A VERTICAL LINE X-Y.
2. DRAW SEMI-CIRCLE OF 14.5R TANGENTIAL TO LINE X-Y.
3. DRAW LINE 1:2.5 TANGENTIAL TO 14.5R SEMI-CIRCLE.
4. DRAW A HORIZONTAL LINE AT 28.5mm FROM THE TOP OF THE FLANGE. AND LOCATE Pt. 'A' AT 63.5mm FROM THE LINE X-Y.
5. FROM Pt. A LOCATE CENTRE 'B' OF ARC OF 330R ON A VERTICAL LINE AT 91mm FROM X-Y.
6. DRAW ARC OF 330R FROM CENTRE 'B'
7. LOCATE CENTRE 'C' ON VERTICAL LINE AT A HORIZONTAL DISTANCE OF 65.5mm FROM THE LINE X-Y SUCH THAT BC= (330-100) ie 230mm.
8. DRAW ARC OF 100R WITH CENTRE AS 'C'.
9. DRAW ARC OF RADIUS 14mm TANGENTIAL TO 100R ARC AND LINE 1:2.5.
10. DRAW LINE 1:20 TANGENTIAL TO 330R ARC.
11. DRAW A VERTICAL LINE AT A DISTANCE OF 130mm FROM THE FLANGE END.

NOTE:

CO-ORDINATES OF POINTS B & C ARE BASED ON NOMINAL DIMENSION OF 28.5mm.

ALT.	AUTH.	DESCRIPTION	DATE
③	SS/24/04	DIMENSION 73.7 DELETED	9/04
②	J.S. CD/3/94	REVISED & REDRAWN	3/94
①	J.S. CD/7/92	CO-ORDINATES OF ARCS SHOWN	3/92

SUPERSEDED BY:	
SUPERSEDES:	
SCALE	P
1:1	C
	D G.V.RAMAN
	T
	J.S.
B.G.	R.D.S.O. (c)

WORN WHEEL PROFILE		GROUP	
		SKETCH-91146	



Annexure 1

VERTICAL ALIGNMENT DETAILS (Up Line)						
Element	Chainage		Gradient	Vertical Curve		Length (Metres)
	Start	End		Radius (m)	Type	
Linear	-473.762	146.877	0.000%			620.639
Circular	146.877	173.123		-3500	Hog	26.246
Linear	173.123	507.801	-0.750%			334.678
Circular	507.801	542.199		2500	Sag	34.398
Linear	542.199	1309.044	0.626%			766.845
Circular	1309.044	1330.956		-3500	Hog	21.912
Linear	1330.956	1583.47	0.000%			252.514
Circular	1583.47	1615.038		-2500	Hog	31.568
Linear	1615.038	1818.733	-1.263%			203.695
Circular	1818.733	1861.267		2500	Sag	42.534
Linear	1861.267	2057.912	0.439%			196.645
Circular	2057.912	2078.088		-4600	Hog	20.176
Linear	2078.088	2409.191	0.000%			331.103
Circular	2409.191	2429.809		-2500	Hog	20.618
Linear	2429.809	2649.483	-0.825%			219.674
Circular	2649.483	2674.517		1900	Sag	25.034



Linear	2674.517	2894.412	0.493%			219.895
Circular	2894.412	2916.588		-4500	Hog	22.176
Linear	2916.588	3280.051	0.000%			363.463
Circular	3280.051	3309.949		2000	Sag	29.898
Linear	3309.949	3654.666	1.495%			344.717
Circular	3654.666	3684.564		-2000	Hog	29.898
Linear	3684.564	3759.169	0.000%			74.605
Pack						
Linear	3900	4353.588	0.000%			453.588
Circular	4353.588	4388.518		-1900	Hog	34.930
Linear	4388.518	4594.992	-1.838%			206.474
Circular	4594.992	4617.008		8000	Sag	22.016
Linear	4617.008	4740.279	-1.563%			123.271
Circular	4740.279	4763.721		1500	Sag	23.442
Linear	4763.721	5117.23	0.000%			353.509
Circular	5117.23	5142.77		-3400	Hog	25.540
Linear	5142.77	5303.534	-0.751%			160.764
Circular	5303.534	5329.22		2500	Sag	25.686
Linear	5329.22	5487.018	0.276%			157.798
Circular	5487.018	5507.736		-7500	Hog	20.718
Linear	5507.736	5799.546	0.000%			291.810
Circular	5799.546	5822.56		-2500	Hog	23.014



