

Maharashtra Metro Rail Corporation Limited

(A Joint Venture of Government of India and Government of Maharashtra)

PUNE METRO RAIL PROJECT

Design of Graphics, Fabrication, Supply, Installation, Testing and Commissioning of Signage of 4 stations viz. Dapodi, Bopodi, Khadki & Range Hill of Reach 01 and 4 stations viz. Deccan Gymkhana, Sambhaji Park, PMC & Civil Court Elevated of Reach 02 of Pune Metro Rail Project.

TENDER NO.

P1 Misc-28/2022

BIDDING DOCUMENTS

For

Project : PUNE METRO RAIL PROJECT

Employer : Maharashtra Metro Rail Corporation Limited

Country : India

 <p>महा मेट्रो PUNE METRO</p>	<p align="center">E-TENDER NOTICE MAHARASHTRA METRO RAIL CORPORATION LTD Pune Metro Rail Project (A joint venture of Govt. of India & Govt. of Maharashtra) 101, The Orion, Opposite Don Bosco Youth Centre, Koregaon Park, Pune - 411001 E-mail: tenders.pmrp@mahametro.org Website: www.punemetroRail.org Telephone: 020-26051074</p>
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Tender Notice No. P1 Misc-28/2022

Dt. 26 July 2022

Name of work:	Design of Graphics, Fabrication, Supply, Installation, Testing and Commissioning of Signage of 4 stations viz. Dapodi, Bopodi, Khadki & Range Hill of Reach 01 and 4 stations viz. Deccan Gymkhana, Sambhaji Park, PMC & Civil Court Elevated of Reach 02 of Pune Metro Rail Project
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KEYDETAILS:

Completion Period	4 Months (including Monsoon Period).
Documents on sale	Documents can be downloaded from 17.00 hrs. on 26.07.2022 to 15.00 Hrs. of 17.08.2022 from Maharashtra Metro Rail Corporation Limited's e-tender Portal.
Cost of documents	INR 23,600/- non-refundable (inclusive applicable taxes) through e-payment by RTGS/NEFT/Credit Card, as per procedure given in e-tender portal.
Source of funds	The Employer has applied loans from the European Investment Bank - EIB (hereinafter called "Funding Agency") towards the part cost of the Project and intends to apply a portion of the proceeds of the loans for payments under this Contract. Disbursement of the loans will be subject, in all respects, to the terms and conditions of the Loan Agreements, including the disbursement procedures and the applicable guidelines of EIB. (http://www.eib.org/attachments/strategies/guide_to_procurement_en.pdf).
Pre-Bid Meeting	The pre-bid meeting shall be conducted on 04.08.2022 at Conference Hall, Maharashtra Metro Rail Corporation Limited, Inside Mahatma Phule Museum, Ghole Road, Shivaji Nagar, Pune – 411005, Maharashtra.
Last date of submission of queries for pre-bid by the bidder.	Up till 08.08.2022 at 11.00 hrs in the soft copy by email tenders.pmrp@mahametro.org
Bid Security	The Bid security (EMD) amount shall be Rs. 3,94,156/ (Only) to be submitted through online mode as follows: Name of Beneficiary: MMRCL PUNE TENDER FEES AND EMD Account No: 39212708855 IFSC Code: SBIN0000454 UPI ID: ptfemd@sbi
Date & Time of submission of Bid	Online submission up to 15.00 Hrs. on 17.08.2022 at Maharashtra Metro Rail Corporation Limited's e-tender portal(https://mahametroRail.etenders.in).
Date & Time of Opening of Bid	On 17.08.2022 at 15.30 Hours or as decided by the authority at the Office of Maharashtra Metro Rail Corporation Limited , 1 st Floor, The Orion, Opposite Don Bosco Youth Centre, Koregaon Park, Pune-411001.
Eligibility Criteria	Tenders are open who fulfil the criteria stipulated in Evaluation and Qualification Criteria (EQC). A firm, who has paid tender fee for the tender documents in their name, can submit the tender either as an individual firm or in JV/ Consortium.
Bid Validity	Tenders shall be valid for a period of 180 days (both days inclusive i.e., the date of submission of tenders and the last date of period of validity of the tender) from the latest date of online submission of Tenders, as described in ITB 18.1 of Instructions to Bidder.

Award of Contract	The Contract will be awarded to the preferred Bidder whose Tender has been determined to be substantially responsive and compliant to the requirements contained in the Tender Documents and who has offered the Lowest Evaluated Price as per ITB 36.1, subject to the quoted amount is considered to be acceptable.
Jurisdiction of Courts	Any suit or application, arising out of any dispute or differences on account of this Tender shall be filed in District and Sessions court at Pune, State Maharashtra/ High Court of Judicature at Bombay, State Maharashtra/ Supreme Court of India, New Delhi only and no other court or any other district of the country shall have any jurisdiction in the matter.
Sale of document, e-payment procedure, submission and other details are available on Maha-Metro tender portal under Pune Metro section in e-tenders https://mahametrorail.etenders.in . To view this tender notice, interested Agencies may visit the Pune Metro Rail website “ www.punemetrorail.org ”.	

**Executive Director (Procurement & Contracts)/PMRP
Maharashtra Metro Rail Corporation Limited**

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DISCLAIMER

The Bidding Documents for “**Design of Graphics, Fabrication, Supply, Installation, Testing and Commissioning of Signage of 4 stations viz. Dapodi, Bopodi, Khadki & Range Hill of Reach 01 and 4 stations viz. Deccan Gymkhana, Sambhaji Park, PMC & Civil Court Elevated of Reach 02 of Pune Metro Rail Project**” contain brief information about the Project and the Works to be executed and various steps involved in the bidding process. The information contained in the Bidding Documents or subsequently provided to Bidders, whether verbally or in documentary or any other form by or on behalf of **Maharashtra Metro Rail Corporation Limited** (hereinafter referred as “**Maha-Metro**” or “the Company” or “Employer”) or any of its employees or advisors, is provided to Bidders on the terms and conditions set out in the Bidding Documents and such other terms and conditions subject to which such information is provided.

The Bidding Documents are not an agreement and is neither an offer nor invitation by **Maha-Metro** to the prospective Bidders or any other person. The purpose of the Bidding Documents is to provide interested parties with information that may be useful to them in making their Bids pursuant to the Bidding Documents. The Bidding Document include statements, which reflect various assumptions and assessments arrived at by **Maha-Metro** in relation to the Project or the work to be executed pursuant to this bidding process. Such assumptions, assessments & statements do not purport to contain all the information that each Bidder may require. The assumptions, assessments, statements & information contained in the Bidding Documents may not be complete, accurate, adequate or correct. Each Bidder should, therefore, conduct its own investigations & analysis and should check the accuracy, adequacy, correctness, reliability & completeness of the assumptions, assessments, statements and information contained in the Bidding Documents and obtain independent advice from appropriate sources.

Information provided in the Bidding Documents to the Bidders is on a wide range of matters, some of which may depend upon interpretation of law. The information given is not intended to be an exhaustive account of statutory requirements & should not be regarded as a complete or authoritative statement of law. **Maha-Metro** accepts no responsibility for the accuracy or otherwise for any interpretation or opinion on law expressed herein.

Maha-Metro, its employees and advisors make no representation or warranty and shall have no liability to any person, including any Bidder under any law, statute, rules or regulations or tort, principles of restitution or unjust enrichment or otherwise for any loss, damages, cost or expense which may arise from or be incurred or suffered on account of anything contained in the Bidding Documents or otherwise, including the accuracy, adequacy, correctness, completeness or reliability of the Bidding Documents & any assessment, assumption, statement or information contained therein or deemed to form part of the Bidding Documents or arising in any way for participation in this bidding stage.

Maha-Metro also accepts no liability of any nature whether resulting from negligence or otherwise howsoever caused arising from reliance of any Bidder upon the statements/information contained in the Bidding Documents.

Maha-Metro may in its absolute discretion, but without being under any obligation to do so, update, amend or supplement the information, assessment or assumptions contained in the Bidding Documents. **Maha-Metro** also reserves the right to change any or all conditions/ information set in the Bidding Documents at any time by way of revision, deletion, updation or annulment through issuance of appropriate addendum as **Maha-Metro** may deem fit without assigning any reason thereof.

The issue of the Bidding Documents does not imply that **Maha-Metro** is bound to select a Bidder or to appoint the selected Bidder for constructing the work envisaged under the Bidding Documents and **Maha-Metro** reserves the right to reject all or any of the Bidders or Bids without assigning any reason whatsoever.

The Bidders shall bear all its costs associated with or relating to the preparation and submission of its Bid including but not limited to preparation, copying, postage, delivery fees, expenses associated with any demonstrations or presentations which may be required by **Maha-Metro** or any other costs incurred in connection with or relating to its Bid. All such costs and expenses will remain with the Bid and **Maha-Metro** shall not be liable in any manner whatsoever for the same or for any other costs or other expenses incurred by a Bidder in preparation or submission of the Bid, regardless of the conduct or outcome of the bidding process.

Section I - Instructions to Bidders

Clause No	Description
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 for the procurement of works and Related Services incidental thereto as specified in Section VII , Schedule of Requirements. The name, identification & number of lots (contracts) of this National Competitive Bidding (NCB) procurement are specified in the BDS.
1.2	Throughout these Bidding Documents (a) the term "in writing" means communicated in written form (e.g. by mail, e-mail, fax, telex) with proof of 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 Employer specified in the BDS has received or has applied for financing (hereinafter called "Funds") from the funding Agency (hereinafter called "the Agency") (status described in BDS) towards the project named in the BDS. The Employer intends to apply a portion of the "Funds" to eligible payments under the contract(s) for which these Bidding Documents are issued.
3.	Corrupt and Fraudulent Practices
3.1	The Purchaser requires compliance with its policy in regard to corrupt and fraudulent practices as set forth in Section V-A.
3.2	The Bidder/Contractor grants the Employer, the EIB and auditors appointed by either of them, as well as any authority or European Union Institution or body having competence under European Union law, the right to inspect and copy the books and records of the bidder, contractor, supplier or consultant in connection with any Bank-financed contract.
4.	Eligible Bidders
4.1	A Bidder may be a firm that is a private entity, a government-owned entity-subject to ITB 4.3 -or any combination of such entities in the form of a joint venture (JV) /Consortium 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 joint venture all members shall be jointly and severally liable for the execution of the Contract in accordance with the Contract terms. The JV/CONSORTIUM 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/CONSORTIUM during the bidding process and, in the event the JV/CONSORTIUM is awarded the Contract, during contract execution. Unless specified in the BDS , there is no limit on the number of members in a JV/CONSORTIUM.
4.2	Conflict of Interest: "Bidders shall not have a conflict of interest. All bidders found to have a conflict of interest shall be disqualified. Bidders shall be considered to have a conflict of interest with one or more parties in this tendering process, if: a. A bidder has been engaged by the Employer to provide consulting services for the preparation related to the procurement of or on the implementation of the project. b. a bidder has any associates/ affiliates (inclusive of parent firms) mentioned in subparagraph (a) above. c. a bidder lends, or temporarily seconds its personnel to firms or organizations which are engaged in consulting services for the preparation related to the procurement of or on the implementation of the project, if the personnel would be involved in any capacity on the same project; or. d. the impartial and objective exercise of the functions of the Employer, or the respect of the principles of competition, non-discrimination or equality of treatment with regard to the procurement procedure or contract, is compromised for reasons involving family, emotional life, political or national affinity, economic interest or any other shared interest. The concept of conflict of interest covers any situation where staff members (or consultants acting on behalf) of the Employer who are involved in the conduct of the procurement procedure or may influence the outcome of that procedure have, directly or indirectly, a financial,

economic or other personal interest which might be perceived to compromise their impartiality and independence in the context of the procurement procedure or contract execution.”

- 4.3 A Bidder shall be from any of the eligible source countries indicated in Section V, Eligible Source Countries of External Funding agency.
- 4.4 A Bidder that has been determined to be ineligible by funding agency 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 eligibility satisfactory to the Employer, as the Employer shall reasonably request.
5. **Eligible Goods and Related Services**
- 5.1 All the Goods and Related Services to be supplied under the Contract and financed by the Agency may have their origin in any country in accordance with Section V, Eligibility criteria and social and environmental responsibility.
- 5.2 For purposes of this Clause, the term "goods" includes commodities, raw material, machinery, equipment, & industrial plants; & "related services" includes services such as insurance, installation, training, and initial maintenance.
- 5.3 The term "origin" means the country where the goods have been mined, grown, cultivated, produced, manufactured or processed; or, through manufacture, processing, or assembly, another commercially recognized article results that differs substantially in its basic characteristics from its components.
- B. **Contents of Bidding Document**
6. **Section of Bidding Document**
- 6.1
 - The Bidding Documents consist of Parts 1, 2, 3 and 4, 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 Bidding Data Sheet (BDS)
 - Section III Evaluation and Qualification Criteria
 - Section IV Bidding Forms
 - Section V Eligibility Criteria and Social and environment responsibility
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 - Section VI Pricing Document
 - Annexure II-A Toolkit for using e-tender portal
 - PART - 2 - WORKS REQUIREMENTS
 - Section VII-A General Specification
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 - Section VII-C 5D BIM
 - PART - 3 - CONDITIONS OF CONTRACT AND CONTRACT FORMS
 - Section VIII General Conditions (GCC)
 - Section IX Particular Conditions (PCC)
 - Section X Contract Forms
 - Section XI SHE Manual
 - PART - 4 - TENDER DRAWINGS
- 6.2 The Invitation for Bids issued by the Employer is not part of the Bidding Document.
- 6.3 Unless obtained directly from Bid portal of the Employer, the Employer is not responsible for the completeness of the document, responses to requests for clarification or Addenda to the Bidding Document 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 or 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 Document shall communicate within date and time the Employer in writing at the Employer's e-mail address as **specified in the BDS** or raise its 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 14 (fourteen) 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 e-Bid portal identified in the BDS and bidder shall not be informed individually.

7.2 The Bidder is advised to visit and examine the Site of Works 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 construction of the Works. 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 conditions 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 If so specified in the BDS, the Bidder's designated representative is invited to attend a pre-bid meeting. The purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage.

7.5 The Bidder is requested, as far as possible, to submit any questions in writing, to reach the Employer not later than one 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 response 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. Non-attendance at the pre-bid meeting will not be a cause for disqualification of a Bidder.

8. Amendment of Bidding Document

8.1 At any time prior to the deadline for submission of bids, the Employer may amend the Bidding 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. The Employer shall also promptly publish the addendum on the Employer's e-Bid portal in accordance with ITB 7.1(as specified in BDS).

8.3 To give Bidders reasonable time in which to take an addendum into account in preparing their bids, the Employer may, at its discretion, extend the deadline for the submission of bids, pursuant to ITB 22.2.

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 into the language specified in the BDS, 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 the following:

- (a) 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 Purchaser in accordance with ITB 12;
- (b) completed schedules, in accordance with ITB 12 and 14;
- (c) Bid Security, in accordance with ITB 19.1(as specified in BDS);
- (d) alternative bids, if permissible, in accordance with ITB 13(as specified in BDS);
- (e) written confirmation authorizing the signatory of the Bid to commit the Bidder, in accordance with ITB 20.2;

- (f) documentary evidence in accordance with ITB 17 establishing the Bidder's continued qualified status or, if post-qualification applies, as specified in accordance with ITB 4.8, the Bidder's qualifications to perform the contract if its Bid is accepted;
- (g) Technical proposal in accordance with ITB 16;
any other document **required in the BDS**
- 11.2 In addition to the requirements under ITB 11.1, bids submitted by a JV/CONSORTIUM shall include a copy of the Joint Venture Agreement entered into by all members. Alternatively, a letter of intent to execute a Joint Venture Agreement in the event of a successful bid shall be signed by all members and submitted with the bid, together with a copy of the proposed Agreement.
- 11.3 The Bidder shall furnish in the Letter of Bid information on commissions and gratuities, if any, paid or to be paid to agents or any other party relating to this Bid (as specified in BDS).
- 12. **Letter of Bid, Covenant of Integrity and Price Schedules**
- 12.1 The Letter of Bid, the Covenant of Integrity and Price Schedules shall be prepared 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 20.4. All blank spaces shall be filled in with the information requested.
- 13. **Alternative Bids**
- 13.1 **Unless otherwise specified in the BDS**, alternative bids will not be considered.
- 13.2 When alternative times for completion are explicitly invited, a statement to that effect will be included in the BDS, as will the method of evaluating different times for completion.
- 13.3 Except as provided under ITB 13.4 below, Bidders wishing to offer technical alternatives to the requirements of the Bidding Documents must first price the Employer's design as described in the Bidding Documents & shall further provide all information necessary for a complete evaluation of the alternative by the Employer, including drawings, design calculations, technical specifications, breakdown of prices, and proposed construction 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 specified in the BDS**, Bidders are permitted to submit alternative technical solutions for specified parts of the Works, & such parts **will be identified in the BDS**, as will the method for their evaluating, and described in **Section VII**, Works Requirements.
- 14. **Bid Prices and Discounts**
- 14.1 Unless otherwise specified in the BDS, Bidders shall quote for the Works 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 Works. 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.
- 14.2 Bidders are required to quote the price for the commercial, contractual and technical obligations outlined in the Bidding Documents.
- 14.3 Bidders shall provide price in each item in the manner and detail called for in the price schedules included in Section IV, Bidding Forms. Further, bidders may add breakdowns of items and provide the prices in each Price Schedule included in Section IV, Bidding Forms.
- 14.4 The price to be offered in the Letter of Bid, in accordance with ITB 12.1, shall be the **total price of the Bid, excluding any discounts that may be offered.**
- 14.5 **Unless otherwise specified in the BDS and the Contract**, the prices offered by the Bidder are subject to adjustment during the performance of the Contract in accordance with the provisions of the Conditions of Contract. In such a case, the Bidder shall furnish the indices and weightings for the price adjustment formulae in the

- Schedule of Adjustment Data and the Employer may require the Bidder to justify its proposed indices and weightings.
- 14.6 If so specified in BDS 1.1, Bids are being invited for individual lots (contracts) or for any combination of lots (packages). Bidders wishing to offer discounts for the award of more than one Contract shall specify in their Bid the price reductions applicable to each package, or alternatively, to individual Contracts within the package. Discounts shall be submitted in accordance with ITB 14.4, provided the Bids for all lots (contracts) are opened at the same time.
- 14.7 **Unless otherwise provided in the BDS**, all duties, taxes, and other levies payable by the Contractor under the Contract, or for any other cause, as of the date twenty-eight (28) days prior to the deadline for submission of Bids, shall be included in the rates and prices and the total Bid Price submitted by the Bidder.
- 14.8 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.
- 15. Currencies of Bid and Payment**
- 15.1 The currency(ies) of the bid & the currency(ies) of payments shall be **as specified in the BDS**.
- 15.2 Bidders may be required by the Employer to justify, to the Employer's satisfaction, their local and foreign currency requirements, and to substantiate that the amounts included in the prices shown in the Schedule of Adjustment Data in the Appendix to Bid are responsible, in which case a detailed breakdown of the foreign currency requirements shall be provided by Bidders.
- 16 Documents comprising the Technical proposal**
- 16.1 The Bidder shall furnish a technical proposal including a statement of work methods, equipment, personnel, schedule and any other information as stipulated in section IV - Bidding Forms, in sufficient detail to demonstrate the adequacy of the Bidder's proposal to meet the work requirements and the completion time.
- 17. Documents Establishing the Eligibility and Conformity of the Goods and Related Services**
- 17.1 To establish the eligibility of the Goods and Related 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.
- 17.2 To establish the conformity of the Goods and Related Services to the Bidding Documents, the Bidder shall furnish as part of its Bid the documentary evidence that the Goods conform to the technical specifications and standards specified in Section VII, Schedule of Requirements.
- 17.3 The documentary evidence may be in the form of literature, drawings or data, and shall consist of a detailed item by item description of the essential technical and performance characteristics of the Goods and Related Services, demonstrating substantial responsiveness of the Goods and Related Services to the technical specification, and if applicable, a statement of deviations and exceptions to the provisions of the Section VII, Schedule of Requirements.
- 17.4 The Bidder shall also furnish a list giving full particulars, including available sources and current prices of spare parts, special tools, etc., necessary for the proper and continuing functioning of the Goods during the period specified in the BDS following commencement of the use of the goods by the Purchaser.
- 17.5 Standards for workmanship, process, material, and equipment, as well as references to brand names or catalogue numbers specified by the Purchaser in the Schedule of Requirements, are intended to be descriptive only and not restrictive. The Bidder may offer other standards of quality, brand names, and/or catalogue numbers, provided that it demonstrates, to the Purchaser's satisfaction, that the substitutions ensure substantial equivalence or are superior to those specified in the Section VII, Schedule of Requirements.
- 17 Documents Establishing the Eligibility and Qualifications of the Bidder**
- 17.1 To establish their eligibility in accordance with ITB 4, Bidders shall complete the Letter of Bid, included in Section IV, Bidding Forms.
- 17.2 The documentary evidence of the Bidder's qualifications to perform the Contract if its bid is accepted shall establish to the Purchaser's satisfaction:
- (a) that, if **required in the BDS**, a Bidder that does not manufacture or produce the Goods it offers to supply shall submit the Manufacturer's Authorization using the form included in Section IV, Bidding Forms to demonstrate that it has been duly authorized by the manufacturer or producer of the Goods to supply these Goods in the Purchaser's Country;

(b) that, if **required in the BDS**, in case of a Bidder not doing business within the Purchaser's Country, the Bidder is or will be (if awarded the contract) represented by an Agent in the country equipped and able to carry out the Supplier's maintenance, repair and spare parts-stocking obligations prescribed in the Conditions of Contract and/or Technical Specifications; and that the Bidder meets each of the qualification criterion specified in Section III, Evaluation and Qualification Criteria.

17.3 Any change in the structure or formation of a Bidder after being prequalified and invited to Bid (including, in the case of a JV/CONSORTIUM, 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) as a consequence of the change, the Bidder no longer substantially meets the qualification criteria set forth in Section III, Qualification Criteria and Requirements; or (ii) 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.

18. Period of Validity of Bids

18.1 Bids shall remain valid for the period **specified in the BDS** after the bid submission deadline date prescribed by the Employer in accordance with ITB 22.1. A bid valid for a shorter period shall be rejected by the Employer as nonresponsive.

18.2 In exceptional circumstances, prior to the expiration of the bid validity period, the Employer may request bidders to extend the period of validity of their bids. The request and the responses shall be made in writing. If a Bid Security is requested in accordance with ITB 19, it 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 18.3.

18.3 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, no adjustment shall be made.
- (c) In any case, bid evaluation shall be based on the bid price without taking into consideration the applicable correction from those indicated above.

19. Bid Security

19.1 The Bidder shall furnish as part of its bid a Bid-Security as **specified in the BDS**, in original form.

19.2 A Bid Security shall use the form included in Section-IV, Bidding Forms or as specified in BDS.

19.3 If a bid security is specified pursuant to ITB 19.1, 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 country as specified in Section V-Eligibility criteria and social and environmental responsibility. If the unconditional guarantee is issued by a financial institution located outside the Purchaser's Country, the issuing financial institution shall have a correspondent financial institution located in the Purchaser'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 Purchaser prior to bid submission. 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 18.2.

19.4 If a Bid Security is specified pursuant to ITB 19.1, any bid not accompanied by a substantially responsive Bid Security or Bid-Securing Declaration shall be rejected by the Purchaser as nonresponsive.