Linear	5822.56	6401.404	-0.921%			578.844
Circular	6401.404	6437.35		2500	Sag	35.946
Linear	6437.35	6969.137	0.517%			531.787
Circular	6969.137	6990.863		-4200	Hog	21.726
Linear	6990.863	7289.794	0.000%			298.931
Circular	7289.794	7310.21		-5500	Hog	20.416
Linear	7310.21	7500.664	-0.371%			190.454
Circular	7500.664	7530.442		2100	Sag	29.778
Linear	7530.442	7903.677	1.047%			373.235
Circular	7903.677	7929.847		-2500	Hog	26.170
Linear	7929.847	7978.705	0.000%			48.858
Pack						
Linear	8100	8410.857	0.000%			310.857
Circular	8410.857	8431.686		-6000	Hog	20.829
Linear	8431.686	8748.692	-0.347%			317.006
Circular	8748.692	8785.202		2200	Sag	36.510
Linear	8785.202	9104.867	1.312%			319.665
Circular	9104.867	9137.676		-2500	Hog	32.809
Linear	9137.676	9458.184	0.000%			320.508
Circular	9458.184	9494.359		-2300	Hog	36.175
Linear	9494.359	10014.99 7	-1.723%			520.638
Circular	10014.99	10069.54		2000	Sag	54.548



r	7	5				
Linear	10069.54 5	10507.44 1	1.005%			437.896
Circular	10507.44 1	10532.55 9		-2500	Hog	25.118
Linear	10532.55 9	10822.3	0.000%			289.741
Circular	10822.3	10847.59 4		5000	Sag	25.294
Linear	10847.59 4	11296.73 4	0.506%			449.140
Circular	11296.73 4	11322.02 8		-5000	Sag	25.294
Linear	11322.02 8	11673.14 3	0.000%			351.115
Circular	11673.14 3	11693.39 9		-5500	Hog	20.256
Linear	11693.39 9	12235.26 4	-0.368%			541.865
Circular	12235.26 4	12271.68 6		2500	Sag	36.422
Linear	12271.68 6	12772.66 8	1.089%			500.982
Circular	12772.66 8	12799.88 3		-2500	Hog	27.215
Linear	12799.88 3	13130.11 4	0.000%			330.231
Packa						
Circular	13200	13231.67 5		-3000	Hog	31.675
Linear	13231.67 5	13846.91 9	-1.063%			615.244
Circular	13846.91	13883.08		2500	Sag	36.162



r	9	1				
Linear	13883.08 1	14427.71 5	0.384%			544.634
Circular	14427.71 5	14448.82 2		-5500	Hog	21.107
Linear	14448.82 2	14782.69 7	0.000%			333.875
Circular	14782.69 7	14803.69 7		-6000	Hog	21.000
Linear	14803.69 7	15246.75 4	-0.350%			443.057
Circular	15246.75 4	15276.98 4		2500	Sag	30.230
Linear	15276.98 4	15826.12 9	0.859%			549.145
Circular	15826.12 9	15847.60 9		-2500	Hog	21.480
Linear	15847.60 9	16232.09 7	0.000%			384.488
Circular	16232.09 7	16254.29 7		-2500	Hog	22.200
Linear	16254.29 7	16949.61 1	-0.888%			695.314
Circular	16949.61 1	16981.83 7		2500	Sag	32.226
Linear	16981.83 7	17545.16 3	0.401%			563.326
Circular	17545.16 3	17571.23 1		-6500	Hog	26.068
Linear	17571.23 1	17833.96	0.000%			262.729
Circular	17833.96	17863.77 7		-3500	Hog	29.817



Linear	17863.77 7	18187.77 5	-0.852%			323.998
Circular	18187.77 5	18251.81 9		2500	Sag	64.044
Linear	18251.81 9	18603.89 9	1.710%			352.080
Circular	18603.89 9	18654.49 5		-2300	Hog	50.596
Linear	18654.49 5	18909.39 6	-0.490%			254.901
Circular	18909.39 6	18936.34 2		1900	Sag	26.946
Linear	18936.34 2	19251.59 4	0.928%			315.252
Circular	19251.59 4	19274.8		-2500	Hog	23.206
Linear	19274.8	19289.25 2	0.000%			14.452
Pack						
Linear	19400	19707.22 5	0.000%			307.225
Circular	19707.22 5	19727.43 1		-2600	Hog	20.206
Linear	19727.43 1	20244.61	-0.777%			517.179
Circular	20244.61	20276.04 7		2500	Sag	31.437
Linear	20276.04 7	20926.19 8	0.480%			650.151
Circular	20926.19 8	20947.81 1		-4500	Hog	21.613
Linear	20947.81 1	21781.83 1	0.000%			834.020



Circular	21781.831	21804.826		-3500	Hog	22.995
Linear	21804.826	22231.354	-0.657%			426.528
Circular	22231.354	22291.254		2500	Sag	59.900
Linear	22291.254	22425.573	1.739%			134.319
Circular	22425.573	22469.047		-2500	Hog	43.474
Linear	22469.047	22734.394	0.000%			265.347
Circular	22734.394	22765.606		-3000	Hog	31.212
Linear	22765.606	23100.689	-1.040%			335.083
Circular	23100.689	23150.968		1800	Sag	50.279
Linear	23150.968	23429.088	1.753%			278.120
Circular	23429.088	23472.912		-2500	Hog	43.824
Linear	23472.912	23729.449	0.000%			256.537
Circular	23729.449	23755.208		-10000	Hog	25.759
Linear	23755.208	24235.753	-0.258%			480.545
Circular	24235.753	24258.247		-5000	Hog	22.494
Linear	24258.247	24355.771	-0.707%			97.524
Packa						



Linear	24500	25113.31 2	-0.707%			613.312
Circular	25113.31 2	25139.13 2		2500	Sag	25.820
Linear	25139.13 2	25748.07 9	0.325%			608.947
Circular	25748.07 9	25770.85 1		-7000	Hog	22.772
Linear	25770.85 1	26066.41 6	0.000%			295.565
Circular	26066.41 6	26088.51 4		-6000	Hog	22.098
Linear	26088.51 4	26406.40 9	-0.368%			317.895
Circular	26406.40 9	26432.36 7		2500	Sag	25.958
Linear	26432.36 7	27468.72 3	0.670%			1036.356
Circular	27468.72 3	27492.17 3		-3500	Hog	23.450
Linear	27492.17 3	27917.57 5	0.000%			425.402
Circular	27917.57 5	27951.35 5		-3000	Hog	33.780
Linear	27951.35 5	28240.39 1	-1.126%			289.036
Circular	28240.39 1	28269.70 7		1900	Sag	29.316
Linear	28269.70 7	28389.83 3	0.417%			120.126
Circular	28389.83 3	28412.76 5		-5500	Hog	22.932
Linear	28412.76	28708.39	0.000%			295.627