- 19.5 The Bid Security of unsuccessful Bidders shall be returned as promptly as possible upon the successful Bidder's signing the contract and furnishing the Performance Security pursuant to **ITB 42**.
- 19.6 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.
- 19.7 The Bid Security may be forfeited, or the Bid Securing Declaration executed:
- (a) if a Bidder withdraws its bid during the period of bid validity specified by the Bidder on the Letter of Bid, or any extension thereto provided by the Bidder; or
 - (b) if the successful Bidder fails to:
 - i. signs the Contract in accordance with **ITB 42**; or
 - ii. furnish a performance security in accordance with **ITB 43**.
- 19.8 The Bid- Security of a JV/CONSORTIUM must be in the name of the JV/CONSORTIUM that submits the bid. If the JV/CONSORTIUM has not been legally constituted into a legally enforceable JV/CONSORTIUM at the time of bidding, the bid security or Bid-Securing Declaration 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** or as specified in BDS.
- 19.9 If a bid security is **not required in the BDS**, pursuant to **ITB 19.1**, and:
- (a) if a Bidder withdraws its bid during the period of bid validity specified by the Bidder on the Letter of Bid, or any extension thereto provided by the Bidder; or
 - (b) if the successful Bidder fails to: sign the Contract in accordance with **ITB 42**; or furnish a performance security in accordance with **ITB 43**;

the Employer may, **if provided for in the BDS**, declare the Bidder ineligible to be awarded a contract by the Employer for a period of time **as stated in the BDS**.

20. Format and Signing of Bid

- 20.1 The Bidder shall prepare one original of the documents comprising the bid as described in **ITB 11** and clearly mark it "ORIGINAL". Alternative bids, if permitted in accordance with **ITB 13**, shall be clearly marked "ALTERNATIVE". In addition, the Bidder shall submit copies of the bid, in the number **specified in the BDS** and clearly mark them "COPY". In the event of any discrepancy between the original and the copies, the original shall prevail.
- 20.2 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.
- 20.3 In case the Bidder is a JV, the Bid shall be signed by an authorized representative of the JV/CONSORTIUM on behalf of the JV/CONSORTIUM, and so as to be legally binding on all the members as evidenced by a power of attorney signed by their legally authorized representatives.
- 20.4 Any inter-lineation, 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

21 Sealing and Marking of Bids

- 21.1 The Bidder shall enclose the original and all copies of the bid, including alternative bids, if permitted in accordance with **ITB 13**, in separate sealed envelopes, duly marking the envelopes as "ORIGINAL", "ALTERNATIVE" and "COPY." These envelopes containing the original and the copies shall then be enclosed in one single envelope or as specified in BDS.
- 21.2 Unless specified in BDS, 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 22.1**;
 - (c) bear the specific identification of this bidding process stated in **ITB 1.1**; and
 - (d) bear a warning not to open before the time and date for bid opening
- 21.3 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.
- 21.4 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.

- 21.5 The inner envelopes containing the Price Bid shall bear a warning not to open until advised by the Employer-
- 22. Deadline for Submission of Bids**
- 22.1 Bids must be received by the Employer at the address and no later than the date and time specified in the BDS. When so specified in the BDS, bidders shall have the option of submitting their bids electronically. Bidders submitting bids electronically shall follow the electronic bid submission procedures specified in the BDS.
- 22.2 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.
- 23. Late Bids**
- 23.1 The Employer shall not consider any bid that arrives after the dead line for submission of bids, in accordance with **ITB 22**. Any bid received by the Employer after the deadline for submission of bids shall be declared late, rejected, and returned unopened to the Bidder.
- 24. Withdrawal, Substitution and Modification of Bids**
- 24.1 A Bidder may withdraw, substitute, or modify its Bid after it has been submitted by sending a written notice, duly signed by an authorized representative, and shall include a copy of the authorization (the power of attorney) in accordance with **ITB 20.2**. 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 20** and **21** (except that withdrawal notices do not require copies), & in addition, the respective envelopes shall be clearly marked "WITHDRAWAL," "SUBSTITUTION," or "MODIFICATION;" and **or as specified in BDS.**
- (b) received by the Employer prior to the deadline prescribed for submission of bids, in accordance with **ITB 22 or as specified in BDS.**
- 24.2 Bids requested to be withdrawn in accordance with **ITB 24.1** shall be returned unopened to the Bidders or as specified in BDS.
- 24.3 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 Bid or any extension thereof.
- 25. Bid Opening**
- 25.1 Except as in the cases specified in ITB 23 and 24, the Purchaser shall publicly open and read out in accordance with ITB 25 all bids received by the deadline (regardless of the number of bids received), at the date, time and place specified in the BDS in the presence of Bidders' designated representatives and anyone who choose to attend. Any specific electronic bid opening procedures required if electronic bidding is permitted in accordance with ITB 22.1, shall be as specified in the BDS.
- 25.2 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 & is read out at bid opening. Next, envelopes marked "SUBSTITUTION" shall be opened and read out and exchanged with the corresponding Bid being substituted, and the substituted Bid shall not be opened, but returned to the Bidder. No Bid substitution shall be permitted unless the corresponding substitution notice contains a valid authorization to request the substitution and is read out at bid opening. Envelopes marked "MODIFICATION" shall be opened and read out with the corresponding Bid. No Bid modification shall be permitted unless the corresponding modification notice contains a valid authorization to request the modification and is read out at Bid opening. Only bids that are opened and read out at Bid opening shall be considered further as specified in the BDS.
- 25.3 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 Bid Price(s), including any discounts and alternative Bids; 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 23.1).
- 25.4 The Employer shall prepare a record of the bid opening that shall include, as a minimum: the name of the Bidder and whether there is a withdrawal, substitution, or modification; the Bid Price, per lot (contract) if applicable, including any discounts, and alternative bids; and the presence or absence of a Bid-Securing Declaration, if one was required. The Bidders' representatives who are present shall be requested to sign the record. The omission of a Bidder's signature on the record shall not invalidate the contents and effect of the record. A copy of the record shall be distributed to all Bidders.
- E. Evaluation and Comparison of Bids**
- 26. Confidentiality**
- 26.1 Information relating to the examination, evaluation, and comparison of the bids, and qualification of the Bidders and recommendation of contract award, shall not be disclosed to bidders or any other persons not officially concerned with the bidding process until information on Contract Award is communicated to all Bidders in accordance with ITB 40.
- 26.2 Any attempt by a Bidder to influence the Employer in the examination, evaluation, and comparison of the bids, and qualification of the bidders, or contract award decisions may result in the rejection of its Bid.
- 26.3 Notwithstanding ITB-26.2, 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.
- 27. Clarification of Bids**
- 27.1 To assist in the examination, evaluation, comparison of the bids, and qualification of the Bidders, the Employer may, at its discretion, ask any Bidder for a clarification of its Bid, given 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 & the response shall be in writing. No change, including any voluntary increase or decrease, in the prices or substance of the Bid shall be sought, offered, or permitted, except to confirm the correction of arithmetic errors discovered by the Employer in the Evaluation of the bids, in accordance with ITB 31.
- 27.2 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.
- 28. Deviation, Reservation and Omissions**
- 28.1 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.
- 29. Determination of Responsiveness**
- 29.1 The Employer's determination of a bid's responsiveness is to be based on the contents of the bid itself, as defined in ITB 11.
- 29.2 A substantially responsive 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 Goods and Related 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.
- 29.3 The Employer shall examine the technical aspects of the bid submitted in accordance with ITB 16, in particular, to confirm that all requirements of Section VII, Schedule of Requirements have been met without any material deviation or reservation, or omission.
- 29.4 If a 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.
- 30. Nonmaterial Nonconformities, Errors and Omissions**

- 30.1 Provided that a Bid is substantially responsive, the Employer may waive any nonmaterial nonconformities in the Bid.
- 30.2 Provided that a bid is substantially responsive, the Employer may request that the Bidder submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial nonconformities in the bid related to documentation requirements. Requesting information or documentation on such nonconformities shall not be related to any aspect of the price of the Bid. Failure of the Bidder to comply with the request may result in the rejection of its Bid.
- 30.3 Provided that a bid is substantially responsive, the Employer shall rectify quantifiable nonmaterial nonconformities related to the Bid Price. To this effect, the Bid Price shall be adjusted, for comparison purposes only, to reflect the price of a missing or non-conforming item or component as **specified in the BDS.**
- 31. Correction of Arithmetical Errors**
- 31.1 Provided that the bid is substantially responsive, the Employer shall correct arithmetical errors on the following basis: (a) Only for admeasurement contracts, if there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected, unless in the opinion of the Employer there is an obvious misplacement of the decimal point in the unit price, in which case the total price as quoted shall govern and the unit price shall be corrected;
- (b) Only for admeasurement contracts, if there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected; and
- (c) if there is a discrepancy between words and figures, the amount in words shall prevail, unless, only for admeasurement contracts, 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.
- 31.2 Bidders shall be requested to accept correction of arithmetical errors. Failure to accept the correction in accordance with ITB 31.1, shall result in the rejection of the Bid.
- 32. Conversion to Single Currency**
- 32.1 For evaluation and comparison purposes, the currency(ies) of the Bid shall be converted in a single currency as **specified in the BDS.**
- 33. Margin of Preference**
- 33.1 Unless otherwise specified in the BDS, a margin of preference shall not apply.
- 34. Sub-Contractors**
- 34.1 Unless otherwise stated in the BDS, the Employer does not intend to execute any specific elements of the Works by sub-contractors selected in advance by the Employer.
- 34.2 In case of Prequalification, the Bidder's Bid shall name the same specialized subcontractor as submitted in the prequalification application and approved by the Employer or may name another specialized subcontractor meeting the requirements specified in the prequalification phase.
- 34.3 In case of Post-qualification, the Employer may permit subcontracting for certain specialized works. When subcontracting is permitted by the Employer, the specialized subcontractor's experience shall be considered for evaluation as indicated in Section III 1.5 Specialized Sub-Contractors. Section III describes the qualification criteria for sub-contractors or as specified in BDS.
- 35. Evaluation of Bids**
- 35.1 The Employer shall use the criteria and methodologies listed in this Clause. No other evaluation criteria or methodologies shall be permitted.
- 35.2 To evaluate a bid, the Employer shall consider the following:
- (a) the Bid Price, excluding Provisional Sums and the provision, if any, for contingencies in the Schedules, but including Day work items, where priced competitively;
 - (b) price adjustment for correction of arithmetic errors in accordance with ITB 31.1;
 - (c) price adjustment due to discounts offered in accordance with ITB 14.4;
 - (d) converting the amount resulting from applying (a) to (c) above, if relevant, to a single currency in accordance with ITB 32;
 - (e) price adjustment due to quantifiable nonmaterial nonconformities in accordance with ITB 30.3;
 - (f) the additional evaluation factors as specified in Section-III, Evaluation and Qualification Criteria;

- 35.3 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.
- 35.4 If these Bidding Documents allow Bidders to quote separate prices for different lots (contracts), the methodology to determine the lowest evaluated price of the lot (contract) combinations, including any discounts offered in the Letter of Bid Form, is specified in Section-III, Evaluation and Qualification Criteria.
- 35.5 If the bid, which results in the lowest Evaluated Bid Price, is significantly lower than the Employer's estimate, or 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 Schedules, to demonstrate the internal consistency of those prices with the construction methods and schedule proposed. If it turns out that the bid price is abnormally low, 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.
36. **Comparison of Bids**
- 36.1 The Employer shall compare the evaluated prices of all substantially responsive bids established in accordance with ITB 35.2 to determine the lowest evaluated bid.
37. **Qualification the Bidders**
- 37.1 The Employer shall determine to its satisfaction whether Bidders meet the qualification criteria specified in Section III, Eligibility 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, Eligibility and Qualification Criteria, for the Bidder who submitted the lowest evaluated and substantially responsive Bid only.
- 37.2 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.
- 37.3 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 proceed to the next lowest evaluated bid to make a similar determination of that Bidder's qualification to perform satisfactorily.
- 37.4 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 or be completed, listing the approved manufacturers or Subcontractors for each item concerned.
38. **Employer's Right to Accept Any Bid, and to Reject Any or All Bids**
- 38.1 The Employer reserves the right to accept or reject any bid, and to annul the bidding process and reject all bids at any time prior to contract award, without thereby incurring any liability to Bidders. In case of annulment, all bids submitted and specifically, bid securities, shall be promptly returned to the Bidders.
- F. **Award of Contract**
39. **Award Criteria**
- 39.1 Subject to ITB 38.1, the Employer shall award the Contract to the Bidder whose bid 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 qualified to perform the Contract satisfactorily.
40. **Notification of Award**
- 40.1 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 Works (hereinafter and in the Conditions of Contract and Contract Forms called "the Accepted Contract Amount").

Relating to award of work and issuance of LOA to the successful bidder, Maha-Metro shall post the details in the Maha-Metro website <http://www.punemetroRail.org> and as specified in BDS.

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

40.3 The Employer shall promptly respond in writing to any unsuccessful Bidder who, after notification of award in accordance with ITB 40.1, requests in writing the grounds on which its bid was not selected.

41 Grounds for Exclusion

41.1 Bidders (either natural or legal persons including any of their subcontractors) shall not be awarded this contract if, on the date of submission of an application or of a bid or on the date of award of a contract, they have been the subject of a conviction by final judgment for one of the following reasons:

- a. where the bidder is bankrupt or is the subject of insolvency or winding-up proceedings, where its assets are being administered by a liquidator or by the court, where it is in an arrangement with creditors, where its business activities are suspended or it is in any analogous situation arising from a similar procedure under national laws and regulations;
- b. bidder have not fulfilled their obligations regarding the payment of social security contributions or taxes in accordance with the legal provisions of the country where they are established or the Employer's country.
- c. where the Employer can demonstrate by any appropriate means a violation by the bidder of applicable obligations in the fields of environmental, social and labour law established by national law, collective agreements or by the international environmental, social and labour law provisions;
- d. where the Employer has sufficiently plausible indications to conclude that the bidder has entered into agreements with other bidder(s) aimed at distorting competition;
- e. where the bidder has shown significant or persistent deficiencies in the performance of a substantive requirement under a prior public contract, a prior contract with the Employer or a prior concession contract which led to early termination of that prior contract, damages or other comparable sanctions;
- f. bidder have been convicted within the past five years by a court decision, which has the force of residential jurisdiction in the country where the project is implemented, of fraud or corruption or any other Prohibited Conduct committed during the procurement or performance of a contract, unless they provide supporting information together with their Covenant of Integrity which shows that this conviction is not relevant in the context of this project;
- g. bidder is listed for financial sanctions by the United Nations and /or European Union for the purposes of fight against terrorist financing or threat to international peace and security;
- h. bidder including JV/ Consortium members should not be excluded by the EU Institutions or any major Multilateral Development Bank (including World Bank Group, African Development Bank, Asian Infrastructure Investment Bank, Asian Development Bank, European Bank for Reconstruction and Development, European Investment Bank or Inter-American Development Bank) from participation in a tendering procedure on the grounds of Prohibited Conduct as defined in the Covenant of Integrity.
- i. where the Employer can demonstrate by appropriate means that the bidder is guilty of grave professional misconduct, which renders its integrity questionable;
- j. where a conflict of interest within the meaning of Sub-Clause 4.2 in ITB cannot be effectively remedied by other less intrusive measures;
- k. where a distortion of competition from the prior involvement of the bidder in the preparation of the procurement procedure, as referred to in Sub-Clause 3.1 in ITB, cannot be remedied by other, less intrusive measures;
- l. where the bidder has been guilty of serious misrepresentation in supplying the information required for the verification of the absence of grounds for exclusion or the fulfilment of the selection criteria, has withheld such information or is not able to submit the supporting documents required pursuant to BDS ITB 4.18; or

- m. where the bidder has undertaken to unduly influence the decision-making process of the Employer, to obtain confidential information that may confer upon its undue advantages in the procurement procedure or to negligently provide misleading information that may have a material influence on decisions concerning exclusion, selection or award.

Notwithstanding point (**Error! Reference source not found.**) above, Employer might not exclude a bidder which is in one of the situations referred to in that point, where the Employer has established that the bidder in question will be able to perform the contract, taking into account the applicable national rules and measures on the continuation of business in the case of the situations referred to in point (a).

Any bidder that is in one of the situations referred to in the above paragraph may provide evidence to the effect that measures taken by the bidder are sufficient to demonstrate its reliability despite the existence of a relevant ground for exclusion. If such evidence is considered as sufficient, the bidder concerned will not be excluded from the procurement procedure.

For this purpose, the bidder shall prove that it has paid or undertaken to pay compensation in respect of any damage caused by the criminal offence or misconduct, clarified the facts and circumstances in a comprehensive manner by actively collaborating with the investigating authorities and taken concrete technical, organizational and personnel measures that are appropriate to prevent further criminal offences or misconduct.

The measures taken by the bidder will be evaluated taking into account the gravity and particular circumstances of the criminal offence or misconduct. Where the measures are considered to be insufficient, the bidder shall receive a statement of the reasons for that decision.

Bidders will also be required to confirm and declare that no agent, middleman or any intermediary has been, or will be, engaged to provide any services, or any other items of work related to the award and performance of this contract.

42. Signing of Contract

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

42.2 In case the agreement is sent, within twenty-eight (28) days but no sooner than 10 days of receipt of the Contract Agreement, the successful Bidder shall sign, date, and return it to the Employer.

43. Performance Security

43.1 Within twenty-eight (28) days of the receipt of notification of award from the Employer, the successful Bidder shall furnish the Performance Security in accordance with the GCC, using for that purpose the Performance Security Form included in Section X, 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.

43.2 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 execution of the Bid-Securing Declaration. 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.

Maha Metro Rail Corporation Limited (Maha-Metro)

**PUNE METRO RAIL PROJECT
BID DOCUMENTS
FOR**

Design of Graphics, Fabrication, Supply, Installation, Testing and Commissioning of Signage of 4 stations viz. Dapodi, Bopodi, Khadki & Range Hill of Reach 01 and 4 stations viz. Deccan Gymkhana, Sambhaji Park, PMC & Civil Court Elevated of Reach 02 of Pune Metro Rail Project.

TENDER NO.

P1 Misc-28/2022

PART I: BIDDING PROCEDURE

SECTION II: BIDDING DATA SHEET

Section II. Bidding Data Sheet (BDS)

The following specific data for the goods to be procured shall complement, supplement, or amend the provisions in the Instructions to Bidders (ITB). Whenever there is a conflict, the provisions herein shall prevail over those in ITB.

ITB Clause Reference	GENERAL
General	The following terms are used in the Bidding Documents shall have the same meaning and interpretations;
ITB 1.1	The number of the Invitation for Bids is: P1 Misc-28/2022
ITB 1.1	The Employer is: Maharashtra Metro Rail Corporation Limited
ITB 1.1	<p>The name of the NCB is: - Design of Graphics, Fabrication, Supply, Installation, Testing and Commissioning of Signage of 4 stations viz. Dapodi, Bopodi, Khadki & Range Hill of Reach 01 and 4 stations viz. Deccan Gymkhana, Sambhaji Park, PMC & Civil Court Elevated of Reach 02 of Pune Metro Rail Project.</p> <p>The identification number is P1 Misc-28/2022</p> <p>The number, identification of the lots (contracts) comprising this tender is: Not applicable.</p>
ITB 1.3 (New Para)	<p>The brief scope of works in this contract is as under:</p> <ol style="list-style-type: none"> 1. The contractor will undertake designing the signage artworks on the basis of the scheme provided by the Employer. 2. The Contractor will undertake the Fabrication and Installation of Signage and Graphics artworks based on technical requirements provided by the Employer and will be responsible for coordinating all interfaces between adjacent and interfacing contract packages and disciplines. 3. The work under this contract shall consist of, but is not limited to, all materials, labor, equipment, tools, plants, scaffoldings, and necessary machinery as required to completely execute all the works relating to Signage and Graphics.
ITB 1.4 (New Para)	<p>The detailed Scope of work for the Design of Graphics, Fabrication, Supply, Installation, Testing and Commissioning of Signage of 4 stations viz. Dapodi, Bopodi, Khadki & Range Hill of Reach 01 and 4 stations viz. Deccan Gymkhana, Sambhaji Park, PMC & Civil Court Elevated of Reach 02 of Pune Metro Rail Project of this contract is further described in the Para-2: Works Requirements and other documents. The Contractor has to design the complete system and execute the work accordingly with the approval of Employer.</p> <p>The Contractor shall also carry out effective interface & coordination with Designated Contractors and others appointed by the Employer from time to time, during the Contract period.</p> <p>The Bidders are particularly advised to pay attention to the IT Requirements of Employer (Part-III - Annexure-A - PROJECT MANAGEMENT INFORMATION SYSTEM (PMIS)).</p>
ITB 1.5 (New Para)	<p>The successful Bidder has to establish its office at Pune if it does not have at present. The cost and expenses for setting up the said office(s) will be deemed to have been included in the Pricing Document and no separate / extra / additional payment will be made on this account.</p>
ITB 2.1	<p>The name of the Project is: Pune Metro Rail Project</p> <p>Source of fund for the project: The project shall be funded from GOM and GOI along with bilateral funding from EIB Luxembourg and AFD France.</p> <p>Source of fund for this work tender: The Employer has applied loans from the European Investment Bank - EIB (hereinafter called "Funding Agency") towards the part cost of the Project and intends to apply a portion of the proceeds of the loans for payments under this Contract. Disbursement of the loans will be subject, in all respects, to the terms and conditions of the Loan Agreements, including the disbursement procedures and the applicable guidelines of EIB.</p> <p>(http://www.eib.org/attachments/strategies/guide_to_procurement_en.pdf)"</p>

ITB 3.1	The Bidders are required as a condition of admission to eligibility, to execute and attach a Covenant of Integrity and Environmental and Social Covenant in the form indicated in Section IV: Bidding Forms.
ITB 3.3 (New Para)	<p>Prohibited Conduct:</p> <p>In pursuance of the Funding Agency's (EIB's) Anti-Fraud Policy (refer http://www.eib.org/en/infocentre/publications/all/anti-fraud-policy.htm), Prohibited Conduct includes corruption, fraud, coercion, collusion, obstruction, money laundering and financing of terrorism defined as follows:</p> <ul style="list-style-type: none"> a) A corrupt practice, is the offering, giving, receiving, or soliciting, directly or indirectly, anything of value to influence improperly the actions of another party. b) A fraudulent practice, is any act or omission, including a misrepresentation that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation. c) A coercive practice is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party. d) A collusive practice, is an arrangement between two or more parties designed to achieve an improper purpose, including influencing improperly the actions of another party. e) An obstructive practice is (a) deliberately destroying, falsifying, altering or concealing of evidence material to the investigation; and/or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation, or (b) acts intended to materially impede the exercise of the EIB's contractual rights of audit or access to information or the rights that any banking, regulatory or examining authority or other equivalent body of the European Union or of its Member States may have in accordance with any law, regulation or treaty or pursuant to any agreement into which the EIB has entered in order to implement such law, regulation or treaty. f) Money laundering is, <ul style="list-style-type: none"> i. the conversion or transfer of property, knowing that such property is derived from criminal activity or from an act of participation in such activity, for the purpose of concealing or disguising the illicit origin of the property or of assisting any person who is involved in the commission of such activity to evade the legal consequences of his action; ii. the concealment or disguise of the true nature, source, location, disposition, movement, rights with respect to, or ownership of property, knowing that such property is derived from criminal activity or from an act of participation in such activity; iii. the acquisition, possession or use of property, knowing, at the time of receipt, that such property was derived from criminal activity or from an act of participation in such activity; iv. participation in, association to commit, attempts to commit and aiding, abetting, facilitating and counselling the commission of any of the actions mentioned in the foregoing points. g) Financing of terrorism is the provision or collection of funds, by any means, directly or indirectly, with the intention that they should be used or in the knowledge that they are to be used, in full or in part, in order to carry out any of the offences within the meaning of Articles 1 to 4 of the Council Framework Decision 2002/475/JHA of 13 June 2002 on combating terrorism. <p>The Employer will declare a firm ineligible, either indefinitely or for a stated period of time, for any Employer's contract, if at any time determines that the firm has engaged in Prohibited Conduct in competing for, or in executing, a borrowed financed contract in general.</p> <p>The Bidder/Contractor grant the Employer, the Funding Agencies and auditors appointed by either of them, as well as any authority or European Union Institution or body having competence under European Union law, the right to inspect and copy the books and records of the bidder, contractor, supplier or consultant.</p>