	5	2				
Pack						
Linear	28800	28858.21 2	0.000%			58.212
Circular	28858.21 2	28890.74 2		-7000	Hog	32.530
Linear	28890.74 2	28944.39 3	-0.465%			53.651
Circular	28944.39 3	28974.56 4		2500	Sag	30.171
Linear	28974.56 4	29458.34 9	0.742%			483.785
Circular	29458.34 9	29480.61 3		-3000	Hog	22.264
Linear	29480.61 3	29789.81 3	0.000%			309.200
Circular	29789.81 3	29821.87 3		1600	Sag	32.060
Linear	29821.87 3	30743.54 8	2.004%			921.675
Circular	30743.54 8	30774.60 6		-1550	Hog	31.058
Linear	30774.60 6	31043.26 2	0.000%			268.656
Circular	31043.26 2	31065.69 2		-4500	Hog	22.430
Linear	31065.69 2	31360.89 9	-0.498%			295.207
Circular	31360.89 9	31390.05 5		2500	Sag	29.156
Linear	31390.05 5	31961.12 1	0.668%			571.066
Circular	31961.12	31987.83		-4000	Hog	26.712



r	1	3				
Linear	31987.83 3	32254.39	0.000%			266.557
Circular	32254.39	32275.61		2700	Sag	21.220
Linear	32275.61	32599.90 8	0.786%			324.298
Circular	32599.90 8	32640.09 2		1500	Sag	40.184
Linear	32640.09 2	32975.26 6	3.465%			335.174
Circular	32975.26 6	33027.24		-1500.023	Hog	51.974



VERTICAL ALIGNMENT DETAILS (Dn Line)						
Element	Chainage		Gradient	Vertical Curve		Length (Metres)
	Start	End		Radius (m)	Type	
ge-1						
Linear	-473.766	146.877	0.000%			620.643
Circular	146.877	173.123		-3500	Hog	26.246
Linear	173.123	507.860	- 0.750%			334.737
Circular	507.86	542.140		2500	Sag	34.280
Linear	542.14	1315.12 6	0.621%			772.986
Circular	1315.126	1336.87 4		-3500	Hog	21.748
Linear	1336.874	1600.10 0	0.000%			263.226
Circular	1600.1	1631.90 0		-2500	Hog	31.800
Linear	1631.9	1833.28 6	- 1.272%			201.386
Circular	1833.286	1876.71 4		2500	Sag	43.428
Linear	1876.714	2059.30 2	0.465%			182.588
Circular	2059.302	2080.69 8		-4600	Hog	21.396
Linear	2080.698	2406.77 8	0.000%			326.080
Circular	2406.778	2428.02 2		-2500	Hog	21.244
Linear	2428.022	2640.21 8	- 0.850%			212.196



Circular	2640.218	2665.32 2		1900	Sag	25.104
Linear	2665.322	2896.66 1	0.472%			231.339
Circular	2896.661	2917.87 9		-4500	Hog	21.218
Linear	2917.879	3292.67 8	0.000%			374.799
Circular	3292.678	3321.32 2		2000	Sag	28.644
Linear	3321.322	3683.67 8	1.432%			362.356
Circular	3683.678	3712.32 2		-2000	Hog	28.644
Linear	3712.322	3789.46 5	0.000%			77.143
ge-2						
Linear	3900	4348.22 1	0.000%			448.221
Circular	4348.221	4383.25 5		-1900	Hog	35.034
Linear	4383.255	4709.83 8	- 1.844%			326.583
Circular	4709.838	4737.49 8		1500	Sag	27.660
Linear	4737.498	5108.41 3	0.000%			370.915
Circular	5108.413	5132.16 9		-3400	Hog	23.756
Linear	5132.169	5308.41 6	- 0.699%			176.247
Circular	5308.416	5332.92 0		2500	Sag	24.504