	<p>If it is established to the required standards that a project-related party has engaged in Prohibited Conduct in the course of a procurement process or implementation of a contract to be financed, the Funding Agency:</p> <ol style="list-style-type: none"> may seek appropriate remediation of the Prohibited Conduct to its satisfaction; may declare ineligible such project-related party to be awarded the contract; and/or may withhold the Funding Agency's no objection to contract award and may apply appropriate contractual remedies, which may include suspension and cancellation, unless the Prohibited Conduct has been dealt with to the satisfaction of the Funding Agency. <p>Furthermore, within the framework of the Funding Agency's Exclusion Policy (see the EIB's Exclusion Policy: https://www.eib.org/en/publications/exclusion-policy.htm), the Funding Agency may declare such project related party ineligible to be awarded a contract under any EIB project or to enter into any relationship with the Funding Agency.</p> <p>IMPORTANT: It should be noted that, in the Covenant of Integrity, the bidder is requested to self-declare all sanctions and / or exclusions (including any similar decisions having the effect of imposing conditions on the bidder or its subsidiaries or to exclude the said bidder or its subsidiaries, such as temporary suspension, conditional non-exclusion, etc.) imposed by the European institutions or any multilateral development banks (including the World Bank Group, the African Development Bank, the Asian Development Bank, European Bank for Reconstruction and Development, European Investment Bank or Inter-American Development Bank), regardless of the date of issue and the expiration or not of such decisions and of the current status of any sanction and / or exclusion. In this regard, any omission or misrepresentation, made knowingly or recklessly, may be considered as fraud under the EIB Anti-Fraud Policy. Therefore, the Employer reserves the right to reject any offer presenting an inaccurate or incomplete Covenant of Integrity, and may cause the rejection of the offer for prohibited conduct.</p>
ITB 4.1	<p>Maximum number of members in the JV/Consortium shall be: Three</p> <p>Lead member shall have minimum 40% participation and other members shall have minimum 20% participation in the proposed JV / Consortium for this work. The lead member must be technical and have maximum participation in the JV/Consortium.</p> <p>In case of JV / Consortium, change in constitution or percentage participation of JV/Consortium shall not be permitted at any stage after their submission of Bid and thereafter.</p> <p>The authorized representative from lead member of JV/Consortium shall be signatory of the bid.</p>
ITB 4.2(e)	<p>No Bidder can be a subcontractor while submitting a Bid individually or as a partner of a JV / Consortium in the same bidding process. A Bidder, if acting in the capacity of subcontractor in any Bid, may participated in more than one Bid, but only in that capacity.</p>
ITB 4.5	<p>This Bidding process is in Single stage two-packet system through e-tender portal of Maharashtra Metro Rail Corporation Limited. Unless otherwise approved by the Employer, the Bids for this Contract will be considered only from those companies, corporation, partnerships, consortia and joint ventures who pass the Eligibility Criteria under Section-III based on submissions with the Bid. Technical bids of only such eligible Bidders will be evaluated.</p>
ITB 4.7 (New Para)	<p>A firm, who has purchased the Bidding Document in their name, can submit the Bid either as individual firm or in JV / Consortium.</p>
ITB 4.9 (New Para)	<p>In case, the Bidder is a JV/Consortium, a detailed JV/Consortium Agreement between the Members of such JV/Consortium stating clearly their inter-relationship and division of work and obligations among the Members as mentioned in ITB 4.13 below should be submitted along with the Bid for proper examination by Maharashtra Metro Rail Corporation Limited. The format of the JV/Consortium Agreement is provided in Section-IV: Bidding Form (Form 8).</p>
ITB 4.10 (New Para)	<p>Further, a Power of Attorney signed by all the JV/Consortium Members duly supported by their board resolutions must also accompany the Bid authorizing the Lead Member, inter-alia, to submit the Bid on their behalf. The formats of the Power of Attorney as well as the board resolution are provided in Section IV: Bidding Form (Form 9). As the Contract Agreement will be required to be executed by all other Members of the Consortium also in addition to signing by the Lead Member, therefore each of such other Members is</p>

	required to issue a Power of Attorney authorizing an individual as its authorized signatory, inter alia, to sign the Contract Agreement. The format of the Power of Attorney is provided in Section IV: Bidding Form (Form 9E).
ITB 4.11 (New Para)	Every Bidder, be it a single entity or a consortium, is required to submit along with its Bid a Power of Attorney duly signed and stamped and supported by its board resolution authorizing an individual as its authorized signatory, inter alia, to sign and submit the Bid. The formats of the Power of Attorney as well as the board resolution are provided in Section IV: Bidding Form (Form 9). In case of Consortium, such power of attorney and board resolution must be executed and passed respectively by the Lead Member.
ITB 4.12 (New Para)	<p>The mode of execution of the power of attorney should be in accordance with the procedure, if any laid down by the applicable law and the charter documents of the executant(s) and when it is so required the same should be under common seal affixed in accordance with the required procedure.</p> <p>For a Power of Attorney executed and issued overseas, the document will also have to be legalized by the Indian Embassy and/or notarized in the jurisdiction where the Power of Attorney is being issued. However, the Power of Attorney provided by a Bidder from a country which has signed The Hague Legislation Convention 1961 is not required to be legalized by the Indian Embassy if it carries a conforming Apostille certificate.</p> <p>This power of attorney should be registered at appropriate authority & easily verifiable.</p>
ITB 4.13 (New Para)	<p>Where the Bidder is a Consortium or Joint Venture, the Bidder shall submit the following additional information to meet the qualification criteria for eligibility:</p> <ol style="list-style-type: none"> A Memorandum of Understanding / Consortium Agreement shall be provided duly notarized by the notary public of country of origin and should be stamped by Embassy / High Commission. Bidders from Member Countries of Hague convention may submit all these documents with "Apostille" stamp instead of Embassy. Nomination of one of the Members of the Consortium or Joint Venture to be in-charge ("Lead member"); and this authorization shall be covered in the Power of Attorney signed by the legally authorized signatories of all Members of Consortium or Joint Venture. Details of the intended financial participation by each member shall be furnished with complete details of the proposed division of responsibilities and relationships among the individual Members. The Lead member shall be authorized to incur liabilities, receive payment (if provided for in MoU / Consortium Agreement) and receive instructions for and on behalf of any or all Members of the Consortium / Joint Venture. All members of the Consortium / Joint Venture shall be jointly and severally responsible for the execution of the Contract in accordance with the terms and conditions of the Contract. In case of the Bidder being Successful, the JV / Consortium Agreement shall be registered at any place in India so as to be legally valid and binding on all partners / members The Bid shall be signed so as to be legally binding on all the Members of the Consortium.
ITB 4.14 (New Para)	The Bidder shall submit with the Bid full details of its ownership and control or, if the Bidder is a Consortium, full details of ownership and control of each Member thereof. The required information should be submitted as per Form 4.11 in the Section IV: Bidding Forms.
ITB 4.15 (New Para)	<p>Indian Bidders, or Indian Members of a Consortium shall submit, a copy of the Permanent Account Number (PAN) issued by the Income Tax Authorities and a certified copy of the last 3 years (including the latest Financial Year) income tax return, duly acknowledged by Income Tax department with their Bid and the Technical Package. In case the Indian member of a Consortium is a wholly owned 100% subsidiary of their foreign partner in the said Consortium and this Indian company has been formed less than 3 years ago, the certified copy of the latest Financial Year income tax return (applicable only if company was formed more than a year ago), duly acknowledged by Income Tax department shall be submitted in the Technical Package.</p> <p>The foreign partner of the JV/Consortium shall submit appropriate documents pertaining to their financial capability/ audited balance sheets and clearances of taxes as per the relevant law of the country of their origin.</p>

ITB 4.16 (New Para)	Each Bidder (each Member in the case of a Consortium) is required to confirm and declare with its Bid that no agent, middleman or any intermediary has been, or will be, engaged to provide any services, or any other item or work related to the award and performance of this Contract. Such Bidder or Member will have to further confirm and declare in the Bid that no agency commission or any payment which may be construed as an agency commission has been, or will be, paid and that the Contract Price will not include any such amount. If the Employer subsequently finds to the contrary, the Employer reserves the right to declare the Bidder as non-compliant and declare any Contract if already awarded to the Bidder to be null and void. Specific declaration to this effect exactly as per Section IV: Bidding Form (Form 18) shall be submitted with the Technical Package.
ITB 4.17 (New Para)	Canvassing or offer of an advantage or any other inducement by any person with a view to influencing acceptance of a Bid will be an offence under laws of India. Such action will result in the rejection of the Bid, in addition to other punitive measures.
ITB 4.18 (New Para)	Each Bidder (each member in the case of joint venture or consortium or partnership) is required to confirm and declare with their Tender that they (as the case may be) have not engaged in any fraudulent and corrupt practice as defined in BDS ITB 3.3 and that no agent, middleman or any intermediary has been, or will be, engaged to provide any services, or any other item or work related to the award and performance of this Contract and declare that no agency commission or any payment which may be construed as an agency commission has been, or will be, paid and that the tender price will not include any such amount. To fulfil this requirement, the Bidder (each member in case of JV / Consortium) shall sign and execute the Covenant of Integrity given as Form - 2.2A and the declaration given as Form 23. If the Employer subsequently finds these has not been provided, the Employer reserves the right to declare the Bidder as non-compliant and declare any Contract if already awarded to the Bidder to be null and void.
ITB 5.2 (New Para)	Bidders are encouraged (Not mandatory & Binding) to adopt Indian sources to the maximum possible extent. However, all plant, materials, supplies, equipment and services shall be to the satisfaction of the Employer and Engineer. The information on all plant, materials, supplies, equipment and services included in the Contractor's Proposal and incorporated into the Contract shall not, in any event, be construed as a submission to the Employer under the Contract. Contractor will be required to take specific approval of the Employer for deployment of plant, materials, supplies, equipment and services in accordance with the Conditions of Contract and Employer's Requirements.
B. BIDDING DOCUMENTS	
ITB 6.1	<ul style="list-style-type: none"> The Bidding Documents consist of s 1, 2, 3 and 4, 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 <ul style="list-style-type: none"> Section I Instructions to Bidders (ITB) Section II Bidding Data Sheet (BDS) Section III Evaluation and Qualification Criteria Section IV Bidding Forms Section V Eligibility Criteria and Social and environment responsibility Section V-A Agency Policy Corrupt and Fraudulent Practices Section VI Pricing Document Annexure II-A Toolkit for using e-tender portal PART - 2 - WORKS REQUIREMENTS <ul style="list-style-type: none"> Section VII-A General Specification Section VII-B Particular Specification Section VII-C 5D BIM PART - 3 - CONDITIONS OF CONTRACT AND CONTRACT FORMS <ul style="list-style-type: none"> Section VIII General Conditions (GCC) Section IX Particular Conditions (PCC) Section X Contract Forms Section XI SHE Manual PART - 4 - TENDER DRAWINGS
ITB 6.3	As this is a e-tender and all relevant document are available on E-tender Portal of Maharashtra Metro Rail Corporation Limited hence the Employer is not responsible for the completeness of the Bidding Documents, responses to requests for clarifications, the

	minutes of the pre-bid meeting (if any), or Addenda to the Bidding Documents in accordance with ITB 8 (Downloaded / Uploaded by Bidder). In case of any contradiction, documents available / uploaded on E-Tender portal of Employer shall prevail.
ITB 6.4	Following is added to existing ITB 6.4 Failure to comply with the requirements of the Bidding Documents and to furnish all information required by the Bidding Documents or submission of a Bid not substantially responsive to the Bidding Documents in every respect will be at the Bidder's risk and may result in rejection of its Bid.
ITB 6.5 (New Para)	The Bidder shall not make or cause to be made any alternation, erasure or obliteration to the text of the Bid Documents.
ITB 6.6 (New Para)	The document including the Bid Documents and all attached documents provided by Maharashtra Metro Rail Corporation Limited are and shall remain or becomes the property of Maharashtra Metro Rail Corporation Limited and are transmitted to the Bidders solely for the purpose of preparation and the submission of a Bid in accordance herewith. The provision of this Para shall also apply <i>mutatis mutandis</i> to the Bids and all other documents submitted by the Bidders, & Maharashtra Metro Rail Corporation Limited will not return to the Bidders any Bid, document or any information provided along therewith.
ITB 6.7 (New Para)	Contents of Supporting Documents
ITB 6.7.1 (New Para)	The references documents, reports, drawings containing site information included in the Bidding Documents are for general information only and any interpretation of the results shall be construed as opinions only and not as representations or warranties as to the actual site conditions. The Bidders' attention is specifically drawn to ITB 6.7.3 below.
ITB 6.7.2 (New Para)	The Bidders shall note the existence of over ground, at grade, utilities and infrastructure in the near vicinity of the Works to be constructed.
ITB 6.7.3 (New Para)	The accuracy or reliability of the documents and reports referred to in this Para ITB 6.7 and of any other information supplied, prepared or commissioned at any time by the Employer or others in connection with the Contract is not warranted. The Bidders' attention is drawn to Clause 4.10 of GC in this regard. The Bidder should visit, examine and assess the Site including working conditions and will be deemed to have satisfied himself of the risks and obligations under the Contract.
ITB 7.1	For Clarification of bid purposes only, all correspondence to be made through mail to the below mentioned email address & addressed to ED, Procurement & Contracts, Maharashtra Metro Rail Corporation Limited. Email address: -tenders.pmrp@mahametro.org All correspondence from Maharashtra Metro Rail Corporation Limited pertaining to this Bid till award of the work shall be done by authorized representative of Maharashtra Metro Rail Corporation Limited . The Bidders are advised to regularly check their email ID registered with their user account at e-tendering portal https://mahametroRail.etenders.in for any update/addendum/corrigendum/pre-tender and post-bid queries/any other correspondence by the Employer. The Bidder is requested, to submit any questions in writing, to reach the Employer before the date and time specified for Pre-Bid meeting in NIT & ITB 7.4. The bidder may send such queries either by post to the address mentioned in the bid document or send by mail to mahametroRail.etenders.in
ITB 7.1.1 (New Para)	Should the Bidder for any reason whatsoever, be in doubt about the meaning of anything contained in the Bid Documents or the extent of detail in the Works Requirements (General Specification and Technical Specification) and Bidding Drawings, the Bidder shall seek clarification from Maharashtra Metro Rail Corporation Limited, not later than the date specified. Bidders are advised to use the format attached in Section IV: Bidding Forms (Form for seeking clarification) while seeking clarifications.
ITB 7.1.2 (New Para)	Maharashtra Metro Rail Corporation Limited will comply with the principle of equal opportunity and fair treatment to respond to the questions / queries raised or clarifications sought by the Bidders on or before the date mentioned in BDS at ITB 7.1 above. All reply of queries and clarifications, in writing shall be up loaded on e-tender portal of Maharashtra Metro Rail Corporation Limited accessible to all prospective bidder. No verbal clarification shall be replied except the queries pertaining to the procedures of submission and uploading of bid on e-tender portal.

ITB 7.1.3 (New Para)	Maharashtra Metro Rail Corporation Limited may also on its own motion, if deemed necessary, issue interpretations and clarifications to all Bidders. All clarifications and interpretations issued by Maharashtra Metro Rail Corporation Limited shall be deemed to be part of the Bid Documents. Verbal clarifications and information given by Maharashtra Metro Rail Corporation Limited or its employees or representatives shall not in any way or manner be binding on Maharashtra Metro Rail Corporation Limited.
ITB 7.2	Following is added to existing ITB 7.2 Any site information given in this bidding document is for guidance only. It shall be deemed that the Bidder has undertaken a visit to the Site of the Works and is aware of and has ascertained itself, the site conditions, traffic, location, surroundings, climate, availability of power, water and other utilities for construction, access to Site, handling & storage of materials, weather data, applicable laws and regulations, and any other matter considered relevant by it prior to the submission of Bid.
ITB 7.4	A Pre-Bid meeting shall take place at the following date, time and place: As per NIT
ITB 7.5	Replace provisions of ITB 7.5 with the following The bidder may send such queries either by post to the address mentioned in the bid documents or by e-mail:- tenders.pmrp@mahametro.org
ITB 7.6	Responses to queries shall not be sent individually to each bidder. It shall be published on e-tender portal of Maharashtra Metro Rail Corporation Limited https://mahametroRail.etenders.in . However, email notices shall be sent to all bidders when new information is uploaded on e-tender portal of Maharashtra Metro Rail Corporation Limited https://mahametroRail.etenders.in .
ITB 7.7 (New Para)	Bidders should alert the Employer in writing with a copy to Funding Agency (EIB) to procurementcomplaints@eib.org in case they consider that certain clauses or technical specifications of the Tender Documents might limit national competition or introduce an unfair advantage to some bidders
ITB 8.2	Following is added to existing ITB 8.2 Such modification in the form of an addendum will be uploaded on the e-Bidding portal https://mahametroRail.etenders.in within the date given in NIT, which shall be available for all the prospective Bidders who have purchased the Bidding Documents in the Bid period. Without prejudice to the general order of precedence prescribed in the Clause 1.5 of GCC, the provisions in any such addenda shall take priority over the Invitation to Bidders and Bidding Documents previously issued. Bidder shall ensure these documents should be submitted along with their original Bid documents submission. These all addendums, corrigendum and clarifications shall be part of the contract agreement.
C. PREPARATION OF BIDS	
ITB 10.1	The language of the bid is English. All correspondence exchange shall be in the English language. Language for translation of supporting documents and printed literature is English. Supporting documents related to eligibility criteria enclosed with the bid, other than English Language, should be translated into English and will have to be endorsed by the Indian Embassy or notarized / registered with appropriate statutory authority in the jurisdiction where the supporting document is being issued. However, such documents provided by a Bidder from a country which has signed The Hague Legislation Convention 1961 is not required to be endorsed by the Indian Embassy, if it carries a conforming Apostille Certificate. The Bidder should provide the relevant contact number and E-mail ID along with the postal address, in English, of issuing authority / agency of such documents for verification purpose.
ITB 11	Documents Comprising the Bid. Replace the Para 11 and its Sub-Paras with the following:
ITB 11.1	General Requirements
ITB 11.1.1	All documents issued for the purposes of bidding as described in ITB 7, and any amendments issued thereof shall be deemed as incorporated in the Bid.

ITB 11.1.2	<p>The Bidder shall, on or before the date and time given in the Notice of Invitation to Bid upload his Bid on e-tendering portal https://mahametroRail.etenders.in in accordance with provisions in ITB 22.1.</p> <p>The Bidder shall, on or before the date given in NIT, submit his Bid online and follow the procedure and steps of E-Tender portal of Maharashtra Metro Rail Corporation Limited Details have been given in E-Toolkit given in Annexure-II-A.</p> <p>Cost of the Bid: Paid online through E-Tender portal. Bid Security: As per format given in the Tender.</p> <p>Technical Package: To be submitted at appropriate place i.e. Technical Envelope on e-tender portal.</p> <p>Financial Package: Financial bid form to be duly filled up directly in the Commercial Envelope only on e-tender portal and not anywhere else.</p> <ul style="list-style-type: none"> • Bidder should ensure that the no part of the Financial Bid should be up-loaded anywhere in the Technical envelope, if the bidder does so then his bid will be rejected out rightly. • The original Bid Security shall be submitted within three working days from the last date stipulated for submission of bid at the office of Maharashtra Metro Rail Corporation Limited at address given above. <p>For Bid Securing Declaration: Refer BDS ITB 19.1 below Bill of Quantities also referred to as the Pricing Document.</p>
ITB 11.1(d)	Alternative bid is not permissible.
ITB 11.1 (i)	The bid documents shall include the bid document including corrigendum/ addendum/ clarifications provided by the Employer during the course before submission of Bid. Failure by the bidder to upload the same shall render the bid to be considered as non-responsive and the bid shall not be validated.
ITB 11.2	Bid Security: Refer BDS ITB 19.1 below
ITB 11.3	Pre-qualification Package
ITB 11.3.1	The pre-qualification documents shall comprise of all information and supporting documents as per Section-III: Evaluation and Qualification Criteria.
ITB 11.4	Technical Package/Technical Section
ITB 11.4.1 (Additional para)	<p>The Bidder shall submit/ upload (through digital signature in the “Technical Package”/ “Technical Section” in the e-tender portal of MAHA-METRO.</p> <ol style="list-style-type: none"> 1. Bidder shall first download the Complete Bid Document along with all Corrigendum/Addendum/Clarification etc. by logging in with E-Tender using his DSC (i.e. DSC of POA/ Owner) read & examine the document & process carefully. 2. For submission of Tender Document and Corrigendum, Tick (✓) Submission Process has been enabled in Technical section of E-Tender Portal of MAHA-METRO. Bidders have to tick (✓) the corresponding checkbox provided in the Technical Section of E-Tendering portal as a token of acceptance of these bid documents & corrigendum / Addendums. By clicking the tick (✓) the bid documents & corrigendum /addendum shall automatically attach to offer of bidder. Further bidder may proceed for submission by clicking submit button. 3. If the bidder has completed the submission process of his bid before due date of submission and in between employer issues a corrigendum, in this circumstance the bidder has to re-submit his bid by “clicking tick (✓)” to the new added corrigendum, in case the new corrigendum has any implications to his already submitted bid. Bidder may, at his option, amend his bid accordingly & re-submit it. 4. Physical Sign & seal of bidder on each page of Bid Documents available online is required. 5. Scanned copy of all enclosures required as described in the Bid Document at various places shall be uploaded in Technical Section / Technical Envelop of E-Tender Portal. 6. Each entity of Technical Section / Technical Envelope have a capacity to upload a document of 10 MB. 7. If any enclosure is more than 10 MB, it may be split by bidder to the size of 10 MB or less & proceed further for uploading in Technical Section / Technical Envelope. 8. If the technical enclosures are more in number than the fixed entity of Technical Section / Technical Envelope. Bidders have option to upload any number of documents

	<p>in “Additional Document” section of “Technical Envelope/ Technical Section” of E-Tender Portal.</p> <p>9. No information pertaining to “Financial Bid” shall be uploaded or disclosed anywhere in “Technical Bid” Technical Section/ Technical Envelope of E-Tender Portal.</p> <p>10. All uploaded enclosures should bear page numbers and indexed properly. The first file uploaded by bidder in the technical section shall be “Index of Enclosures”.</p>
ITB 11.4.1.1	Scanned copies of Bid Security and Bid Processing Fee
ITB 11.4.1.2	Attested Copy of Power of Attorney (from each Member in case of Consortium) to submit Bid.
ITB 11.4.1.3	Consortium Agreement (in case the Bidder is a Consortium) duly covering the details provided under BDS ITB 4.13;
ITB 11.4.1.4	Letter of Bid in accordance with ITB 12;
ITB 11.4.1.5	Statement of Deviation: No Deviations are allowed.
ITB 11.4.1.6	Certificate confirming submission of all documents of Financial Package in Technical Package with price left blank (as per format provided in Section-IV: Bidding Forms (Form 16)).
ITB 11.4.1.7	Bidder’s Technical Proposal
(1)	The Bidder shall submit with its Bid its Technical Proposals as described in Section IV: Bidding Form (Form 4.4). The Technical Proposals to also include details of major component, equipment, sub-systems, assemblies and any specialized works proposed to be sub-contracted or bought-in (See ITB 34.4 below).
(2)	<p>The Bidder shall submit in his Technical Package a schedule of the main items of Contractor’s Equipment (refer Form 4.5 under Section IV. Bidding Forms), which he intends to use for carrying out the Works, indicating the activities for which each item will be used. The Bidder shall specify in each case:</p> <ul style="list-style-type: none"> • If he owns or intends to purchase such items, and • If he intends to enter into hire, hire purchase, or leasing or charter-party arrangements.
(3)	The Bidder may be requested by Maharashtra Metro Rail Corporation Limited in writing to amplify, explain and develop the Contractor’s Technical Proposals in substantially greater detail during the detailed technical package evaluation period such that they may be confirmed as complying clearly with Works Requirements and, in accordance with BDS ITB Para 8.4 herein, can be incorporated into the Contract. Only those aspects of the Contractor’s Technical Proposal that the Employer (at its sole discretion) considers clearly conforming will form part of the Contract.
ITB 11.4.1.8	<p>Outline Quality Plan (Form 4.7 under Section IV: Bidding Form): The Bidder shall submit as part of its Bid an Outline Quality Plan illustrating the intended means of compliance with the Clause 5.2 to 5.6 of General Specifications (Part 2, Section VII-A, Works Requirements, and setting out in summary form an adequate basis for the development of the more detailed document required under specifications of the Bid. The Outline Quality Plan shall contain sufficient information to demonstrate clearly the proposed method of achieving the Bidder’s quality objectives with regard to the requirement of the Contract.</p> <p>Overall responsibility of quality for manufacture, testing, commissioning and DLP shall be with the Consortium member based on whose experience and strength, the Bidder has qualified for this Bid.</p>
ITB 11.4.1.9	<p>Outline Safety Plan (Form 4.8 under Section IV: Bidding Form): The Bidder shall submit as part of its Bid an Outline Safety Plan which shall contain sufficient information to demonstrate clearly the Bidder’s proposals for achieving effective and efficient safety procedures in the design, manufacture, testing & commissioning of the Works. The Outline Safety Plan should include an outline of the safety procedures and regulations to be developed and the mechanism by which they will be implemented for ensuring safety including Hazard Analysis, Fire Control, Electro Magnetic Compatibility/Electromagnetic Interference control, reliability, availability and maintainability requirements as given in the Works Requirements (Clause 14.5 and 14.6 of General Specifications,</p>