Linear	5332.92	5487.75 6	0.281%			154.836
Circular	5487.756	5508.86 6		-7500	Hog	21.110
Linear	5508.866	5808.04 7	0.000%			299.181
Circular	5808.047	5831.28 9		-2500	Hog	23.242
Linear	5831.289	6403.65 2	- 0.930%			572.363
Circular	6403.652	6440.37 0		2500	Sag	36.718
Linear	6440.37	6948.68 0	0.539%			508.310
Circular	6948.68	6971.32 0		-4200	Hog	22.640
Linear	6971.32	7274.11 8	0.000%			302.798
Circular	7274.118	7295.88 2		-5500	Hog	21.764
Linear	7295.882	7472.52 1	- 0.396%			176.639
Circular	7472.521	7501.82 3		2100	Sag	29.302
Linear	7501.823	7894.83 4	1.000%			393.011
Circular	7894.834	7919.82 4		-2500	Hog	24.990
Linear	7919.824	7965.77 7	0.000%			45.953
ge-3						



Linear	8100	8409.466	0.000%			309.466
Circular	8409.466	8430.502		-6000	Hog	21.036
Linear	8430.502	8744.050	- 0.351%			313.548
Circular	8744.05	8780.432		2200	Sag	36.382
Linear	8780.432	9102.795	1.303%			322.363
Circular	9102.795	9135.373		-2500	Hog	32.578
Linear	9135.373	9453.527	0.000%			318.154
Circular	9453.527	9488.873		-2100	Hog	35.346
Linear	9488.873	10023.650	- 1.683%			534.777
Circular	10023.650	10077.314		2000	Sag	53.664
Linear	10077.314	10517.940	1.000%			440.626
Circular	10517.940	10542.942		-2500	Hog	25.002
Linear	10542.942	10832.965	0.000%			290.023
Circular	10832.965	10858.398		5000	Sag	25.433
Linear	10858.398	11304.794	0.509%			446.396
Circular	11304.794	11330.226		-5000	Hog	25.432
Linear	11330.226	11696.966	0.000%			366.740
Circular	11696.966	11718.535		-5500	Hog	21.569
Linear	11718.535	12224.781	- 0.392%			506.246
Circular	12224.781	12261.677		2500	Sag	36.896
Linear	12261.677	12764.895	1.084%			503.218
Circular	12764.895	12791.987		-2500	Hog	27.092
Linear	12791.987	13125.578	0.000%			333.591
ge-4						
Circular	13200	13232.381		-3000	Hog	32.381
Linear	13232.381	13836.646	- 1.080%			604.265
Circular	13836.646	13873.354		2500	Sag	36.708



Linear	13873.354	14411.044	0.388%			537.690
Circular	14411.044	14432.395		-5400	Hog	21.351
Linear	14432.395	14764.175	0.000%			331.780
Circular	14764.175	14784.815		-6000	Hog	20.640
Linear	14784.815	15236.401	- 0.344%			451.586
Circular	15236.401	15266.295		2500	Sag	29.894
Linear	15266.295	15820.701	0.852%			554.406
Circular	15820.701	15841.995		-2500	Hog	21.294
Linear	15841.995	16234.628	0.000%			392.633
Circular	16234.628	16256.763		-2500	Hog	22.135
Linear	16256.763	16954.328	- 0.885%			697.565
Circular	16954.328	16986.369		2500	Sag	32.041
Linear	16986.369	17557.118	0.396%			570.749
Circular	17557.118	17582.873		-6500	Hog	25.755
Linear	17582.873	17847.780	0.000%			264.907
Circular	17847.78	17877.123		-3500	Hog	29.343
Linear	17877.123	18194.443	- 0.838%			317.320
Circular	18194.443	18260.460		2500	Sag	66.017
Linear	18260.46	18583.7 07	1.802%			323.247
Circular	18583.70 7	18636.8 90		-2300	Hog	53.183
Linear	18636.89	18886.7 60	-0.510%			249.870
Circular	18886.76	18914.1 43		1900	Sag	27.383
Linear	18914.14 3	19232.4 08	0.931%			318.265
Circular	19232.40	19255.6		-2500	Hog	23.281