	<p>Part 2, Section VII-A) and Clause 5 and 12 (Sub Clause 4.8, 4.22) of Part B - Specific Provisions of Section IX-Particular Conditions.</p> <p>The Outline Safety Plan shall be headed with a formal statement of policy in relation to safety and shall be sufficiently informative to define the Bidder's Safety Plans and set out in summary an adequate basis for the development of the Site Safety and Safety in transportation to be submitted in accordance with Works Requirements and Clause 12 (Sub Clause 4.8, 4.22) of Part B - Specific Provisions of Section IX-Particular Conditions. The Bidder may be requested by Maharashtra Metro Rail Corporation Limited in writing to amplify, explain or develop its Outline Safety Plan prior to the date of acceptance of the Bid and to provide more details with a view to reaching provisional acceptance of such Plan.</p>
ITB 11.4.1.10	<p>Outline Environmental Plan (Form 4.9 under Section IV: Bidding Form): The Bidder shall submit as part of its Bid an Outline Environmental Plan setting out in summary form its intended means of complying with the Employer's Safety, Health and Environment Manual and noise standards for the Works (refer Clause 9 - Sub Clause 4.8 of Part B - Specific Provisions of Section IX-Particular Conditions). This shall be an adequate basis for the development of the more detailed document to be submitted under Works Requirements. This shall form the basis for the submission of a detailed and comprehensive Environmental Plan to be submitted in accordance with Works Requirement (Clause 3.6.3 of General Specifications, Part 2, Section VII-A) at the time of detailed design.</p> <p>The Bidder may be requested by Maharashtra Metro Rail Corporation Limited in writing to amplify, explain or develop its Outline Environmental Plan prior to the date of acceptance of the Bid and to provide more detail with a view to reaching provisional acceptance of such a Plan.</p> <p>The Bidders (each member in case of JV / Consortium) shall sign and execute the Environmental and Social Covenant given as Appendix - 2.2B and submit with the Tender.</p>
ITB 11.4.1.11	<p>The Structure of the Bidder including details of ownership and control of the Bidder (Form 4.11 under Section IV: Bidding Form).</p>
ITB 11.4.1.12	<p>Project Management Plan (Form 4.10 under Section IV: Bidding Form): The Bidder shall submit with its Bid a Project Management Plan including staffing schedule as prescribed in Works Requirements (Clause 3.3 of General Specifications, Part 2, Section VII-A), inter-alia, indicating names, qualifications, professional experience and corporate affiliation of all proposed key management and engineering personnel (above the level of supervisor) and specialists. Details shall be included for all such personnel whether directly employed or engaged on a consultancy or advisory basis and whether associated with the design or the construction of the Works. The submission shall include a provisional management structure and organization chart showing areas of responsibility, relative seniorities and lines of reporting.</p> <p>The Bidder shall include its proposals for its Co-ordination Control Team and include the name and qualifications of the Team Leader responsible for the interface co-ordination with Designated Contractors. The key staff for design and construction shall be from that member of the JV / Consortium of the Subcontractor on the experience of which, the JV / Consortium has been pre-qualified.</p> <p>The successful Bidder shall deploy those proposed key management and engineering personnel. Should they be not available for the Work, the successful Bidder shall deploy an equivalent or superior expert (in qualification, experience and capability) acceptable to the Employer and subject to the written prior approval of Employer.</p>
ITB 11.4.1.13	Staffing Schedule and Organization Chart as per ITB 11.4.1.13 above (refer Form 4.1 under Section IV: Bidding Form)
ITB 11.4.1.14	Bidder's Proposed Works and Design submission Programme.
(1)	The Bidder shall submit with its Bid, a Works Programme which shall indicate how the Bidder intends to organize and carry out the Works and achieve Stages and complete the whole of the Works by the appropriate Key Dates. Detailed requirements for the Works Programme are set out in Section IV: Bidding Forms (Form 4.3).

	<p>Periods for each stage of work are given in Part 3, Section IX, PC Part A -Contract Data (Table - Summary of Sections). The Works Programme shall be prepared in terms of weeks from Commencement Date of Works.</p> <p>The Works Programme given in the Bid shall not in any event be construed as a submission of the Works Programme as required to be furnished according to the Works Requirements.</p>
(2)	<p>The Bidder shall submit with its Bid its proposed Design Submission Programme to cover the Design Phase. Such proposed Programme shall:</p> <ul style="list-style-type: none"> (a) be consistent with the Works Programme as detailed in Works Requirements; (b) Include a Schedule identifying, describing, cross-referencing and explaining the Design Packages and Submissions which the Bidder intends to submit; (c) take due account of the design co-ordination interface periods during which the Contractor shall be required to undertake and complete all aspects of design co-ordination with other contractors (Designated Contractors) engaged in the design of the Project such that each contractor can complete its coordinated design in the knowledge that such design will be compatible and coordinated with others and allowing adequate time for the Employer's assessments and decisions. <p>The proposed Design Submission Programme submitted at the time of Bid shall be modified and developed as necessary during the Contract Period to incorporate the Employer's programme requirements in respect of review by the Employer and the Engineer.</p>
(3)	<p>The Bidder's attention is drawn to the Works Requirements (Clause 2.5 of General Specifications, Part 2, Section VII-A) and the requirements that the initial Proposed Works Programme and Design Submission Programme shall be submitted within the period stipulated in Works Requirements. However, the Bidder should note that it may be requested by Maharashtra Metro Rail Corporation Limited in writing to amplify, explain & develop its proposed Works Programme prior to award of Contract.</p>
(4)	<p>The proposed Design Submission Programme and other submissions given in the Bid shall not, in any event, be construed as a submission as required to be furnished as per the Works Requirements.</p>
ITB 11.4.1.15	<p>Manufacture, Installation, Testing and Construction Methods: The Bidder shall submit with its Bid, the methods by which the Bidder intends to manufacture and test the systems/subsystems offshore as well as in India. Details shall be given of the locations and arrangements for offshore work, the facilities available and any understanding from others that the Bidder has in such matters. The manufacturing methods to be employed, the equipment's and facilities available or proposed to be set up off-shore and/or in India, will be analyzed during technical evaluation and shall be in sufficient detail to allow a full appreciation of the Bidder's proposals in relation to all aspects of the Works.</p>
ITB 11.4.1.16	<p>Undertaking regarding confidentiality of Bid information (as per format provided in Section IV: Bidding Forms (Form 13))</p>
ITB 11.4.1.17	<p>Certificate confirming receipt of all Bidding Documents addenda (as per format provided in Section IV: Bidding Forms (Form 17));</p>
ITB 11.4.1.18	<p>Declaration for non-engagement of any agent, middlemen or intermediary (as per format provided in Section IV: Bidding Forms (Form 18));</p>
ITB 11.4.1.19	<p>Certificate from the Bidder that all the contents of the Bidding Documents have been carefully examined by the Bidder and all the pages of Bidder's proposal have been signed and stamped as per pro-forma as given in Section IV: Bidding Forms (Form 19).</p>
ITB 11.4.1.20	<p>Letters of undertaking for ensuring supply of critical spares and availability of technical support (as per format provided in Section IV: Bidding Forms (Form 20));</p>
ITB 11.4.1.21	<p>Bid Index (Form 10 under Section IV: Bidding Form): The Bidder shall include with his Bid an index which cross refers all of the Employer's bidding requirements elaborated in these documents to all the individual sections of Technical Package and Financial Package which the Bidder intends to be the responses to each and every one of those requirements.</p>
ITB 11.4.1.22	<p>Details of providers of guarantees and warranties (refer BDS ITB 43)</p>
ITB 11.4.1.23	<p>Clause by clause commentary as detailed below:</p>

(1)	The Bidder shall provide a valid and fully compliant proposal for the Works as detailed in the Works Requirements. The Bidder shall submit a detailed clause-by-clause commentary on all the clauses of the Works Requirements.
(2)	<p>Bidders shall note that their comments to the clause-by-clause commentary wherever given shall only be in the following form:</p> <ul style="list-style-type: none"> • Complied: "Complied" shall be indicated by the Bidder where the Bidder is able to comply fully with the clause. • Noted: Where a clause merely provides information, and no other comment is necessary, "Noted" will suffice. • Not Complied: Where the Bidder is not able to comply fully with certain clauses or has any observation or proposes an alternative design, "Not Complied" shall be indicated and comments if any of the Bidder shall be indicated in detail. All Clauses with status as "Not Complied" shall be included in the statement of Deviations and shall be priced in Financial Package.
(3)	<p>Bidders shall also note that:</p> <ul style="list-style-type: none"> • Any comment by the Bidder in the Clause-By-Clause Commentary, other than either of "Complied", "Noted" or "Not Complied" shall be treated as "Not Complied". Unless Bidder prices against such clauses in the Financial Package, the comment shall be considered as unconditionally withdrawn with no financial implications and shall be considered as NULL and VOID.
(4)	A Bid without a Clause-by-Clause Commentary as stated above, is liable to be treated as unresponsive and be rejected.
(5)	Should any further document be required in pursuance to ITB 11.4.1.23, the Bidder will be instructed by the Employer which package of the Bid submission is to contain such document. The documents identified in BDS ITB 11.4.1.5, 11.4.1.13 and 11.4.1.21 will be used for the purpose of analyzing and evaluating the Bid but will not form part of the Contract unless same shall have been expressly incorporated into the Contract.
ITB 11.4.1.24	<p>Supporting Technical Documents: The Bidder shall submit with the Technical Package the documents that are identified in paragraphs below. These documents will be used for the purpose of evaluating and analyzing the Bid but will not form part of the Contract, unless the same shall have been expressly incorporated into the Contract.</p> <ul style="list-style-type: none"> (a) Details of providers of guarantees and warranties (see ITB 43); (b) Proposals for use of Site and Site management (see ITB 11.4.1.25 below) (c) Understanding of scope of works (see Section VII-B Particular Specifications) (d) Details of works including specialized works if already decided to be subcontracted (see ITB 34 & submit details in Appendix 4.4-B of Form 4.4 under Section IV. Bidding Forms) (e) Documents amplifying the Bidder's Technical proposal as described in Section IV: Bidding Forms (Form 4.4)
ITB 11.4.1.25	Proposal for use of Site and Site Management:
(1)	The Contractor will be given access to the Site in accordance with Clause 2.1 of GC. The Bidder shall submit with their Bid details of their proposed use of the works areas as described in the Works Requirements and such other areas in or in the vicinity of Pimpri Chinchwad Municipal Corporation & Pune Municipal Corporation which they propose to use for the purpose of executing the Works. Such details shall be subject to the provisions of the Works Requirements and shall include proposed preparatory work, arrangement for access to these temporary work sites or other areas and proposals for reinstatement on completion.
(2)	<p>The Bidder shall show, in outline, his proposed site layouts for:</p> <ul style="list-style-type: none"> (a) Accommodation and other facilities (b) Fabrication and storage areas. (c) Temporary storage and unloading areas.
(3)	The Bidder shall indicate his proposals for the provision of utility services to the Site. The Bidder is to note that the Contractor will be fully responsible for the provision of all utility services necessary for the construction and completion of works as described in the Works Requirements.
(4)	The Bidder's attention is drawn to the requirement that access to the Site or parts of the Site will, from time to time, have to be shared with other contractors carrying out works on, or in the vicinity of the Site including, without limitation, works relating to design and construction of stations; design, manufacture and installation of signaling,

	train control and telecommunications on the corridors; design, manufacture, supply and commissioning of rolling stock; design, manufacture and installation of lifts & escalators on the corridors; installation of Track work; design, manufacture, supply and installation of automatic fare collection / platform screen doors; construction, manufacture and installation of Depot and equipment's etc. Bidder may refer to Works Requirements - General Specifications and Works Requirements - Technical Specifications for details.
ITB 11.4.1.26	Any further documents which have been requested in accordance with ITB 8.4 above.
ITB 11.4.1.27	In case of an incorporated Bidder (or Consortium Members who are incorporated) copies, in English, of the Memorandum and Articles of Association or equivalent expression of corporate capacity.
ITB 11.4.1.28	Details of previous collaborations between JV/Consortium members in any other project.
ITB 11.4.1.29	PAN details as per ITB 4.15 above (for Indian companies)
ITB 11.4.1.30	One set of complete Bid Documents (including all addenda) un-tampered, signed and stamped on right hand bottom corner of each page and reference documents signed and stamped.
ITB 11.4.1.31	A declaration by the Bidders as per Section IV: Bidding Forms (Form 14) must be submitted stating that the Bid Documents have been downloaded from official website of e-tendering portal https://mahametroRail.etenders.in and no changes, what so ever, has been made by the Bidder. Bids received without the declaration are also liable to be rejected at any stage.
ITB 11.4.1.32	Any further documents which are requested in writing by Employer before submission of the Bid by way of evaluation documents, but which are not to form part of the Contract.
ITB 11.4.2	Designer
ITB 11.4.2.1	The design of the Works shall be undertaken by a Designer or the design wing of the Bidder (the Designer) who has experience in the design / design checking of similar works respectively as in scope of Bid. Approval of the proposed Designer intended to be engaged shall be obtained from Employer before engaging the Designer by the Contractor.
ITB 11.4.2.2	The Bidder shall submit with his Bid details of the agencies proposed to be hired and either the proposed terms and conditions upon which the Designer would be appointed in the event of acceptance of the Bid (excluding the financial and commercial terms thereof) or at least a statement of the heads (salient features) of such an agreement. The Bidder should note that, if heads of agreement are supplied with the Bid, the Bidder may be required to develop such heads into a full agreement during the Bid evaluation period and to submit the agreement in its final form prior to award of the Contract. Bidder should note that submission of the details of the agencies in the Bid does not mean approval of the agencies. The successful Bidder will be required to submit proposal for the agencies after award of the Contract for approval. Submission at Bid stage is only for the point of view of understanding of the offer of the Bidder.
ITB 11.4.2.3	The Bidder shall confirm that the terms for engagement of the Designer will include for certification of the As-Built drawings, and regular inspection of the Works to confirm that the construction complies with the intent of the design.
ITB 11.5	Financial Package
ITB 11.5.1	<p>(a) Summary sheet provided in the Commercial Envelope Section of E-Tender portal of Maharashtra Metro Rail Corporation Limited shall be duly filled up online.</p> <p>(b) Few prices schedules may require to be filled up physically and should be signed and stamped by authorized signatory/POA of bidder or POA of lead member of JV/consortium and scanned copies of such schedules may be uploaded as instructed in the BOQ or tender portals. (Deleted)</p> <p>The Bid Total Price includes all Taxes and Duties as per Goods & Service (GST) Act, net of input credit (if any) and Custom Tariff Act, Royalties, Cess etc. The price to be quoted shall be the total price of the Bid as elaborated in PART 1 Bidding Procedures, Pricing Documents Annexure IV-A.</p> <p>The Financial Package should be separately completed, each page duly signed and stamped and submitted / uploaded as per procedure in e-tender portal. No pricing information shall be submitted in any manner except in the Financial Proposal. The</p>

	<p>Pricing Document or any pricing information, if submitted by the Bidder along with the Technical Proposal or in any other manner other than the Financial Proposal Pricing Document envelope, will render the bid liable for rejection.</p> <p>The prices shall be entered at the prescribed place in the Pricing Document. These prices should include all costs associated with or required to be incurred for the purpose of execution of the Contract in accordance with the terms thereof.</p>
ITB 12.2 (New Para)	The Letter of Bid with all Schedules/ Forms shall be completed and signed by a duly authorized and empowered representative of the Bidder. If the Bidder comprises a Consortium the Letter of Bid shall be signed by a duly authorized representative of the Lead Member. Signatures on the Letter of Bid shall be witnessed and dated. Copies of relevant powers of attorney shall be attached.
ITB 13.1	Alternative bids shall not be permitted under ITB 13.2, ITB 13.3, or ITB13.4.
ITB 13.2	Alternative times for completion not permitted.
ITB 13.4	Alternative technical solutions shall not be permitted
ITB 14.1	No discounts are allowed and also not to be quoted by the bidder in the Letter of Bid and in the Schedules.
ITB 14.2	<p>Replace provisions of ITB 14.2 with the following:</p> <p>The Pricing Document is included in Part I of bid document as Pricing Documents/BOQ Section VI.</p> <p>The Bidder shall complete the Pricing Document in accordance with the instructions given therein. The completed Pricing Document shall be submitted with the Letter of Financial Bid.</p> <p>The Bidder is to note that Key Dates are to be determined by reference to periods from the Commencement Date of the Works. Periods for each stage of Work are given in Section IX. Particular Conditions, Part A -Contract Data 'Table - Summary of Sections'. Milestones Dates shall be, likewise, determined by reference to the respective periods from the Commencement Date of the Works. It is the intention that, prior to Date of Commencement, Key Dates and Milestones will be converted to calendar dates.</p> <p>Prior to award of Contract, the successful Bidder shall reformat the Pricing Document, Schedule of Milestones, Key Dates / and the Work Programme, so as to correlate between these documents, as required by the Employer.</p>
ITB 14.3	The price quoted in the commercial envelope in e-tender portal of Maharashtra Metro Rail Corporation Limited shall be the total price bid.
ITB 14.4	No discounts or any either methodology shall be quoted by the bidder in the Letter of Bid by the bidder.
ITB 14.5	For price adjustment / variation, refer to instructions / conditions provided in the Section IX-Particular Conditions of Contract Sub-Clause 13.8.
ITB 14.7	The price quoted by bidders deemed to be inclusive of all kinds of duties, taxes, Cess and other levies payable as per GST, Custom tariff act etc. and as prevailing on 28 days (Base Date) prior to final date of submission of bid (Closing time & date of submission of online bid).
ITB 14.8 (New Para)	Bidders shall quote for the entire work on a "single responsibility" basis such that the Bid Price covers all Contractor's obligations mentioned in or to be reasonably inferred from the Bid Documents in respect this Contract P1 Misc-28/2021 and completion of the whole of Works. This includes all requirements under the Contractor's responsibilities for testing & commissioning of the works including integrated testing & commissioning, the acquisition of all permits, approvals and tender licenses, etc.; the operation, maintenance and training services and such other items and services as may be specified in the Bid Documents.
ITB 14.9 (New Para)	The Bidder shall submit with its Bid (Financial Package) Milestone Payment Schedule, which shall show in tabular form the anticipated accumulated value of work done for all Cost Centers put together. The Bidder shall also submit monthly cash flows for the Contract. Both Milestone Payment Schedules and monthly cash flows shall be submitted for each currency of the Contract separately. The Milestone Payment Schedule shall be consistent with the proposed Works Programme.

ITB 14.10 (New Para)	If the Bidder is requested by Maharashtra Metro Rail Corporation Limited in writing to amplify & develop its proposed Work Programme & Design submission Programme pursuant to BDS ITB 11.4.1.14 above, the Bidder will be required to amend the Monthly Payment Schedule so as to be consistent with the Proposed Works and Design submission Programme with a view to reaching provisional acceptance of the amended version. If such provisional acceptance is notified, the Bidder shall be required, prior to award of Contract, to submit such amended versions as its proposed Monthly Payments conditional only upon acceptance of its Bid.
ITB 14.11 (New Para)	The Bidder should note Sub-clause 14.7 of the General Conditions (GC) and Clause 48 (Sub-Clause 14.2) from Part B- Specific Provisions of the Particular Conditions (PC) that describes the method of determining interim payments by reference to Milestone payments.
ITB 14.12 (New Para)	The Bidder shall submit its Bid without any deviations to the Bid Documents.
ITB 14.13 (New Para)	The Employer may get, from the Government, partial or complete waiver of taxes under GST, royalties, Labour, cess, and other levies payable to various authorities. The successful Bidder (the Contractor) shall maintain meticulous records of all the taxes and duties paid under GST etc. and provide the same with each running bill. In case the waiver becomes effective, the Contractor will be advised on the process to be followed to obtain the refund from the concerned authority. The Contractor shall arrange for the remit of the refund to the Employer. In case of failure by the Contractor to remit such amounts, the same shall be recovered from amounts due for payment to the Contractor. The Pro forma of undertaking is provided in Part-1: Bidding Form (Form 21).
ITB 14.14 (New Para)	With the Bid submission, the Bidder shall submit the Pro forma of undertaking provided in Part-1: Bidding Form (Form 22) stating that registrations under various fiscal and labour laws like GST, Profession Tax, Import Export Code, Employee State Insurance, Provident Fund, Maharashtra Labour Welfare Fund, shall be obtained by the bidders in the event of award of the work.
ITB 14.15 (New Para)	(DELETED)
ITB 14.16 (New Para)	Maharashtra Metro Rail Corporation Limited project is covered under Project Import Chapter 98.01 of Custom Tariff Act according to which only concessional custom duty is payable. The Bidder should avail this benefit and pass on the benefit of the same to Maharashtra Metro Rail Corporation Limited . As regards registration under Project Import, after the award of the contract, Maharashtra Metro Rail Corporation Limited at the written request of Contractor shall facilitate the Contractor for obtaining sponsoring / recommendation letter from the Ministry of Urban Development / Government of Maharashtra forgetting themselves registered for availing Project Import benefits. The responsibility to avail the concessional benefits under Project Import shall solely rest with the Contractor.
ITB 14.17 (New Para)	The Contractor shall maintain details of Taxes paid/payable under GST Law and submit: <ul style="list-style-type: none"> • Certificate of the Chartered Accountant in regard to turnover & other details of GST related to the project of Maharashtra Metro Rail Corporation Limited. • All payments will be subject to TDS provisions in force from time to time.
ITB 14.18 (New Para)	In view of above, the Bidders are advised to quote the price inclusive of all Taxes, and Duties as per Goods & Services (GST) Act, net of input credit (if any) and Custom Tariff Act etc., Royalties, Cess etc. and all other incidental charges required to fulfill the bidding conditions including statutory deduction viz., TDS towards Income Tax / Works Contract Tax etc. after considering ITB 14.7 to 14.18 above.
ITB 15.1	The currency(ies) of the bid and the payment currency(ies) shall be in Indian National Rupees (INR) in which the Bid Price is expressed in the Bid of the successful Bidder.
ITB 15.3 (New Para)	Interim payments in relation to each Cost Centre will be certified and paid, in accordance with the provisions of Clause 14.7 of the GC and Clause 48 (Sub-Clause 14.2, Advance Payment) of Part B- Specific Provisions of the PC in the currency shown against the relevant Milestone.
ITB 16.2 (New Para)	The Bidder shall be required to amplify, explain and develop the Contractor's Technical Proposals in substantially great details during the Bid evaluation period such that they may be confirmed as complying clearly with the Works Requirements and, in accordance with BDS ITB 8.4 herein, can be incorporated into the Contract. Only those aspects of

	the Contractor's Technical Proposal that the Employer (at his sole discretion) considers clearly conforming, will form part of the Contract.
ITB 18.1	The bid validity period shall be 180 days
ITB 18.3 (a)	The bid price shall not be adjusted.
ITB 19.1	<p>Bid Security is required as mentioned below: -</p> <p>The total bid security amount shall be INR 3,94,156/- submitted as below: INR 3,94,156/- in form of Bank Guarantee, as per procedure given in bid documents, from an Indian Schedule commercial bank (excluding Cooperative Banks) or from a schedule Foreign Bank as defined in Section 2(e) of RBI Act 1934.</p> <p>Bank Name : BANK OF MAHARASHTRA Branch with Address: (01150) PUNE MAIN BRANCH, LOKMANGAL, 1501, SHIVAJINAGAR, PUNE-411005 Bank Account Name: MAHARASHTRA METRO RAIL CORPORATION LIMITED Bank Account No.: 60274237292 Bank Account Type: Current IFSCode: MAHB0001150</p> <p>(a) A scanned copy of this BG is to be uploaded online and the bidder should ensure physical submission of the original bank guarantee at the office of Maha-Metro at address specified in bid document, within 3 working days from the last date stipulated for submission of the bid documents (online). (b) If the bidder fails to submit the scanned copy at the aforesaid BG or fails to submit the original bank guarantee, his Bid shall not be considered for opening & rejected outright</p>
ITB 19.2	The Bidder shall submit with his Bid a Bid Security for the sum mentioned in BDS/ITB by BG as specified in ITB 19.1 above. Such Bid Security in form of Bank Guarantee from an Indian Schedule commercial bank (excluding Cooperative Banks) or from a schedule Foreign Bank as defined in Section 2(e) of RBI Act 1934 and shall be valid for a period of 60 days beyond the Bid Validity period stipulated in the Bid.
ITB 19.8	The Bid Security as specified in ITB 19.1 above shall be submitted by the lead member in case of JV/Consortium.
ITB 20.1	<p>Bids to be submitted through e-tender portal of Maharashtra Metro Rail Corporation Limited only. (No physical submission of bid is allowed)</p> <p>The Bidder shall prepare and upload scanned copy of the Bid Securing Declaration, the documents for Pre-Qualification (Initial Filter Package), Technical Package of the Bid, and the Financial Package of the Bid, as described in ITB 11. The Bid Security in original is required to be submitted physically by bidders within 3 working days after online submission of bid.</p>
ITB 20.3	<p>The written confirmation of authorization to sign on behalf of the Bidder shall consist of:</p> <p>A written power of attorney authorizing the signatories of the Bid to commit each member of the JV/Consortium. The power of attorney (ies) shall be substantially in the format provided under Section IV: Bidding Forms (Form 9) of these Bidding Documents.</p> <p>The entire bid documents along with the corrigendum / addendum issued from time to time & requisite enclosures signed by authorized signatory of bidder shall be uploaded on e-tender portal of Maharashtra Metro Rail Corporation Limited, failing which the bid shall be considered as non-responsive.</p> <p>'and'</p> <ol style="list-style-type: none"> A firm, who has purchased the Bid Document in his name shall submit the Bid in his own name by using his DSC. In case of JV / Consortium the power of attorney hold of lead member is authorized to sign all legal documents, bid documents and other enclosures. However, the digital signature (DSC) of any member of JV/Consortium may be used for accessing /downloading/uploading & submitting the tender documents.

	<p>iii. Such digital signature (DSC) holders who is submitting the bid / or whose DSC is being used for accessing / submitting the bid, shall be authorized by POA (Lead Partner) of JV/Consortium & a notarized authority letter should be enclosed with the bid.</p> <p>iv. The facility in the e-tender portal of MAHA-METRO is also available for viewing & downloading the document free of cost.</p>
D. SUBMISSION AND OPENING OF BIDS	
ITB 21.1	Deleted.
ITB 21.2	Deleted.
ITB 21.3	Deleted.
ITB 22.4 (New Para)	Bids shall be submitted through e-tender portal of Maharashtra Metro Rail Corporation Limited only with clearly marked 'Pre-qualification & Technical Proposal', containing documents comprising the Technical Proposal in accordance with the provisions of ITB 16, and the other clearly marked 'Financial Proposal', containing Schedule of Prices or the Pricing Documents in accordance with the provisions of ITB 14.
ITB 22.1	<p>For bid submission purposes: - No physical submission of bid is allowed. The bid submission has to be strictly done through e-Bid portal of Maharashtra Metro Rail Corporation Limited.</p> <p>The deadline for online submission of bids is: As per NIT (as amended).</p> <p>Bidders must submit their bids electronically only. The electronic bidding submission procedures shall be:</p> <p>The electronic bidding submission procedures shall be as per (E-Tender procedure) Annexure-2A: (Toolkit for using Maharashtra Metro Rail Corporation Limited e-tender portal)</p> <p>The Bidder shall, on or before the date and time given in the Notice inviting Bid, upload his Bid on e-tendering portal (https://mahametroRail.etenders.in) Bidders may refer to e-tender procedures (Toolkit for using e-tender portal) at Annexure-2A</p> <p>The Bidders shall furnish the information strictly as per the formats given in the Bid documents without any ambiguity. The Maharashtra Metro Rail Corporation Limited shall not be held responsible if the failure of any Bidder to provide the information in the prescribed formats results in a lack of clarity in the interpretation and consequent disqualification of its Bid.</p> <p>In case of support or help required during online submission or difficulty encountered during online submission, the Bidders may contact the following official(s): 1. Prashant Jadhav (Consultant): 020-26051074</p>
ITB 23.2 (New Para)	Bids received after due date and time of submission shall not be accepted. Maharashtra Metro Rail Corporation Limited will not be responsible for any delay, internet connection failure or any error in uploading the Bid submission. The Bidders are advised to upload their submissions well before the due date and time of Bid submission to avoid any problems and last-minute rush.
ITB 23.3 (New Para)	The Employer may, at his discretion, extend the deadline for submission of Bids by issuing an amendment in accordance with ITB, in which case all rights and obligations of the Employer and the Bidders previously subject to the original deadline will thereafter be subject to the deadline as extended.
ITB 25.1	<p>The bid opening shall take place at As per NIT (as amended).</p> <p>Executive Director Procurement & Contracts MAHARASHTRA METRO RAIL CORPORATION LIMITED Pune Metro Rail Project 101, The Orion, Opposite Don Bosco Youth Centre, Koregaon Park, Pune - 411001 Telephone: 020-26051072</p> <p>The mode of bidding being only e-tendering mode no physical submission of bid is allowed. The electronic bid opening procedure shall be: The Technical Envelope/ Packages of Online Submitted Bids shall be opened (downloaded) first by the opening</p>

	<p>committee on due date and time of Bid opening in presence of bidders who choose to remain present.</p> <p>No minimum number of bids is required in order to proceed to bid opening.</p> <p>Add following paragraph below the existing paragraph of ITB 25.1:</p> <p>The Bid Security will be checked for the submission of bid from the downloaded documents of technical bid submitted by the bidders and details will be read out for the information of representative of Bidders, present at the time of opening of Bid. The bidders present shall be informed to sign on attendance sheet about their presence for the bid opening (downloading).</p> <p>After evaluation of Technical Bid received electronically via E-tender portal of Maharashtra Metro Rail Corporation Limited, the Financial/ Commercial Package/ Envelope of bid of technically successful bidder shall be opened. The date & time of opening of Financial Bid shall be communicated to Technically Successful bidder electronically (E-mail).</p>
ITB 25.3	<p>Replace provisions of ITB 25.3 with the following:</p> <p>For the avoidance of doubt, all references to the opening envelopes and reading out in the preceding shall mean opening and reading out the corresponding Technical Proposal as applicable. The reading out of the Technical Proposal shall include the presence or absence of a bid security; and any other details as the Employer may consider appropriate. The Letter of Bid and the Schedules are to be initialed by a minimum of two representatives of the Employer attending bid opening. The Employer shall neither discuss the merits of any bid nor reject any bid (except for late bids, in accordance with ITB 23.1) at this stage.</p>
ITB 25.4	<p>Replace provisions of ITB 25.4 with the following:</p> <p>The Employer shall prepare a record of the bid opening that shall include, as a minimum: the name of the Bidder and whether there is a withdrawal, substitution, or modification; and the presence or absence of a bid securing declaration. 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.</p>
ITB 25.5 (New Para)	<p>On opening of the Bid, it will be checked if they contain Pre-Qualification Package, Technical & Financial Packages. The Employer shall prepare a record of opening of the, Pre-Qualification and Technical Package, which shall include, the name of Bidder and presence or absence of a Bid Security. The Bidder is advised that the Employer's policy in respect of comparison of Bids is that the Technical Packages will be opened and reviewed to determine their acceptability & responsiveness to the Works Requirements and Bidding Drawings. Unacceptable and unresponsive bids will be rejected, and the corresponding Financial Package will not be opened.</p>
ITB 25.6 (New Para)	<p>After the evaluation of the Technical Proposals in accordance with ITB 27, 28, 29 and ITB 30, the Employer shall prepare a list of responsive Bidders for opening of their Financial Proposals. A date, time and venue will be electronically notified to all Bidders for announcing the result of evaluation and opening of Financial Proposals. The opening of Financial Proposals shall be done in presence of respective representatives of responsive Bidders who choose to be present.</p>
ITB 25.7 (New Para)	<p>The Financial Bid(s)/Package(s) which bidder(s) have uploaded online will be opened on a subsequent date; at least seven (7) days after the evaluation results of Technical Bids are published on e-Tender portal of Maha Metro. Financial packages of only those Bidders whose submissions are found substantially responsive and technically compliant will be opened. The time of opening of Financial Package shall be informed separately to only the Bidders who have qualified during Pre-Qualification and Technical evaluation stages and Bidders can be present to witness opening of Financial Package.</p> <p>No Bid shall be rejected at the opening of Price Bids.</p>

	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 TOTAL LUMPSUM PRICE' and Pricing for unqualified withdrawal as per Pricing Document.."
E. EVALUATION, AND COMPARISON OF BIDS	
ITB 26.2	Bids shall be deemed to be under consideration immediately after they are opened and until such time Maharashtra Metro Rail Corporation Limited makes official intimation of award/rejection to the Bidders. While the Bids are under consideration, Bidders and/or their representatives or other interested parties are advised to refrain, save and except as required under the Bidding Documents, from contacting by any means, Maharashtra Metro Rail Corporation Limited and/ or their employees/representatives on matters related to the Bids under consideration.
ITB 26.4 (New Para)	The Bid Documents, as listed in ITB 6.1 above, and any addenda thereto, together with any further communications, are issued for the purpose of enabling the Bidders to submit the Bids only. The Bidder shall not disclose any information contained in the documents or otherwise supplied in connection with this Bid invitation to any third party except for the purpose of preparing its Bid. The Bidder shall maintain complete confidentiality till the Contract is awarded except otherwise stated in the Bidding Documents and the Contract. A letter of undertaking is attached in Section IV: Bidding Forms (Form 13) and shall be completed by the Bidder and returned in the Technical Package. In the event that such confidentiality is breached, the Employer may reject the Bid. Copyright in all plans and any other documents issued to the Bidder is reserved.
ITB 26.5 (New Para)	The Bid drawings and documentation prepared by the Employer shall be used solely for the design of the Works. They shall not be used in part, whole or altered form for any other purpose without the express permission in writing of the Employer. Information relating to the examination, clarification, evaluation and comparison of bids and recommendations for the award of a contract shall not be disclosed to bidders or any other persons not officially concerned with such process until the award to the successful bidder has been announced.
ITB 29.1.1 (New Para)	<p>General Evaluation: Prior to the detailed evaluation of Bids, the Employer will determine whether each Bid:</p> <ul style="list-style-type: none"> • has been properly signed; and • has been accompanied by a valid Bid Security; and • meets the Eligibility and Qualification Criteria - Bidders, which do not qualify in any of the minimum eligibility criteria, shall not be considered for further evaluation of Technical packages and shall be rejected • meets the other aspects of general evaluation as per BDS ITB 4.9 to 4.17 • includes the signed copy of Covenant of Integrity, Environmental and Social Covenant (as per Form 2.2A and 2.2B under Section IV. Bidding Forms) and includes the signed Declaration of Undertaking (as per Form 23) under Section IV. Bidding Forms. <p>A 'NO' answer to any of the above items will disqualify the Bid/ Bidder.</p>
ITB 29.2.1 (New Para)	<p>Evaluation of qualifying conditions: Bids that include qualifications which:</p> <ol style="list-style-type: none"> 1. Seek to shift to the Employer, another government agency or another contractor all or part of the risk and/or liability allocated to the Contractor in the Bidding Documents; or 2. Which includes a deviation from the Bidding Documents which would render the Works, or any part thereof, unfit for their intended purpose; or 3. fails to submit a workable methodology to suit the local conditions"; or 4. which fails to commit to the date specified for the completion of the Works as specified under Section IX. Particular Conditions (PC) Part- A - Contract Data 'Table: Summary of Sections' will be deemed non-conforming and shall be rejected.
ITB 29.3.1 (New Para)	<p>Evaluation of Technical Package</p> <p>The Employer will evaluate the technical proposal to determine the technical suitability and acceptability as per Works Requirements-General Specifications and Technical Specifications of only such Bidders who qualify based on BDS ITB 29.1.1 above.</p> <p>The Technical Proposal as submitted in accordance with BDS ITB 11.4.1 (including its relevant sub-paras) shall be evaluated for its Conformity with the General and Technical Requirements as per Part 2, Sections VII-A and VII-B. Furthermore, the adequacy and appropriateness of the Bidder's responses to the related requirements in Part 1 shall be evaluated.</p>

ITB 29.4	<p>Bids which are:</p> <ul style="list-style-type: none"> • not fulfilling the General Evaluation Criteria as per ITB 29.1.1 above, • not substantially responsive as per ITB 29.2 above • having material deviation or reservation as per ITB 29.2 above • not fulfilling the qualifying conditions as per ITB 29.2.1 above, and • not fulfilling the Employer's Requirements - General Specification and Technical Specification as per ITB 29.3.1 above <p>will be deemed non-conforming and shall be rejected by the Employer and shall not be allowed subsequently to be made responsive by correction or withdrawal of the nonconforming deviation or reservation.</p>
ITB 29.5 (New Para)	If any Bid is rejected, pursuant to ITB 29.4 above, the Financial Package of such Bidder shall be returned unopened.
ITB 29.6 (New Para)	Bidders may note that pursuant to their qualification in the 'Prequalification and Evaluation Criteria' and 'Technical Evaluation' as per ITB 29.3 above, any acts of the Bidder (applies to each individual member in case of a Joint Venture/Consortium) which constitute sufficient grounds for exclusion as mentioned under ITB 41 will result in disqualification of the Bidder and the Financial Package of such Bidder shall be returned unopened.
Replace existing ITB 31 and its sub-Para as under:	
ITB 31	Evaluation of Financial Package
ITB 31.1	The financial proposals of only those that comply with the General Evaluation Criteria as per ITB 29.1.1 above and whose Technical Package is found compliant as per ITB 29 (and its sub-Para) above, will be opened and evaluated.
ITB 31.2	<p>Bids determined to be substantially responsive will be checked by the Employer for any arithmetic errors. Errors will be corrected by the Employer on the following basis</p> <p>A. if there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected, unless in the opinion of the Employer there is an obvious misplacement of the decimal point in the unit price, in which case the total price as quoted shall govern and the unit price shall be corrected;</p> <p>B. If there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail, and the total shall be corrected; and</p> <p>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 arithmetical error, in which case the amount in figures shall prevail subject to (A) and (B) above.</p> <p>If the Bidder does not accept the corrected Bid, its Bid will be rejected, and the Bid Security forfeited.</p>
ITB 32.1	Bids will be compared in Indian Rupees only. This will be achieved by conversion of the Foreign Currency portion of the Bid into Indian Rupees by using the Exchange Rates published by Financial Benchmarks India Pvt. Ltd (www.fbil.org.in) 30 (Thirty) days before the date specified for Bid opening, and then adding the same to the Indian Rupee portion of the Bid. In case this particular day happens to be a holiday, the exchange rate published by Financial Benchmarks India Pvt. Ltd (www.fbil.org.in) on the next working day will be considered.
ITB 34.1	At this time the Employer does not intend to execute certain specific parts of the Works by sub-contractors selected in advance.
ITB 34.4 (New Para)	<p>Sub-Contract</p> <p>Sub-contracting, excluding design work shall be generally limited to 50% of the lump sum price. The terms and conditions of subcontracts and the payments that have to be made to the Subcontractors shall be the sole responsibility of the Contractor.</p> <p>For sub-contracts exceeding Rs.5 million, it will be obligatory for the Contractor to obtain a "Notice of No-Objection" from the Engineer, to the identity of the Sub-contractor and Vendor. The Contractor shall certify that the cumulative value of the subcontracts (including those upto Rs.5 million each) awarded is within the aforesaid</p>

	<p>50% limit. In this regard the Bidder's attention is drawn to Clause 4 of PC. Any proposals by the Bidders in their offer shall not be construed as an approval of the vendor.</p> <p>The terms & conditions of the sub-contract are the sole prerogative of the Contractor and are deemed to be included in the price(s) quoted by the Bidder. However, the Subcontractor / Vendor shall fully comply with the technical specifications included in the Works Requirements.</p>
ITB 35.2	<p>Replace the existing ITB 35.2 with the following:</p> <p>In evaluating the Bids, the Employer will determine for each Bid the evaluated Bid price by adjusting the Bid price as follows:</p> <ul style="list-style-type: none"> A. making any corrections for errors pursuant to ITB 31.2; B. making appropriate adjustments for conditions, qualifications, deviations, etc. pursuant to ITB 14.12. C. converting the amount resulting from applying (A) & (B) above to a single currency in accordance with ITB 32.1; D. adding to (C) above the present worth of the capitalized cost of loss in transformer computed in accordance with Appendix 4.4-E of Form 4.4 under Section IV. Bidding Forms <p>Price variation clause will not be considered for financial evaluation. Bidders may also note that Appendix N: Section OPT (Optional Items -AMC) of Pricing Document i.e. Annual Maintenance for 3 years will also not be included in the financial evaluation of the Bids.</p>
ITB 35.5	<p>Replace the existing ITB 35.5 with below</p> <p>An Abnormally Low Bid shall be the bid where the Bid price, in combination with other elements of the Bid, appears so low that it raises material concerns as to the capability of the Bidder in regards to the Bidder's ability to perform the Contract for the offered Bid Price or the bid, which results in the lowest Evaluated Bid Price, is significantly lower than the Employer's estimate, or the bid is seriously unbalanced or front loaded in the opinion of the Employer.</p> <p>In the event of identification of a potentially Abnormally Low Bid, the Employer shall seek written clarifications from the Bidder, including detailed price analyses of its Bid price in relation to the subject matter of the contract, scope, proposed methodology, schedule, allocation of risks and responsibilities and any other requirements of the Bidding document.</p> <p>After evaluation of the price analyses, in the event that the Employer determines that the Bidder has failed to demonstrate its capability to perform the Contract for the offered Bid Price, the Employer shall reject the Bid."</p>
ITB 35.6 (New Para)	The Employer reserves the right to accept or reject any variation, deviation or alternative offer. Variations, deviations, alternative offers and other factors which are in excess of the requirements of the Bidding Documents or otherwise result in the accrual of unsolicited benefits to the Employer shall not be taken into account in Bid evaluation.
ITB 35.7 (New Para)	All stages of Bid Evaluation and Contract award stages i.e. Pre-qualification, Technical Evaluation, Financial Evaluation, Letter of Acceptance and Contract Agreement shall be subject to 'No-Objection' from EIB.
F. AWARD OF CONTRACT	
ITB 39.1	<p>Replace the existing ITB 39.1 with the following:</p> <p>Subject to ITB 38.1 and BDS ITB 39.2, bidder whose bid has been determined to be substantially responsive to the Bidding Documents and who has offered the Lowest Evaluated Bid Price (refer BDS ITB 35.2 for comparison on equal terms for determination of Lowest Evaluated Bid Price), and whose offer is balanced in terms of ITB 35.6, provided that such Bidder has been determined to be eligible and qualified in accordance with provisions of ITB 4 for deciding the successful eligible Contractor to whom the Contract will be awarded.</p>
ITB 39.2 (New Para)	Deleted
ITB 39.3 (New Para)	In case, Successful Bidder is a Consortium, then the Performance Security may be furnished on behalf of the Consortium either by the Lead Member or by all the Members of such Consortium in such proportion as may be agreed to between them.

ITB 40.1	Deleted
ITB 40.3	Deleted
ITB 40.4 (New Para)	The "Letter of acceptance" will be sent in duplicate to the successful Bidder, who will return one copy to the Employer duly acknowledged and signed by the authorized signatory, within one week of receipt of the same by him. The Letter of Acceptance will constitute a part of the Contract.
ITB 40.5 (New Para)	In the event of award of the Contract, the following will be the sequence of events in the order given below: Letter of Acceptance; Notice to Proceed; Signing of Contract;
ITB 42.1	Replace the existing ITB 42.1 with the following: Promptly upon notification of the Letter of Acceptance, the Employer shall send the successful Bidder the Contract Agreement. The Employer shall inform all the Bidders regarding the intent of contract award decision including the summary of the reasons of the decision at the time when publishing the evaluation results of the Financial Bids through the Maha-Metro e-tender portal.
ITB 42.2	Replace the existing ITB 42.2 with the following: The Bidder should note that after the acceptance of bid (technical and financial), the successful Bidder will be eligible for issuance of Letter of Acceptance. In the event of successful Bidder's acceptance of the LOA, the Bidder will be required to execute the Contract Agreement in the form specified in Section X Contract Forms with such modifications as may be considered necessary at the time of finalization of the Contract within a period of 28 days from the date of issue of the Letter of Acceptance.
ITB 43.1	The Performance Guarantee required in accordance with Clause 4.2 of the GC shall be for an amount as specified in Section IX. Particular Conditions, Part A - Contract Data in the form of a bank guarantee issued from an Indian Scheduled bank (excluding Cooperative Banks) or from a scheduled Foreign Bank as defined in Section 2(e) of RBI Act 1934 read with Second Schedule in the types and proportions of currencies in which the Contract Price is payable.
ITB 43.3 (New Para)	The Bidder has to furnish other Guarantees, Undertakings, & Warranties, in accordance with the provisions of the General Conditions of Contract and Particular Conditions of Contract (refer ITB 44).
ITB 43.4 (New Para)	Failure of the successful Bidder to comply with the requirements of ITB 42 and ITB 43 shall constitute sufficient grounds for the annulment of the award and execution of the Bid Securing Declaration.
ITB 44 (New Para)	Guarantees and Warranties
ITB 44.1 (New Para)	The Bidder shall submit full details of the identity of the proposed parties who would respectively provide or issue: <ul style="list-style-type: none"> the Performance Security in accordance with Sub-Clause 4.2 of the GC; parent company Undertakings in accordance with Clause 3 (Sub-clause 4.2A) of Part-B Specific Provisions of the PC; parent company Guarantees in accordance with Clause 3 (Sub-clause 4.2A of Part-B Specific Provisions) of the PC;
ITB 44.2 (New Para)	The Contractor shall submit other Warranties and Guarantees in accordance with Clause 3 (Sub-clause 4.2A) of Part-B Specific Provisions of PC. All the Guarantees and Warranties shall be submitted prior to the signing of the Contract.
ITB 44.3 (New Para)	If the Bidder comprises a Consortium, a parent company of each Member of such Consortium will be required to execute the Undertakings and Guarantees referred to in sub-paragraphs (b) and (c) of ITB 44.1 above.
ITB 44.4 (New Para)	Forms of the above documents are given in the Schedules to the Particular Conditions of Contract.
ITB 44.5 (New Para)	The Contractor should note that all Guarantees, Undertakings and Warranties except Advance Payment Guarantee, Retention Money Guarantee shall be executed prior to signing of the Contract.

ITB 45 (New Para)	Insurance
ITB 45.1 (New Para)	The Bidder's attention is drawn to the provisions contained in Clause 18 of the General Conditions of Contract and Clause 56 (Sub-Clause 16.2), 57 (Sub-Clause 17.1) & 58 (Sub-Clause 18.1) of Part-B Specific Provisions of Particular Conditions of Contract.
ITB 46 (New Para)	Settlement of Disputes of the Tender Process: Any suit or application, arising out of any dispute or differences on account of this Tender shall be filed in District and Sessions court at Pune, State Maharashtra/ High Court of Judicature at Bombay, State Maharashtra/ Supreme Court of India, New Delhi only and no other court or any other district of the country shall have any jurisdiction in the matter.