	8	89				
Linear	19255.68	19268.2	0.000%			12.585
	9	74				
ge-5						
Linear	19400	19711.299	0.000%			311.299
Circular	19711.299	19731.851		-2700	Hog	20.552
Linear	19731.851	20260.511	- 0.761%			528.660
Circular	20260.511	20291.489		2500	Sag	30.978
Linear	20291.489	20945.251	0.478%			653.762
Circular	20945.251	20966.758		-4500	Hog	21.507
Linear	20966.758	21825.095	0.000%			858.337
Circular	21825.095	21848.199		-3500	Hog	23.104
Linear	21848.199	22272.381	- 0.660%			424.182
Circular	22272.381	22332.279		2500	Sag	59.898
Linear	22332.279	22466.942	1.736%			134.663
Circular	22466.942	22510.338		-2500	Hog	43.396
Linear	22510.338	22774.031	0.000%			263.693
Circular	22774.031	22805.264		-3500	Hog	31.233
Linear	22805.264	23123.212	- 1.041%			317.948
Circular	23123.212	23168.788		1700	Sag	45.576
Linear	23168.788	23460.902	1.640%			292.114
Circular	23460.902	23501.898		-2500	Hog	40.996
Linear	23501.898	23762.644	0.000%			260.746
Circular	23762.644	23787.651		-10000	Hog	25.007
Linear	23787.651	24282.849	- 0.250%			495.198
Circular	24282.849	24307.151		-5000	Hog	24.302
Linear	24307.151	24391.760	-			84.609



			0.736%			
ge-6						
Linear	24500	25096.360	- 0.736%			596.360
Circular	25096.36	25122.980		2500	Sag	26.620
Linear	25122.98	25725.632	0.329%			602.652
Circular	25725.632	25747.000		-6500	Hog	21.368
Linear	25747	26045.336	0.000%			298.336
Circular	26045.336	26068.200		-6500	Hog	22.864
Linear	26068.2	26401.839	- 0.352%			333.639
Circular	26401.839	26427.738		2500	Sag	25.899
Linear	26427.738	27441.864	0.684%			1014.126
Circular	27441.864	27465.812		-3500	Hog	23.948
Linear	27465.812	27906.397	0.000%			440.585
Circular	27906.397	27940.603		-2800	Hog	34.206
Linear	27940.603	28203.717	- 1.222%			263.114
Circular	28203.717	28234.299		1900	Sag	30.582
Linear	28234.299	28365.580	0.388%			131.281
Circular	28365.58	28386.916		-5500	Hog	21.336
Linear	28386.916	28681.262	0.000%			294.346
ge-7						
Linear	28800	28889.232	0.000%			89.232
Circular	28889.232	28918.247		-7000	Hog	29.015
Linear	28918.247	28985.357	- 0.415%			67.110
Circular	28985.357	29014.123		2500	Sag	28.766
Linear	29014.123	29503.291	0.736%			489.168
Circular	29503.291	29525.375		-3000	Hog	22.084
Linear	29525.375	29888.178	0.000%			362.803



Circular	29888.178	29920.310		1550	Sag	32.132
Linear	29920.31	30810.027	2.044%			889.717
Circular	30810.027	30841.123		-1500	Hog	31.096
Linear	30841.123	31096.916	0.000%			255.793
Circular	31096.916	31119.664		-4500	Hog	22.748
Linear	31119.664	31409.968	- 0.506%			290.304
Circular	31409.968	31439.612		2500	Sag	29.644
Linear	31439.612	31999.229	0.680%			559.617
Circular	31999.229	32026.437		-4000	Hog	27.208
Linear	32026.437	32294.882	0.000%			268.445
Circular	32294.882	32315.118		8100	Sag	20.236
Linear	32315.118	32553.456	0.250%			238.338
Circular	32553.456	32600.944		1500	Sag	47.488
Linear	32600.944	33000.100	3.416%			399.156
Circular	33000.1	33051.336		-1500	Hog	51.236