Maharashtra Metro Rail Corporation Limited (Maha-Metro)

**PUNE METRO RAIL PROJECT
BID DOCUMENTS
FOR**

Design of Graphics, Fabrication, Supply, Installation, Testing and Commissioning of Signage of 4 stations viz. Dapodi, Bopodi, Khadki & Range Hill of Reach 01 and 4 stations viz. Deccan Gymkhana, Sambhaji Park, PMC & Civil Court Elevated of Reach 02 of Pune Metro Rail Project.

TENDER NO.

P1 Misc-28/2022

PART I: BIDDING PROCEDURE

SECTION III: EVALUATION AND QUALIFICATION CRITERIA

Section III. Evaluation and Qualification Criteria

This Section contains all the criteria that the Employer shall use to evaluate bids and qualify Bidders, in accordance with ITB 35 and ITB 37. The Bidder shall provide all the information requested in the forms included in Section IV, Bidding Forms.

1. General

Wherever a Bidder (foreign) is required to state a monetary amount, Bidders should indicate the INR equivalent using the rate of exchange determined as follows:

- For turnover or financial data required for each year - Exchange rate prevailing on the last day of the respective calendar year.
- 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 the ITB 32.1. Any error in determining the exchange rates in the Bid may be corrected by the Employer.

2. Qualification

The Bid submission of Bidders, who do not qualify the minimum eligibility criteria & bid capacity criteria stipulated hereunder, shall not be considered for further evaluation and therefore rejected. The mere fact that the Bidder is qualified as mentioned in sub clause 1 to 4 below shall not imply that his bid shall automatically be accepted. The same should contain all technical data as required for consideration of Bid prescribed in the ITB.

Eligibility and Qualification Criteria				Compliance Requirements			Documentat ion
Sr. No.	Subject	Requirement	Single Entry	Joint Venture (existing or intended)			Submission Requiremen ts
				All Parties Combined	Each Member	Any one memb er	
1. Eligibility							
1.1	Nationality	Nationality in accordance with ITB 4.3	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Forms ELI - 1.1 and 1.2, with attachments
1.2	Conflict of Interest	No conflicts of interest in accordance with ITB 4.2	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Letter of Bid
1.3	EIB Ineligibility	Not having been declared ineligible by EIB, as described in ITB 4.4	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Form 2.2A
1.4	Government Owned Entity of the Borrower country	Meets conditions of ITB 4.3	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Forms ELI - 1.1 and 1.2, with attachments
2. Historical Contract Non-Performance							
2.1	History of Non-Performing Contracts	Non-performance of a contract ¹ did not occur as a result of supplier	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Form CON-2

		default in the past 5 years.					
2.2	Suspension Based on Execution of Bid Securing Declaration by the Employer or withdrawal of the Bid within Bid validity	Not under suspension based on execution of a Bid Securing Declaration pursuant to ITB 4.4 or withdrawal of a Bid pursuant ITB 19.9.	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Letter of Bid
2.3	Pending Litigation	Bidder's financial position & prospective long-term profitability sound according to criteria established in 3.1 below & assuming that all pending litigation will be resolved against the Bidder. Note: All pending litigation shall in total not be more than 100% of the Bidder's Net Worth.	Must meet requirement	N/A	Must meet requirement	N/A	Form CON-2

1 Non-performance, as decided by the Employer, shall include all contracts where (a) non-performance was not challenged by the contractor, including through referral to the dispute resolution mechanism under the respective contract, and (b) contracts that were so challenged but fully settled against the contractor. Non-performance shall not include contracts where Employer's decision was overruled by the dispute resolution mechanism. Non-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 Bidder have been exhausted.

² This requirement also applies to contracts executed by the Bidder as JV/Consortium member.

3. Financial Situation and Performance							
3.1	Financial Capabilities	i. The Bidder shall demonstrate that it has access to, or has available, liquid assets, unencumbered real assets, lines of credit, and other financial means (independent of any contractual	Must meet requirement	Must meet requirement	Must meet requirement as per their % share in JV	N/A	Form FIN-3.1 with attachment and Form FIN-3.3

		<p>advance payment) sufficient to meet the cash flow requirements estimated as INR 39 million for the subject contract(s) net of the Bidders other commitments.</p> <p>ii. The Bidder shall demonstrate to the satisfaction of the Employer, that it has adequate sources of finance to meet the cash flow requirements on works currently in progress and for future contract commitments.</p> <p>iii. The audited balance sheets or, if not required by the laws of the Bidder's country, other financial statements acceptable to the Employer, for the last 5 years shall be submitted and must demonstrate the current soundness of the Bidder's financial position and indicate its prospective long-term profitability.</p>	<p>Must meet requirement</p> <p>Must meet requirement</p>	<p>Must meet requirement</p> <p>N/A</p>	<p>N/A</p> <p>Must Meet Requirement</p>	<p>N/A</p> <p>N/A</p>	<p>Form FIN-3.1. with Form FIN-3.4</p> <p>Form FIN-3.1 with attachment.</p>
3.2	Average Annual Construction Turnover	The average annual turnover from construction of last three financial years	Must meet requirement	Must meet requirement	Must meet minimum [twenty] per cent [20%] of the	Must meet at least [forty] per cent [40%] of the requirement	Form FIN - 3.2

		should be \geq INR 79 Millions (In terms of rupee equivalent adjusted to last date of financial year that ended on or before 31.03.2021 by applying 5% escalation for Indian Rupees and 2% for foreign currency per year)			requirement	nt (For Lead Member)	
3.3	CDR	The bidder having undergone Corporate Debt Restructuring (CDR) in last five years must submit their banker's certificate stating that their account with the bank is "standard account" as on base date i.e. 28 days before submission of bid. In case the bidder has not undergone CDR then he must submit an undertaking to the effect.	Must Submit	N/A	Must Submit	N/A	Form FIN-3.6
3.4	Net Worth	Net Worth of Bidder ending 31.03.2021 should be minimum INR 26 Million. In case of JV, Net Worth will be evaluated only for the Lead member.	Must meet requirement	NA	NA	Must meet requirement (for Lead Member only)	Form FIN - 3.1
3.5	Bid Capacity Criteria	Bid Capacity: The Bidders will be qualified only if their available bid capacity is more than INR 79 million. Available bid capacity will be calculated based on the following formula:	Must meet requirement	Must meet requirement	NA	NA	Form FIN - 3.4

		Available Bid Capacity= $2 \times A \times N \times B$ Where, A = Maximum of the value of construction works executed in any one year during the last five financial years (updated to 31.03.2021, 5% inflation for Indian Rupees every year and 2% for foreign currency portions per year). N = No. of years prescribed for completion of this work. B = Value of existing commitments (as on 31.03.2021) for on-going construction works during next 18 months.					
3.6	Profitability	The Bidder should be a Profit (Net) making firm and should have made profit during any two of the last 5 financial years i.e.(FY 2016-17, 2017-18, 2018-19, 2019-2020 and 2020-21)	Must meet requirement	N/A	Must meet requirement	N/A	Form FIN-3.5
4. Experience							
4.1	General Construction Experience	Experience under construction contracts in the role of prime contractor, JV/Consortium Lead member for at least the last 5 years, ending 31.03.2021 Whereas for the other members of JV for at least the last 2 years, ending 31.03.2021	Must meet requirement	N/A	Must meet requirement	N/A	Form EXP-4.1
4.2 (a)	Specific Construction & Contract	Experience under contracts in the role of contractor (single entity or					Form EXP-4.2(a)

	<p>Management Experience</p> <p>JV member) for Manufacturing, supply, installation & commissioning of signages works for Metro station/ Railway Station/ Airport/ Stadium/ Auditorium/ Malls projects, the Applicant must meet the following eligibility criteria for being considered as qualified in Technical evaluation and become eligible for financial package opening.</p> <p>1. A minimum number of 01 (One) similar contract (separately or combined): Manufacturing, supply, installation & commissioning of signages works for Metro station/ Railway Station/ Airport/ Stadium/ Auditorium/ Malls projects for a value of INR 63 Million or more, completed in the last 5 years starting from 2016 either as a single entity or as a JV member and must have been Substantially completed.</p> <p>OR</p> <p>2. A minimum number of 02 (Two) similar contracts (separately or combined): Manufacturing, supply, installation &</p>	Must meet requirement	Must meet requirement	N/A	N/A	
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		<p>commissioning of signages works for Metro station/ Railway Station/ Airport/ Stadium/ Auditorium/ Malls projects for a value of INR 39 Million or more, completed in the last 5 years starting 2016 either as a single entity or as a JV member and must have been Substantially completed.</p> <p>OR</p> <p>A minimum number of 03 (Three) similar contracts (separately or combined): Manufacturing, supply, installation & commissioning of signages works for Metro station/ Railway Station/ Airport/ Stadium/ Auditorium/ Malls projects for a value of INR 32 Million or more, completed in the last 5 years starting 2016 either as a single entity or as a JV member and must have been Substantially completed.</p>					
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5. Environmental, Social, Health and Safety (ESHS)							
5.1	Quality & Qualification Criteria	<p>1. The Bidder must have valid Environmental Management Certificate ISO:140001 or equivalent.</p> <p>2. The Bidder must have valid Quality Management Certificate</p>	Must meet requirement	N/A	NA	Lead member must meet requirement	Form PER-2 (for CV of EHS Personnel)

		ISO:9001/DNV/TU V/ JAS-ANZ/ equivalent. 3. The Bidder must have valid Health and Safety Certificate OHSAS:18001. The bidder must agree to deploy at least two key personnel having Environment expertise of minimum ten years in sites management measure and the second one in social works with min.10 years experience.					
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Notes:

- 1) Bidder shall furnish year wise and contract wise details of work for last five years i.e. up to 31.03.2021.
- 2) For ongoing Works, quantity of successfully completed portion of works executed up to 31.03.2021 will also be considered for qualification of experience criteria.
- 3) The completed value of work done shall be updated up to 31.03.2021 price level applying 5% inflation for Indian Rupees every year and 2% for foreign currency portions per year.
- 4) General construction Experience for this contract shall mean the construction work including All Civil construction of Metro Station /Metro Depot / Oil Depot/ Railway Workshops/ Airport / Oil Refineries/Industrial Unit for Central Govt./State Government/ PSU/ Urban Local Bodies/Private Corporates registered with NSE/BSE in India or other industrial units/ plant of comparable magnitude and similar activities of work having piling, Pre-fabricated /Pre-Engineered / fabricated Steel structures and Sheds, Architectural finishes, EMP works including installations of Machinery and Plants & Equipment involving interface with all systems.
- 8) Bidder to submit the audited financial statements for last five financial year up to 31.03.2021, and if audited financial statement of FY 2020-21 is not available, provisional statement to be submitted, duly certified by statutory auditor. For Foreign bidders, last five financial year is up to 31.12.2020 when financial year is January to December of the year.

3. Evaluation

In addition to the criteria listed in ITB 35.2 (a) - (e) the following criteria shall apply:

3.1 Assessment of adequacy of Technical Proposal with Requirements

The assessment of the Technical Proposal submitted by a Bidder shall comprise (a) evaluation of the Bidder's technical capacity to mobilize key equipment and key personnel to carry out the works, (b) construction method, (c) construction schedule (d) sufficiently detailed supply sources, in accordance with requirements specified in Section VII - Works Specifications and following items of Technical Proposal:

- 3.1.1 Evaluation of Tender Programme
- 3.1.2 Evaluation of Bidder Technical Proposals
- 3.1.3 Evaluation of Outline Quality Plan
- 3.1.4 Evaluation of Outline Safety Plan
- 3.1.5 Evaluation of Outline Environmental Plan
- 3.1.6 Evaluation of Outline Project Management Plan
- 3.1.7 Evaluation of Manufacture, Testing and Commissioning Plan

The Employer will evaluate the technical suitability and acceptability of the proposals. The financial proposals of only those Bids, which are technically compliant and substantially responsive, in accordance with paragraph ITB 29, will be evaluated.

- 3.2 Multiple Contracts - Not Applicable
- 3.3 Alternative Completion Times - Not Applicable
- 3.4 Technical alternatives - Not Applicable
- 3.5 Specialized Subcontractors

Only the specific experience of sub-contractors for specialized works permitted by the Employer will be considered. The general experience and financial resources of the specialized sub-contractors shall not be added to those of the Bidder for purposes of qualification of the Bidder.

3.6 Personnel

The Bidder must demonstrate that it has the personnel for the key positions that meet the following requirements for deployment: The numbers shown are only indicative and to be deployed more as per site requirement including other supervisors. In case of delay beyond one month as per the deployment schedule penalty will be imposed as below. However, imposition of penalty will not relieve bidder from the responsibility of deployment of requisite no. of personnel.

N o	Position	Qualification	Total work experien ce (years)	In Similar Works Experience (years)	Min. numbe r requir ed	Penalty for non- deployme nt/ delayed deployme nt as per the deployme nt schedule in INR.
1	Project Manager	Graduate with good knowledge of Signage works.	10 years	5 years as Project Manager in Similar Nature of works in Signages & Graphics as per requirement Section IV: Bidding Forms	1	1 lakh / month

2	Team Leader/ Dy.PM	Graduate with good knowledge of Signage works.	8 years	3 years as Project Manager in Similar Nature of works in Signages & Graphics as per requirement Section IV: Bidding Forms	1	0.75 lakh / month
2	Designer	Graduate in Architecture	7 years	3 years in similar works	1	0.75 lakh / month each
3	Interface Coordinator/Manager	Any Graduate with experienced as interface coordinator/station manager for station	6 years total experience	3 years in similar works	2 (1 in each Reach)	0.65 lakh / month
4	Safety Manager	Any Graduate preferably with Diploma in Safety	6 years total Experience	3 years in similar works	1	0.75 lakh / month
5	Site Supervisor	Any Graduate with signage execution experience	3 years	1 years in similar works	4	0.5 lakh / month

Notes:

The proposed Key personnel are not to be changed till the completion of the work. Under exceptional circumstances, in case they are required to be changed, the replacement should have similar or better experience and qualification than as required above. These changes are permitted only with the approval of the Employer. **Each change in approved Key personnel will attract penalty of 10% of Contract price.**

The Bidder shall provide details of the proposed personnel and their experience records using Forms PER-1 and PER-2 included in Section IV, Bidding Forms.

3.7 Equipment: - The Bidder must demonstrate that it has the key equipment required for fabrication and installation of signages at site as required.

The Bidder shall provide further details of proposed items of equipment using Form EQU in Section IV, Bidding Forms.

Maha Metro Rail Corporation Limited (Maha-Metro)

**PUNE METRO RAIL PROJECT
BID DOCUMENTS
FOR**

Design of Graphics, Fabrication, Supply, Installation, Testing and Commissioning of Signage of 4 stations viz. Dapodi, Bopodi, Khadki & Range Hill of Reach 01 and 4 stations viz. Deccan Gymkhana, Sambhaji Park, PMC & Civil Court Elevated of Reach 02 of Pune Metro Rail Project.

TENDER NO.

P1 Misc-28/2022

PART I: BIDDING PROCEDURE

SECTION IV: BIDDING FORMS

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19.	Form of certificate confirming careful examination of all the contents of Bidding Documents and signing of all pages of Bidder's proposal
20.	Undertaking for ensuring supply of critical spares and availability of technical support
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23.	Declaration of Undertaking

24. Quality Management / Environmental, Social, Health and Safety (ESHS) Certification.....

Letter of Bid

[The Bidder shall prepare his Letter of Bid on a Letterhead paper specifying his name and address]

Date: _____

NCB No.: _____

Invitation for Bid No.: _____

Alternative No.: _____

To: _____

We, the undersigned, declare that:

- (a) We have examined and have no reservations to the Bidding Documents, including Addenda issued in accordance with Instructions to Bidders (ITB8)
- (b) We have no conflict of interest in accordance with ITB 4;
- (c) We have not been suspended nor declared ineligible by the Employer based on execution of a Bid Securing Declaration in the Employer's country in accordance with ITB 4.4.
- (d) We offer to supply in conformity with the Bidding Documents and in accordance with the Delivery Schedule specified in the Schedule of Requirements the following Goods:
- (e) The total price of our Bid, excluding any discounts offered in item (f) below is:
In case of only one lot, total price of the Bid
In case of multiple lots, total price of each lot
In case of multiple lots, total price of all lots (sum of all lots)
- (f) The discounts offered and the methodology for their application are: NOT APPLICABLE
 - i. The discounts offered are:
 - ii. The exact method of calculations to determine the net price after application of discounts is shown below:
- (g) Our bid shall be valid for a period of **180days** 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;
- (h) If our bid is accepted, we commit to obtain a performance security in accordance with ITB 42 of the Bidding Documents;
- (i) We are not participating, as a Bidder or a subcontractor, in more than one bid in this bidding process in accordance with ITB 4.2(e), other than alternative bids submitted in accordance with ITB13;
- (j) We have paid, or will pay the following commissions, gratuities, or fees with respect to the bidding process or execution of the Contract:

Name of Recipient	Address	Reason	Amount
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[If none has been paid or is to be paid, indicate "none."]

- (k) We understand that this bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal contract is prepared and executed; and
- (l) We understand that you are not bound to accept the lowest evaluated bid or any other bid that you may receive.
- (m) 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.

Name of the Bidder* _____

Name of the person duly authorized to sign the Bid on behalf of the Bidder** _____

Title of the person signing the Bid _____

Signature of the person named above _____

Date signed _____ day of _____

*: In the case of the Bid submitted by 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

Note: Para (e) to (h) of letter of bid are not to be included in Technical Proposal

1A. Pro-Forma Letter of Participation from Each Partner of Joint Venture (JV) /Consortium

(On each Firm's Letter Head)

No....

Dated.....

From:

To,

THE MANAGING DIRECTOR,
MAHARASHTRA METRO RAIL CORPORATION LTD.,
Pune Metro Rail Project
101, The Orion, Opposite Don Bosco Youth Centre,
Koregaon Park, Pune - 411001

Sir,

Regarding:

Tender No. P1 Misc-28: Design of Graphics, Fabrication, Supply, Installation, Testing and Commissioning of Signage of 4 stations viz. Dapodi, Bopodi, Khadki & Range Hill of Reach 01 and 4 stations viz. Deccan Gymkhana, Sambhaji Park, PMC & Civil Court Elevated of Reach 02 of Pune Metro Rail Project.

Ref: Your notice for Invitation for Bid (IFB)

We wish to confirm that our company/firm (delete as appropriate) has formed a Joint Venture with and for the purposes associated with IFB referred to above.

(Member(s) who are not the lead partner of the JV/Consortium should add the following paragraph)

*

‘This JV/Consortium is led by _____ whom we hereby authorize to act on our behalf for the purpose of submission of Bid for and authorize to incur liabilities and receive instructions for an on behalf of any and all the partners or constituents of the Joint Venture.’

OR

*(Member being the lead member of the group should add the following paragraph) **

‘In this group we act as leader and, for the purposes of applying for qualification, represent the Joint Venture.’

In the event of our group being awarded the contract, we agree to be jointly with (Names of other members of our JV/Consortium)and severally liable to the MAHA METRO RAIL PROJECT, its successors and assigns for all obligations, duties and responsibilities arising from or imposed by the contract subsequently entered into between MAHA METRO RAIL PROJECT and our JV/Consortium.

*I/We further agree that entire execution of the contract shall be carried out exclusively through the lead partner.

Yours faithfully,

(Signature)

(Name of Signatory)

(Capacity of Signatory)

Seal

* Delete as applicable

Note: This form is applicable for Technical Package only.

2. Appendix to Bid

2.1 Schedule of Adjustment Data

(Refer to BOQ / Pricing Document)

2.2A COVENANT OF INTEGRITY

(The Bidder shall prepare his Letter of Bid on a Letterhead paper specifying his name and address)

We declare and covenant that neither we nor anyone, including any of our directors, employees, agents, joint venture partners or sub-contractors, where these exist, acting on our behalf with due authority or with our knowledge or consent, or facilitated by us, has engaged, or will engage, in any Prohibited Conduct (as defined below) in connection with the tendering process or in the execution or supply of any works, goods or services for [specify the contractor tender invitation] (the “Contract”) and covenant to so inform you if any instance of any such Prohibited Conduct shall come to the attention of any person in our organisation having responsibility for ensuring compliance with this Covenant. We shall, for the duration of the tender process and, if we are successful in our tender, for the duration of the Contract, appoint and maintain in office an officer, who shall be a person reasonably satisfactory to you and to whom you shall have full and immediate access, having the duty, and the necessary powers, to ensure compliance with this Covenant. We declare and covenant that neither we nor anyone, including any of our directors, employees, agents, joint venture partners or sub-contractors, where these exist, acting on our behalf with due authority or with our knowledge or consent, or facilitated by us, (i) is listed or otherwise subject to EU/UN Sanctions and (ii) in connection with the execution or supply of any works, goods or services for the Contract, will act in contravention of EU/UN Sanctions. We covenant to so inform you if any instance shall come to the attention of any person in our organisation having responsibility for ensuring compliance with this Covenant.

If (i) we have been, or any such director, employee, agent or joint venture partner, where this exists, acting as aforesaid has been, convicted in any court or sanctioned by any authority of any offence involving a Prohibited Conduct in connection with any tendering process or provision of works, goods or services during the five years immediately preceding the date of this Covenant, or (ii) any such director, employee, agent or a representative of a joint venture partner, where this exists, has been dismissed or has resigned from any employment on the grounds of being implicated in any Prohibited Conduct, or (iii) we have been, or any of our directors, employees, agents or joint venture partners, where these exist, acting as aforesaid has been excluded or otherwise sanctioned by the EU Institutions or any major Multi-lateral Development Bank (including World Bank Group, African Development Bank, Asian Development Bank, European Bank for Reconstruction and Development, European Investment Bank or Inter-American Development Bank) from participation in a tendering procedure on the grounds of Prohibited Conduct, we give details of that conviction, dismissal or resignation, or exclusion below, together with details of the measures that we have taken, or shall take, to ensure that neither this company nor any of our directors, employees or agents commits any Prohibited Conduct in connection with the Contract [give details if necessary]. We acknowledge that if we are subject to an exclusion decision by the European Investment Bank (EIB), we will not be eligible to be awarded a contract to be financed by the EIB. We grant [indicate the name of the Project Promoter], the European Investment Bank and auditors appointed by either of them, as well as any authority or European Union institution or body having competence under European Union law, the right to inspect and copy our books and records and those of all our sub-contractors under the Contract. We accept to preserve these books and records generally in accordance with applicable law but in any case for at least six years from the date of tender submission and in the event we are awarded the Contract, at least six years from the date of substantial performance of the Contract.”

Name _____ In the capacity of _____

Signed _____

Duly authorised to sign the contract for and on behalf of _____

Date _____

Note: The Covenant of Integrity form shall be duly signed by the authorised signatory of the bidder, failing which the bid shall be liable for rejection.

2.2B ENVIRONMENTAL AND SOCIAL COVENANT

(The Bidder shall prepare his Letter of Bid on a Letterhead paper specifying his name and address)

We, the undersigned, commit to comply with - and ensuring that all of our sub-contractors comply with - all labour laws and regulations applicable in the country of implementation of the contract, as well as all national legislation and regulations and any obligation in the relevant international conventions and multilateral agreements on environment applicable in the country of implementation of the contract.

Labour standards. We further commit to the principles of the eight Core ILO standards¹⁹ pertaining to: child labour, forced labour, non-discrimination and freedom of association and the right to collective bargaining. We will (i) pay rates of wages and benefits and observe conditions of work (including hours of work and days of rest) which are not lower than those established for the trade or industry where the work is carried out; and (ii) keep complete and accurate records of employment of workers at the site.

Workers relations. We therefore commit to developing and implementing a Human Resources Policy and Procedures applicable to all workers employed for the project in line with Standard 8 of the EIB's Environmental and Social Handbook. We will regularly monitor and report on its application to *[insert name of the Contracting Authority]* as well as on any corrective measures periodically deemed necessary.

Occupational and Public Health, Safety and Security. We commit to (i) complying with all applicable health and safety at work laws in the country of implementation of the contract; (ii) developing and implementing the necessary health and safety management plans and systems, in accordance with the measures defined in the Project's Environmental and Social Management Plan (ESMP) and the ILO Guidelines on occupational safety and management systems²⁰; (iii) providing workers employed for the project access to adequate, safe and hygienic facilities as well as living quarters in line with the provisions of Standard 9 of the EIB's Environmental and Social Handbook for workers living on-site; and (iv) using security management arrangements that are consistent with international human rights standards and principles, if such arrangements are required for the project.

Protection of the Environment. We commit to taking all reasonable steps to protect the environment on and off the site and to limit the nuisance to people and property resulting from pollution, noise, traffic and other outcomes of the operations. To this end, emissions, surface discharges and effluent from our activities will comply with the limits, specifications or stipulations as defined in *[insert name of the relevant document]*²¹ and the international and national legislation and regulations applicable in the country of implementation of the contract.

Environmental and social performance. We commit to (i) submitting *[insert periodicity as indicated in the tender documents]* environmental and social monitoring reports to *[insert name of the Contracting Authority]*; and (ii) complying with the measures assigned to us as set forth in the environmental permits *[insert name of the relevant document if applicable]*²² and any corrective or preventative actions set forth in the annual environmental and social monitoring report. To this end, we will develop and implement an Environmental and Social Management

System commensurate to the size and complexity of the Contract and provide *[insert name of the Contracting Authority]* with the details of the (i) plans and procedures, (ii) roles and responsibilities and (iii) relevant monitoring and review reports.

We hereby declare that our tender price as offered for this contract includes all costs related to our environmental and social performance obligations as part of this contract. We commit to (i) reassessing, in consultation with *[insert name of the Contracting Authority]*, any changes to the project design that may potentially cause negative environmental or social impacts; (ii) providing *[insert name of the Contracting Authority]* with a written notice and in a timely manner of any unanticipated environmental or social risks or impacts that arise during the execution of the contract and the implementation of the project previously not taken into account; and (iii) in consultation with *[insert name of the Contracting Authority]*, adjusting environmental and social monitoring and mitigation measures as necessary to assure compliance with our environmental and social obligations.

Environmental and social staff. We shall facilitate the contracting authority's ongoing monitoring and supervision of our compliance with the environmental and social obligations described above. For this purpose, we shall appoint and maintain in office until the completion of the contract an Environmental

and Social Management Team (scaled to the size and complexity of the Contract) that shall be reasonably satisfactory to the Contracting Authority and to whom the Contracting Authority shall have full and immediate access, having the duty and the necessary powers to ensure compliance with this Environmental and Social Covenant.

We accord the Contracting Authority and the EIB and auditors appointed by either of them, the right of inspection of all our accounts, records, electronic data and documents related to the environmental and social aspects of the current contract, as well as all those of our subcontractors.

Name In the capacity of

Signed

Duly authorised to sign the contract for and on behalf of

Date

Note: The Environmental and Social Covenant form shall be duly signed by the authorised signatory of the bidder, failing which the bid shall be liable for rejection.

2.3 Copyright Undertaking
(To be submitted on Bidder's Letter head)

Date

To:

THE MANAGING DIRECTOR,
MAHARASHTRA METRO RAIL CORPORATION LIMITED,
101, The Orion, Opposite Don Bosco Youth Centre,
Koregaon Park, Pune - 411001

LETTER OF UNDERTAKING

Tender No. P1 Misc-28/2022: Design of Graphics, Fabrication, Supply, Installation, Testing and Commissioning of Signage of 4 stations viz. Dapodi, Bopodi, Khadki & Range Hill of Reach 01 and 4 stations viz. Deccan Gymkhana, Sambhaji Park, PMC & Civil Court Elevated of Reach 02 of Pune Metro Rail Project.

We, (name of Bidder / joint venture) hereby undertake that the tender drawings, both in hard copy / digitised format, and the Bid documents purchased as a necessary part of our preparation of this Bid shall be used solely for the preparation of the Bid and that if the Bid is successful, shall be used solely for the design of the temporary and permanent works.

We further undertake that the aforesaid tender drawings and documents prepared by **Maharashtra Metro Rail Corporation Limited** shall not be used in whole, in part or in any altered form on any other project, scheme, design or proposal that the joint venture, the joint venture parent companies or sub-contractors of the joint venture are or will be involved with either in India or any other country.

Signed.....

For and on behalf of
(Name of tender / joint venture)

3. Schedules

Refer to BOQ / Pricing Document

4. Technical Proposal

- 4.1 Staffing Schedule and Organization Chart
- 4.2 Method Statement
- 4.3 Requirements of Works Programme
- 4.4 Bidder's Technical Submissions
- 4.5 Equipment - Form EQU
- 4.6 Personnel - Forms PER-1 and PER-2
- 4.7 Outline Quality Plan
- 4.8 Outline Safety Assurance Plan
- 4.9 Outline Safety, Health and Environmental Plan
- 4.10 Outline Project Management Plan
- 4.11 Manufacture, Testing and Commissioning Plan
- 4.12 Structure of the Bidder
- 4.13 Requirement Undertaking
- 4.14 Scope of Work Compliance Undertaking

4.1 Staffing Schedule and Organization Chart

The Bidder shall provide with the Bid a complete Schedule and Organization chart as required by BDSITB 11.4.1.13.

- (1) The name, background and professional experience of each key staff member to be assigned to this project, with particular reference to his experience of a nature similar to that of the proposed assignment.
- (2) An organization chart with assignment of each key staff member (identified by name), duration & timing together with clear description of the responsibilities of each key staff member within the overall work programme.
- (3) The Bidder to propose his design organization in detail and outline his manufacturing/testing organization. Also, the Bidders shall provide the necessary details on their staff for the project design phase. For the later phases, staff needs to be proposed for key positions.
- (4) The Bidder must demonstrate that it has the personnel for the key positions that meet the requirements as mentioned in section III Evaluation and Criteria.
- (5) The Bidder shall provide details of the proposed personnel and their experience records using Forms PER-1 and PER-2 included in Section IV, Bidding Forms.
 - a. Project Manager- Graduate having minimum 15 years of total experience out of which 10 years should be in projects of similar nature.
 - b. Deputy Project Manager (DPM) - Graduate having minimum 10 years of total experience out of which 5 years should be in projects of similar nature.
 - c. SHE Organization- As per the qualification and experience given in SHE manual (shall include an Accident Prevention Officer).
 - d. All other key staff shall be graduate with minimum 5 years' experience in relevant discipline.
- (6) Please note that in case Employer judges that the continuation of any person of the Bidder including its subcontractor(s) is not in the interest of the project, a written notice will be given to Bidder who will promptly remove the person within a week.
- (7) The Bidder shall submit the Site Organization Chart with narrative description and the relationship between Head Office and the Site Management clearly indicating the clear distribution of authority and responsibility between Head Office and Site Management.

We hereby confirm that this is minimum project specific mobilization, and these will be suitably augmented, as required for achieving the Works requirements and key dates. We also confirm to deploy manpower required for safety as per SHE Manual attached with the Bidding Documents.

SIGNATURE OF AUTHORIZED SIGNATORY
ON BEHALF OF BIDDER

4.2 Method Statement

Each Bidder shall set out details of the Method Statement for the Works to demonstrate how it will meet the Employer's objective and requirements. As a minimum, the Method Statement shall address the following:

- (a) Details of the arrangements and methods which the Bidder proposes to implement for the construction of the Works, in sufficient detail to demonstrate their adequacy to achieve the requirements of the Contract including completion within the Time for Completion stated in the Particular Conditions of Contract.
- (b) Outline of the arrangements of the Bidder to manage coordination of Site access.
- (c) Comments on the geotechnical and subsurface aspects of the Works including materials, material sources and any constraints
- (d) Not Used
- (e) Comments on logistics and traffic management *[as may be appropriate]*.
- (f) Outline of the arrangements and organisation of the Bidder to ensure compliance with the Works Requirements.
- (g) Outline of the arrangements of the Bidder to carry out testing upon completion as specified in the Works Requirements.
- (h) [Insert other information, as may be appropriate.]

4.3 Requirements of Works Programme

- (a) The Works Programme shall show how the Bidder proposes to organize and carry out the Works and to achieve Stages and complete the whole of the Works by the given Key Dates.
- (b) The Works Programme or Programmes shall be developed as a critical path network using suitable software. The network must be fully resourced and show the co-ordination with System Wide Contracts. **The Works Programme shall show achievement of all Key Dates and Works Area Access Dates.**
- (c) The Works Programme shall include the Bidder's Design Submission Programme and should indicate, wherever possible, dates and periods relating to interfaces with and between others including dates for submission of further documents required by the Contract and periods for their acceptance.
- (d) The Works Programme shall contain sufficient detail to assure the Employer of the feasibility of the plan and approach proposed by the Bidder.
- (e) The Bidder should have regard to the possibility that during the Bid evaluation period the Works Programme may be developed into a Programme which, in the event of award, would be the initial submission of the Works Programme. To facilitate this process, the Bidder shall, in the preparation of the Works Programme, take due account of the provisions of Works Requirements - General Specifications in so far as they concern the Works Programme.
- (f) The Works Programme shall be accompanied by a narrative statement that shall describe Programme activities, assumptions and logic, and highlight the Bidder's perception of the major constraints and critical areas of concern in the organization, construction and completion of the Works. This narrative statement shall also indicate which elements of the Works the Bidder intends to carry out off-Site and/or outside India with details of the proposed locations of where any such work is to be carried out, the facilities available.
- (g) The Bidder shall prepare logic diagrams providing the philosophy for shared access, shared areas with co-incident and adjacent work areas and submitted as part of his Bid. These logic diagrams shall be developed and submitted along with the Works Programmes as submitted during the course of the Works.
- (h) All programmes shall include design, procurement periods, major material, offsite production/ prefabrication, temporary construction, interface and periods for systemwide, utility and adjacent contractors etc.
- (i) The programme should show the makeup programme / cover up programme for slippage in availability of few of the access area dates to achieve the completion of different stretches as per schedule.

4.4 Bidder's Technical Submissions

A. Requirements for Bidder's Technical Submissions

- A1. The Bidder's attention is drawn to the List of Definitions and List of Abbreviations in the Works Requirements and to Clause 1 of the General Conditions in which terms are defined.
- A2. The Bidder's Technical Proposals shall comply or, subject to reasonable development, be capable of complying with the Works Requirements in all respects. The Bidder's Technical proposal shall demonstrate such compliance.

The Bidder's Technical Proposals shall establish the safety standards to be followed and installation and testing methods that will be employed.

The following paragraphs list the minimum documentation that shall be supplied by the Bidder as part of his technical package for technical evaluation of the Bid. The Bidder shall include any further information necessary to demonstrate the suitability of his proposal.

B. General Requirements

- B1. The Bidder shall submit a detailed clause by clause commentary on all the clauses of the Works Requirements when a clause merely provides information and no other comment is necessary "noted" will suffice. Where the Bidder is not able to comply fully with certain clauses and proposes an alternative, the deviations shall be consolidated and listed separately in the Statement of Deviations. Excepting the items listed in the statement of deviations, the Bidder shall give a Certificate of Compliance in the form Appendix A for all the items.
- B2. The Bidder shall also advise the conflicts, if any, in the Bid documents between various functional requirements or specifications.
- B3. The Bidder shall detail any potential problems or hazards that have been identified during the Bidder's assessment of the Works Requirement.
- B4. The Bidder shall submit:
 - a. Technical Information of Contractor's Equipment proposed by the Bidder such as equipment for mechanised handling of Rails, support systems for setting of Ballastless Track & Turnout for installation, various survey equipment, equipment for transport & delivery of concrete to the site of work etc.
 - b. Information for justifying the Proneness of the equipment proposed by the Bidder.
 - c. For the deployment of mobile flash butt plant, the Bidder shall submit a concrete and complete proposal as to whether he owns the plant or proposes to hire/subcontract the same along with details such as source of plant, its technical details and capabilities of Welding UIC 60,880 grade, 1080 HH grade Rails and also the detailed CV of the operator of the machine to demonstrate technical suitability & availability of the operator for Welding work.
 - d. Information for In-house or the sub-contract of manufacture or vending proposed by the Bidder in the format given in Appendix B.
 - e. The Bidder shall specifically submit the details / CV of all the Supervisors available with the Bidder for installation of ballasted Track separately for this contract, indicating their experience and the name of projects on which these supervisors have gained the experience / expertise;

C. Technical Requirements

- C1. The Bidder's Technical Proposals shall also cover the following:
 - (a) Normally Track structures (Caste-in-situ) are to be followed as given in tender drawing for viaduct. However, bidder may also propose other proven ballast less Track structure and submit detailed design for consideration of **Maharashtra Metro Rail Corporation Limited**. However proposed ballast less Track structure should not infringe the SOD. The proven improvement/innovation in design of plinth with the objective of improved performance, reduction in execution time shall be encouraged and no price advantage will be given on this account irrespective of life cycle claimed.

For this purpose, contractor will submit detailed design along with drawing and performance report of proposed system. The performance report shall only be considered for those systems which are substantially on elevated corridor & not less than 14T axle load which are in operation for public carriage of passenger for not less than year. The performance is in addition to suitability of design and not in lieu of design. The design has to conform to the prevalent International standards.

- (b) Detailed drawing and specification of proposed Ballastless Track structure on viaduct and Underground. Any Ballastless Track slab / plinth system proposed should have proven record on the viaduct and Underground. Details of same to be submitted.
- (c) If any change to the Track structure proposed vide para (a) & (b) above to be used with MSS, then Details of Ballastless Track structure to be furnished. However, it is to be ensured that there should not be any infringement of SOD.
- (d) Method adopted for topographic setting of final alignment on finished surface of depot layout for final setting of Track;
- (e) Methodology for handling/re-handling, transportation of the P. Way materials imported by the Employer from Mumbai Port/ to the site, stacking/storage of such material, security of material against theft, loss and damage;
- (f) Methodology for proper handling of Rails and Welded panels to site of work;
- (g) Methodology of installation procedure including any other alternative construction method / scheme as proposed by Bidder for Ballastless Track with construction speed and finished tolerances of Track;
- (h) Detailed design of RMC suitable for long distance pumping / transportation
- (k) Methodology for installation of Ballastless turn outs & crossovers;
- (l) Other technical information in support of the technical proposal.

C2. Deleted

D. Technical Documents

D1. The Bidder's Technical Proposals shall also include the following documents:

a. Deviation Statement

The deviation statement shall draw attention to any part or parts of the Works Requirements - Particular Specification which the Contractor intends to amend or omit and shall contain further material as required.

In producing the deviation statement, the Bidder shall ensure that clauses, paragraphs and any appendices therein are identified by their numbering as uniquely belonging to the deviation statement.

The Bidder should note that the Specifications submitted with the Bid as part of the Bidder's Technical Proposals will, prior to acceptance of Bid, be merged and consolidated into a single document for incorporation into the Contract.

The Bidder should note that the deviation statement forms a crucial part of the Bidder's Technical Proposals and shall be prepared in sufficient detail to demonstrate full compliance with the Works Requirements. The quality of the deviation statement will be paramount in evaluating technical compliance of Bids.

b. Codes and Standards

The Bidder shall provide justification for any codes or standards, it proposes in its list as alternatives or additions to those specified in the Works Requirements.

The Bidder will be required, during the Bid process, to provide a certified English translation of any codes or standards it proposes to use, and which are not normally available in English.

**Appendix A to Bidder's Technical Submissions
Certificate of Compliance and Schedule of Deviations**

**(TO BE SUBMITTED ON BIDDER'S LETTERHEAD)
CERTIFICATE OF COMPLIANCE**

This Certificate is issued in the full knowledge that the Technical Proposals submitted are in clause by clause compliance with the Works Requirements, except as noted in Statement of Deviations accompanying this Certificate.

Signed

Authorized Representative

**Appendix B to Bidder's Technical Submission
PROPOSALS FOR SUB-CONTRACTED WORKS**

(DELETED)

4.5 Form EQU: Equipment

The Bidder shall provide adequate information to demonstrate clearly that it has the capability to meet the requirements for the key equipment listed in Section III, Evaluation and Qualification Criteria. A separate Form shall be prepared for each item of equipment listed, or for alternative equipment proposed by the Bidder.

Item of equipment							
Equipment Information	Name of manufactures			Model and power rating			
	Capacity			Year of manufacture			
Current status	Current location						
	Details of current commitments						
Source	Indicate source of the equipment						
	<input type="checkbox"/>	Owned	<input type="checkbox"/>	Retired	<input type="checkbox"/>	Leased	<input type="checkbox"/>

Omit the following information for equipment owned by the Bidder.

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

4.6 Personnel
Form PER-1: Proposed Personnel

Bidders should provide the names of suitably qualified personnel to meet the specified requirements stated in Section III. The data on their experience should be supplied using the Form below for each candidate.

- | | |
|---|---------------------|
| 1 | Title of position * |
| | Name |
| 2 | Title of position * |
| | Name |
| 3 | Title of position * |
| | Name |
| 4 | Title of position * |
| | Name |

* As listed in Section-III

Form PER-2: Resume of Proposed Personnel

Name of Bidder		
Position		
Personnel information	Name	Date of Birth
	Professional qualification	
Present employment	Name of employer	
	Address of employer	
	Telephone	Contact (manager / personnel officer)
	Fax	E-mail
	Job Title	Years with present employer

Summarize professional experience over the last 20 years, in reverse chronological order. Indicate particular technical and managerial experience relevant to the project.

From	To	Company / Project / Position / Relevant technical and management experience
------	----	---

4.7 Outline Quality Plan

The Bidder shall submit as part of his Bid an Outline Quality Plan illustrating the intended means of compliance with the Work's Requirements and setting out in summary form an adequate basis for the development of the more detailed Quality Plans required. The Outline Quality Plan shall contain sufficient information to demonstrate clearly the proposed method of achieving the Bidder's quality objectives with regard to the requirement of the Contract. The Bidder may be requested to amplify, explain or develop his Outline Quality Plan prior to the date of acceptance of the Bid due and to provide more details with a view to reaching provisional acceptance of such a Plan.

4.8 Outline Safety Assurance Plan

The Bidder shall submit as part of its Bid an Outline System Safety Assurance Plan which shall contain sufficient information to demonstrate clearly the Bidder's proposals for achieving effective and efficient safety procedures in the design, manufacture, transport, integrated testing and commissioning of Works. The Outline System Safety Assurance Plan should include an outline of the safety procedures and regulations to be developed and the mechanism by which they will be implemented for ensuring safety including Hazard Analysis, Fire Control, Electromagnetic compatibility / Electro-magnetic Interference Control, reliability, availability and maintainability as given in this Bid.

The Bidder shall also include in the Outline Safety Plan sufficient information to demonstrate clearly the Bidder's proposal for the safety of the Works / Plant / Equipment and personnel at the site. On the basis of this information, the Contractor shall develop a Detailed Site Safety Plan as given in this Bid.

The Outline System Safety Assurance Plan shall be headed with a formal statement of policy in relation to safety and shall be sufficiently informative to define the Bidder's safety plans and set out in summary an adequate basis for the development of the Safety Plan to be submitted in accordance with the conditions of this Bid.

The Bidder may be requested to amplify, explain or develop its Outline System Safety Assurance Plan prior to the date of acceptance of the Bid and to provide more details with a view to reaching provisional acceptance of such a Plan.

4.9 Outline Safety, Health and Environmental Plan

The Bidder shall submit as part of his Bid an Outline Safety, Health & Environment Plan which shall contain sufficient information to demonstrate clearly the Bidder's proposals for achieving effective and efficient compliance to the conditions of contract on SHE manual. The Outline Plan should include an outline of the procedures and regulations to be developed and the mechanism by which they will be implemented for ensuring safety as required by Sub-Clause 4.18 of the GC and Clause 9 of PC.

The Outline Plan shall be headed with a formal statement of policy in relation to Safety, Health & Environment protection and shall be sufficiently informative to define the Bidder's plans and set out in summary an adequate basis for the development of the Site Safety, Health & Environment Plan to be submitted in accordance with Sub-Clause 4.18 of the GCC and Clause 9 of PCC.

The Bidder may be requested to amplify, explain or develop its Outline Environmental Plan prior to the date of issue of Letter of Acceptance and to provide more details with a view to reaching provisional acceptance of such a plan.

4.10 Outline Project Management Plan

The Bidder shall submit with his Bid a Project Management Plan as prescribed in Work's Requirement - inter-alia indicating names, qualifications, professional experience and corporate affiliation of all proposed key management and engineering personnel (above the level of supervisor) and specialists.

Project Director of the consortium shall be based in PUNE. Design Liaison Engineer, Interface Manager shall be continuously based in PUNE (India) Project Office throughout the Contract Period. Installation Engineers and Commissioning Engineers shall be continuously based in PUNE during the respective activities.

The Bidder shall include his proposals for his Co-ordination Control Team and include the name and qualifications of the Team Leader responsible for the interface co-ordination with Designated Contractors.

4.11 Manufacture, Testing and Commissioning Plan

The Bidder shall submit with its Bid, the methods by which the Bidder intends to manufacture and test the components / equipment. Details shall be given of the locations and arrangements for offshore and indigenous works, the facilities available and any understanding from others that the Bidder has in such matters. The manufacturing methods to be employed, the equipment's and facilities available or proposed to be set up off-shore and or in India, will be analysed during technical evaluation and shall be in sufficient detail to allow a full appreciation of the Bidder's proposals in relation to all aspects of the Works. The extent of automation involved in manufacture, particularly in the area of Welding, shall be clearly stated for both off-shore and indigenous manufacture.

4.12 Structure of the Bidder

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 JV/Consortium) and the ownership of the Bidder including 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 JV/Consortium Agreement relating to the composition of the Bidder shall be submitted, if the Bidder is a Consortium. Should the Bidder be an entity established or to be established to Bid for this Contract, details of the shareholders' agreement or proposed 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 the name of the Lead Member 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 should 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 Consortium cannot be reached by unanimous agreement.
3. The Bidder shall confirm that the broad scope split of work amongst the Consortium members shall be as hereunder: **(Deleted)**

SN	Work & Responsibility	Partner Qualifying	Local Partner (if any)
1	Design	P	S
2	Engineering	P	S
3	QC for manufacturing - Off-shore and On shore	P	S
4	Manufacturing - Off shore	P	X
5	Manufacturing - On shore	S	P
6	Interfacing	P	S
7	Testing and commissioning	P	S
8	Design validation and type testing	P	S
9	Warranty services	P	S
10	Project management	P	S
11	Training (offshore & on shore)	P	S
12	Manuals	P	S

P - Responsible Partner - Primary Responsibility

S - Support Partner - Secondary Responsibility

X - No Role

Note: The responsibilities as confirmed in the table above are independent of the invoicing structure given in the Pricing Document of the financial package.

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 its ability to carry out the Works; and
- (c) No changes will be made to any such agreements during the Bidding period or during the contract period (if contract awarded) without first obtaining the Employer's agreement to the proposed change or changes

4.13: Interfacing Requirement Undertaking

Our understanding of the interfacing requirement is enclosed herewith. We hereby confirm that our offer is fully compliant with the interfacing requirement with Other Designated Contractors/ Power Supply Authorities/ Statutory Authorities.

Seal:

SIGNATURE OF THE BIDDER

Date:

4.14: Scope of Work Compliance Undertaking

Our understanding to the scope of work is enclosed herewith. We hereby confirm that our offer is fully compliant with the scope of work detailed in Works Requirements, and the price of withdrawal of deviations is included in Part 4 of Bill of Quantities under Financial Package.

Seal:

SIGNATURE OF THE BIDDER

Date:

5. Bidders Qualification without prequalification

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

5.1 Form ELI -1.1
Bidder Information Form
 (To be submitted on Bidder's Letter head)

Date: _____
 NCB No. and title: _____
 Page _____ of _____ pages

Bidder's Name

In case of Joint Venture (JV/Consortium), name of each members :

Bidder's actual or intended country of registration:

[indicate country of Constitution]

Bidder's actual or intended year of incorporation:

Bidder's legal address [in country of registration]:

Bidder's authorized representative information

Name: _____

Address: _____

Telephone/Fax numbers: _____

E-mail address: _____

1. Attached are copies of original documents of

☐ Articles of Incorporation (or equivalent documents of constitution or association), and/or documents of registration of the legal entity named above.

☐ In case of JV/Consortium, letter of intent to form JV/Consortium or JV/Consortium agreement, in accordance with ITB 4.1.

☐ In case of Government-owned enterprise or institution, in accordance with ITB4.3 documents establishing:

☐ Legal and financial autonomy

☐ Operation under commercial law

☐ Establishing that the Bidder is not dependent agency of the Employer

2. Included are the organizational chart, a list of Board of Directors, and the beneficial ownership

5.2 Form ELI -1.2

(To be submitted on Bidder's Letter head)

Bidder' JV/Consortium Information Form

Date: _____

NCB No. and title: _____

Page _____ of _____ pages

Bidder's JV/Consortium Name

JV/CONSORTIUM member's name

JV/CONSORTIUM member's country of registration:

JV/CONSORTIUM member's year of constitution:

JV/CONSORTIUM member's legal address in country of constitution:

JV/CONSORTIUM member's authorized representative information

Name: _____

Address: _____

Telephone/Fax numbers: _____

E-mail address: _____

1. Attached are copies of original documents of

☐ Articles of Incorporation (or equivalent documents of constitution or association), and/or documents of registration of the legal entity named above.☐ In case of Government-owned enterprise or institution, documents establishing legal and financial autonomy, operation in accordance with commercial law, and absence of dependent status, in accordance with ITB 4.3.

2. Included are the organizational chart, a list of Board of Directors, and the beneficial ownership

5.3 Form CON-2:

Historical Contract Non-Performance, Pending Litigation and Litigation History
(to be completed by the Bidder and by each member of the Bidder's JV/CONSORTIUM)

Bidder's Name: _____

Date: _____

JV/CONSORTIUM Member's Name _____

NCB No. and title: _____

Page _____ of _____ pages

Non-Performed Contracts in accordance with Section III, Evaluation & Qualification Criteria			
.. Contract non-performance did not occur since 1 st January <i>[insert current year number less 5]</i> specified in Section III, Evaluation and Qualification Criteria, Sub-Factor 2.1. .. Contract(s) not performed since 1 st January <i>[insert current year number less 5]</i> specified in Section III, Evaluation and Qualification Criteria, requirement 2.1			
Year	Non-performed portion of contract	Contract Identification	Total Contract Amount (current value, currency, exchange rate and INR equivalent)
<i>[insert year]</i>	<i>[insert amount and percentage]</i>	Contract Identification: <i>[indicate complete contract name/ number, and any other identification]</i> Name of Employer: <i>[insert full name]</i> Address of Employer: <i>[insert street/city/country]</i> Reason(s) for non-performance: <i>[indicate main reason(s)]</i>	<i>[insert amount]</i>

Pending Litigation, in accordance with Sr. No. 2.3 of Section III, Qualification Criteria and Requirements			
Year of dispute	Amount in dispute (currency)	Contract Identification Name of Employer: Address of Employer: Matter in dispute: Party who initiated the dispute: Status of dispute:	Total Contract Amount (currency), INR Equivalent (exchange rate)

5.4 Form CON - 3
Historical Debarment/ Blacklisting/ Termination/ Rescind
(DELETED)

5.5 Form FIN - 3.1:**Financial Situation and Performance**

Bidder's Name: _____

Date: _____

JV/CONSORTIUM Member's Name: _____

NCB No. and title: _____

Page _____ of _____ pages

1. Financial data

Type of Financial information in (currency)	Historic information for previous _____ years, _____ (amount in currency, currency, exchange rate*, INR 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)					
Total Equity / Net Worth (NW)					
Current Assets (CA)					
Current Liabilities (CL)					
Working Capital (WC)					
Information from Income Statement					
Total Revenue (TR)					
Profits Before Taxes (PBT)					
Cash Flow Information					
Cash Flow from Operating Activities					

2. Financial documents

The Bidder and its parties shall provide copies of financial statements for 5 (five) years pursuant Section III, Evaluation and Qualifications Criteria, Sub-factor 3.1. The financial statements shall:

- (a) reflect the financial situation of the Bidder or in case of JV/CONSORTIUM 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.
 - (e) The financial data in the prescribed format shall be certified by Chartered Accountant with his stamp and signature.
- ☐ Attached are copies of financial statements¹ for the 5 (five) years required above and complying with the requirements

¹ If the most recent set of financial statements is for a period earlier than 12 months from the date of bid, the reason for this should be justified.

**5.6 Form FIN - 3.2:
Average Annual Construction Turnover**

Bidder's Name: _____

Date: _____

JV/CONSORTIUM Member's Name _____

NCB No. and title: _____

Page _____ of _____ pages

Year	Annual turnover data (Construction only)		
	Amount Currency	Exchange rate	INR equivalent
<i>[indicates year]</i>	<i>[insert amount and indicate currency]</i>		
Average Annual Construction Turnover *			

The financial data in the prescribed format shall be certified by Chartered Accountant with his stamp and signature.

*See Sr. No.3.2 of Section III, Evaluation and Qualification Criteria.

**5.7 Form FIN - 3.3:
Financial Resources**

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 specified in Section-III (Evaluation and Qualification Criteria)

Financial Resources		
No	Source of financing	Amount in INR Equivalent
1		
2		
3		

The financial data in the prescribed format shall be certified by Chartered Accountant with his stamp and signature.

5.8 Form FIN - 3.4:**i. Current Contract Commitments / Works in Progress**

Bidders and each member to a JV/CONSORTIUM should provide information on their current commitments on all contracts that have been awarded, or for which a letter of intent or acceptance has been received, or for contracts approaching completion, but for which an unqualified, full completion certificate has yet to be issued.

Current Contract Commitments					
No	Name of Contract	Employer's Contact Address, Tel. Fax	Value of Outstanding Work in INR	Estimated Completion Date	Average Monthly Invoicing Over Last Six Months in INR/month
1					
2					
3					
4					
5					

The financial data in the prescribed format shall be certified by Chartered Accountant with his stamp and signature.

ii. Bid Capacity**Bid Capacity Calculation of Single Entity or Members of Consortium/JV**

S. No	Each Member Name	Maximum value of similar works executed in any one year during the last three years (Updated to 31.03.2021 price level)	Value of Price level, of existing commitments and ongoing works (During the next 1.25 Years) starting from 28 days prior to date for submission of Bid	No. of years prescribed for Completion of the works for which tenders are invited	Bid Capacity (Rupees in Crores)	Remarks
		A	B	N	$(2 \times A \times N) - B$	

The above to be duly certified by Statutory Auditor under his signature & stamp.

**5.8.1 Form FIN-3.5
Bidder's Profitability**

Bidders and each member to a JV should provide information on their earnings before interest and tax in any two years out of the last five years. The financial data in the prescribed format shall be certified by Chartered Accountant with his stamp and signature.

	Profitability-earnings before interest and Tax in INR					Years in which Profitability-earnings before interest and Tax is +ve (Positive)
	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	
Member-1 (Lead Member)						
Member-2 (other than Lead Member)						
Member-3 (other than Lead Member)						

5.8.2 Form FIN-3.6
Corporate Debt Restructuring

Bidders and each member to a JV/CONSORTIUM having undergone Corporate Debt Restructuring (CDR) in last five years must submit their banker's certificate stating that their account with the bank is "standard account" as on base date i.e. 28 days before submission of bid.

In case the bidders and each member to a JV/CONSORTIUM has not undergone CDR then he must submit an undertaking to the effect.

5.9 Form EXP - 4.1:**General Construction Experience*****[Each Bidder or member of a JV/CONSORTIUM must fill this form]***

Bidder's Name: _____

Date: _____

JV/CONSORTIUM Member's Name _____

NCB No. and title: _____

Page _____ of _____ pages

Starting Year*	Ending Year	Contract Identification	Role of Bidder
		Contract name: _____ Brief Description of the Works performed by the Bidder: _____ Amount of contract: _____ Name of Employer: _____ Address: _____	
		Brief Description of the Works performed by the Bidder: _____ Amount of contract: _____ Name of Employer: _____ Address: _____	
		Contract name: _____ Brief Description of the Works performed by the Bidder: _____ Amount of contract: _____ Name of Employer: _____ Address: _____	

*See Section III Evaluation and Qualification Criteria - Sub Factor 4.1

5.10 Form EXP - 4.2(a):

Specific Construction and Contract Management Experience
[Each Bidder or member of a JV/CONSORTIUM must fill this form]

Bidder's Name: _____

Date: _____

JV/CONSORTIUM Member's Name _____

NCB No. and title: _____

Page _____ of _____ pages

Similar Contract No.	Information			
Contract Identification				
Award date				
Completion date				
Role in Contract	Prime Contractor	Member in JV/CONSORTIUM	Management Contractor	Sub-Contractor
Total Contract Amount			In INR equivalent	
If member in a JV/CONSORTIUM or subcontractor, specify participation in total Contract amount				
Employer's Name:				
Address:				
Telephone / Fax number				
E-mail				

5.10 Form EXP - 4.2(a) (cont.):**Specific Construction and Contract Management Experience (cont.)**

Similar Contract No.	Information
Description of the similarity in accordance with Sub-Factor 4.2(a) of Section III:	
<ol style="list-style-type: none"> 1. Amount 2. Physical size of required works items 3. Complexity 4. Methods / Technology 5. Construction rate for key activities 6. Other Characteristics 	

Notes:

Documentary proof such as completion certificates from client clearly indicating the nature/scope of work, actual completion cost and actual date of completion for such work should be submitted. The offers submitted without this documentary proof shall not be evaluated. In case the work is executed for private client, copy of work order, bill of quantities, bill wise details of payment received certified by CA, TDS certificates for all payments received and copy of final/last bill paid by client shall be submitted.

Value of successfully completed portion of any ongoing work up to date of Bid submission will also be considered for qualification of work experience criteria.

For completed works, value of work done shall be updated to Bid submission date assuming 5% inflation for Indian Rupees every year and 2% for foreign currency portions per year. For the purpose of evaluation of work experience, all prices will be converted to Indian Rupees using the Exchange (selling) rates for those currencies at the close of business of the State Bank of India at 31st December of each year for the works completed in respective year. For the works completed in the latest year before 31st of December of current year, the exchange rates of foreign currency shall be applicable 28 days before the Bid submission date.

In case of JV / Consortium, full value the work, if done by the same JV / Consortium or any of members of the / Consortium shall be considered. If the work done by them in any other JV / Consortium, value of work as per his percentage participation in that JV / Consortium shall be considered.

**5.11 Form EXP - 4.2(b):
Construction Experience in Key Activities**

Bidder's Name: _____

Date: _____

Bidder's JV/CONSORTIUM Member's Name _____

Sub-contractor's Name (as per ITB 34.2 and 34.3): _____

NCB No. and title: _____

Page _____ of _____ pages

1. Key Activity No One : _____

Information				
Contract Identification				
Award date				
Completion date				
Role in Contract	Prime Contractor	Member in JV/CONSORTIUM	Management Contractor	Sub-Contractor
Total Contract Amount			In INR equivalent	
Quantity (Volume, number or rate of production, as applicable) performed under the contract per year or part of the year	Total quantity in the contract (i)	Percentage participation (ii)	Actual Quantity Performed(i) x (ii)	
Year 1				
Year 2				
Year 3				
Year 4				
Information				
Employer's Name				
Address:				
Telephone / Fax number				
E-mail				
Description of the key activities in accordance with Sub-Factor 4.2(b) of Section III:				

2. Key Activity No. Two

3.

Notes:

Documentary proof such as completion certificates from client clearly indicating the nature/scope of work, actual completion cost & actual date of completion for such work should be submitted. The offers submitted without this documentary proof shall not be evaluated. In case the work is executed for private client, copy of work order, bill of quantities, bill wise details of payment received certified by CA, TDS certificates for all payments received & copy of final/last bill paid by client shall be submitted. Value of successfully completed portion of any ongoing work up to date of Bid submission will also be considered for qualification of work experience criteria.

For completed works, value of work done shall be updated to Bid submission date assuming 5% inflation for Indian Rupees every year and 2% for foreign currency portions per year. For the purpose of evaluation of work experience, all prices will be converted to Indian Rupees using the Exchange (selling) rates for those currencies at the close of business of the State Bank of India at 31st December of each year for the works completed in respective year. For the works completed in the latest year before 31st December of current year, the exchange rates of foreign currency shall be applicable 28 days before the Bid submission date.

In case of JV/Consortium, full value the work, if done by the same JV / Consortium or any of members of the JV/Consortium shall be considered. If the work done by them in any other JV/CONSORTIUM / Consortium, value of work as per his percentage participation in that JV / Consortium shall be considered.

6. Form of Bid Security

(Demand Guarantee)

Beneficiary: _____
Invitation for Bids No: _____
Date: _____
BID GUARANTEE No.: _____
Guarantor: _____

We have been informed that _____ (hereinafter called "the Applicant") has submitted or will submit to the Beneficiary its bid (hereinafter called "the Bid") for the execution of _____ under Invitation for Bids No. _____ ("the IFB").

Furthermore, we understand that, according to the Beneficiary's conditions, bids must be supported by a bid 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 _____ (_____) upon receipt by us of the Beneficiary's first 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 ("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) has failed to execute the contract agreement, or (ii) has failed to furnish the performance security,, in accordance with the Instructions to Bidders ("ITB") of the Beneficiary's bidding document.

This guarantee will expire: (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) sixty 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 (URDG) 2010 Revision, ICC Publication No. 758.

[signature(s)]

Valid upto.....

**7. Form of Bid-Securing Declaration
DELETED**

8. Form of Joint Bidding Agreement

(To be on non-judicial stamp paper of appropriate value as per Stamp Act relevant to place of execution, duly signed on each page. Foreign entities submitting the Bid are required to follow the applicable law in their country)

FORM OF JV/CONSORTIUM AGREEMENT BETWEEN

M/S....., M/S.....,

M/S..... AND M/S.....

FOR (.....)

THIS JV/Consortium Agreement (hereinafter referred to as "Agreement") executed on this..... day of Two thousand Twelve between..... a company incorporated under the laws of..... and having its Registered Office at (hereinafter called the "Party 1", which expression shall include its successors, executors and permitted assigns), and..... a company incorporated under the laws of..... and having its Registered Office at (hereinafter called the "Party 2", which expression shall include its successors, executors and permitted assigns) and..... a Company incorporated under the laws of..... and having its Registered Office at..... (hereinafter called the "Party 3", which expression shall include its successors, executors and permitted assigns)

(The Bidding JV/ consortium should list the name, address of its registered office and other details of all the consortium Members)

for the purpose of submitting the Bid in response to the Bidding Documents and in the event of selection as Successful Bidder to execute the Contract Agreement and/or other requisite documents, and to carry out the '.....' ("Works") for Pune Metro Rail project to be awarded by Maharashtra Metro Rail Corporation Limited (hereinafter referred as "Maha-Metro" or "the Company").

Party 1, Party 2, and Party 3 are hereinafter collectively referred to as the "Parties" and individually as a "Party".

WHEREAS Maharashtra Metro Rail Corporation Limited desired to engage a contractor for [name of the Maharashtra Metro Rail Corporation Limited Works] for Pune Metro Rail Project.

AND WHEREAS the JV/Consortium of [.....] (insert the names of all the Members) intends to participate for the Bid, against the Bidding Documents issued to..... [Insert the name of Employer of Bidding Document].

AND WHEREAS Para BDS ITB 4.9 of the Instructions to Bidder stipulates that the Bidders bidding on the strength of a consortium shall submit a legally enforceable JV/Consortium Agreement in a format specified in the Bidding Documents.

NOW THEREFORE, THIS INDENTURE WITNESSTH AS UNDER:

In consideration of the above premises and agreement, all the parties in this JV/Consortium do hereby mutually agree as follows:

1. In consideration of the selection of the JV/Consortium as the Successful Bidder by the Company, we the Members of the JV/Consortium and Parties to the JV/Consortium Agreement do hereby unequivocally agree that M/s..... (Insert name of the Lead Member), shall act as the Lead Member as defined in the Bidding Documents for self and agent for and on behalf of (the names of all the other Members of the JV/Consortium to be filled in here) to do on behalf of the JV/Consortium, all or any of the acts, deeds or things necessary or incidental to the JV/Consortium's Bid for the Contract including submission of the Bid, participating in meetings, responding to queries, submission of information/ documents and generally to represent the JV/Consortium in all its dealings with Maharashtra Metro Rail Corporation Limited or any other Government Agency or any person, in connection with the Works until culmination of

- the process of bidding till the Contract is entered into with **Maharashtra Metro Rail Corporation Limited** and thereafter till the expiry of the Contract.
2. The Lead Member is hereby authorized by the Members of JV/Consortium and Parties to the JV/Consortium Agreement to bind the JV/Consortium, incur liabilities and receive instructions for and on behalf of all Members. It is agreed by all the Members that entire execution of the Contract including payment shall be carried out exclusively through the Lead Member.
 3. The Lead Member shall be liable and responsible for ensuring the individual and collective commitment of each of the Members of the JV/Consortium in discharging all their respective obligations under the Contract with **Maharashtra Metro Rail Corporation Limited**. Each JV/Consortium Member further undertakes to be individually liable for the performance of its part of the obligations without in any way limiting the scope of collective liability envisaged in this Agreement.
 4. In case of any breach of any of the obligations as specified under Clause 3 above by any of the JV/Consortium Members, the Lead Member shall be liable to fulfil such obligation.
 5. It is agreed that sharing of responsibilities hereto among the JV/Consortium members shall not in any way be a limitation of responsibility of the Lead Member under these presents.
 6. This JV/Consortium Agreement shall be construed and interpreted in accordance with the Laws of _____.
 7. It is hereby agreed that the Lead Member shall furnish the Bid Securing Declaration, as stipulated in the Bidding Documents, on behalf of the JV/Consortium.
 8. It is hereby agreed that in case of selection of bidding consortium as the Successful Bidder, the Parties to this JV/Consortium Agreement do hereby agree that the Lead Member shall furnish the Performance Security on behalf of the JV/Consortium, as stipulated in the Bidding Documents.
 9. It is further expressly agreed that the JV/Consortium Agreement shall be irrevocable and, for the Successful Bidder, shall remain valid over the term of the Contract, unless expressly agreed to the contrary by the Company.
 10. The Lead Member is authorized and shall be fully responsible for the accuracy and veracity of the representations and information submitted by the JV/Consortium Members respectively from time to time in response to the Bidding Documents for the purposes of the Bidding.
 11. It is expressly understood and agreed between the Members that the responsibilities and obligations of each of the Members shall be as follows:
.....
.....
 12. It is agreed by the Members that the above sharing of responsibilities and obligations shall not in any way be a limitation of joint and several responsibilities and liabilities of the Members, with regards to all matters relating to the execution of the Works as envisaged in the Bidding Documents and the Contract. The Parties shall be jointly and severally liable for execution of the Works in accordance with the terms of the Contract and the Bidding Documents.
 13. It is clearly agreed that the Lead Member shall ensure performance under the Contract and if one or more JV/Consortium Members fail to perform its/their respective obligations under the agreement(s), the same shall be deemed to be a default by all the JV/Consortium Members.
 14. It is hereby agreed that in case of selection of the JV/Consortium as the Successful Bidder, [the Lead Member shall furnish the Performance Security on behalf of the JV/Consortium as stipulated in the Bidding Documents] / [the Performance Security as stipulated in the Bidding Documents shall be furnished by the Members on behalf of the JV/Consortium in such proportion as may be agreed to between us]
 15. It is agreed by all the Members that there shall be separate JV/Consortium Bank Account (distinct from the bank accounts of the individual Members) to which the individual Members shall contribute their share capital and/or working capital and the financial obligations of the JV/Consortium shall be discharged through the said JV/Consortium Bank Account only and also all the payments received by the JV/Consortium from the Employer shall be through that account alone.
 16. It is hereby expressly agreed between the Parties to this JV/Consortium Agreement that neither Party shall assign or delegate its rights, duties or obligations under this Agreement except with prior written consent of the Company.
 17. We hereby agree to ratify all acts, deeds and things lawfully done by the aforesaid Lead Member pursuant to this Agreement and that all acts, deeds and things done by the aforesaid Lead Member shall and shall always be deemed to have been done by us/Consortium.

This JV/Consortium Agreement

- (a) has been duly executed and delivered on behalf of each Party hereto and constitutes the legal, valid, binding and enforceable obligation of each such Party,

- (b) sets forth the entire understanding of the Parties hereto with respect to the subject matter hereof including the JV/Consortium/Bidder's legal persona and there is or are no other agreements relating to the JV/Consortium/Bidder's incorporation, constitution, powers or organisation which may affect in any way its ability to carry out the Works;
- (c) may not be amended or modified except in writing signed by each of the Parties and with prior written consent of the Company.

IN WITNESS WHEREOF, the Parties to the JV/Consortium Agreement have, through their authorized representatives, executed these presents and affixed common seals of their respective companies on the Day, Month and Year first mentioned above.

Common Seal of For and on behalf of
has been affixed in my/our JV/Consortium Member (party 1)
presence pursuant to the M/s.....
Board of Director's resolution
dated

.....
(Signature)	(Signature of authorized representative)
Name:	Name:
Designation:.....	Designation:
Place:	
Date:	

Witness:

1.
(Signature)
Name
Designation.....

2.
(Signature)
Name
Designation.....

Common Seal of For and on behalf of
has been affixed in my/our JV/Consortium Member (Party 2)
presence pursuant to the M/s.....
Board of Director's
resolution dated

.....
(Signature)	(Signature of authorized representative)
Name: Name:	
Designation: Designation:	
Place:	
Date:	

WITNESS

1.
(Signature)
Name
Designation.....

2.
(Signature)
Name
Designation.....

Attested:

.....
(Signature)
(Notary Public)
Place:
Date:

Common Seal of For and on behalf of
has been affixed in my/our JV/Consortium Member (Party 3)
presence pursuant to the M/s.....
Board of Director's

resolution dated

.....
(Signature) (Signature of authorized representative)
Name: Name:
Designation: Designation:
Place:
Date:

WITNESS

1.
(Signature)
Name
Designation.....
2.
(Signature)
Name
Designation.....

Attested:

.....
(Signature)
(Notary Public)

Place:.....
Date:.....

9. Form of Legal Capacity/ Power of Attorney*(Refer ITB20.2)**(To be forwarded on the letterhead of the Bidder/ Lead Member of Consortium)***Format for Board Resolution****(A) Format for the Board resolution to be passed by a Bidder (not applicable in case of consortium)**

The Board, after discussion, at the duly convened Meeting on (Insert date), with the consent of all the Directors present and in compliance of the provisions of the Companies Act, 1956, passed the following Resolution:

RESOLVED THAT pursuant to the applicable provisions of the Companies Act, 1956 and as permitted under the Memorandum and Articles of Association of the Company, approval of the Board be and is hereby accorded to submit a Bid in response to the Bidding Documents dated _____ issued by Maharashtra Metro Rail Corporation Limited (**Maharashtra Metro Rail Corporation Limited**) for '.....' [name of the work] for **Pune Metro Rail Project**.

FURTHER RESOLVED THAT Mr./Ms....., (insert the name and designation of the concerned official of the Company) be and is hereby authorized to take all the steps required to be taken by the Company for submission of the aforesaid Bid, including in particular, signing the Bid, making changes thereto and submitting amended Bid, signing and executing all the documents related to the Bid, certified copy of this Board resolution or letter or undertakings, etc., required to be submitted to **Maharashtra Metro Rail Corporation Limited** as part of the Bid or such other documents as may be necessary in this regard and to do in our name and our behalf all or any of the acts, deeds or things necessary or incidental to submission of our said Bid including signing and executing the Contract Documents, making representations to **Maharashtra Metro Rail Corporation Limited** or any other authority, and providing information / responses to **Maharashtra Metro Rail Corporation Limited**, representing us in all matters before **Maharashtra Metro Rail Corporation Limited**, and generally dealing with **Maharashtra Metro Rail Corporation Limited** in all matters in connection with our Bid till the completion of the bidding process as per the terms of the above said Bidding Documents and further till the Contract is entered into with MahaMetro thereafter till the expiry of the Contract.

FURTHER RESOLVED THAT a power of attorney as per the draft attached to the Bidding Documents be issued in favour of the above named person, _____, to be executed by Mr. _____ or Mr. _____, Directors of the Company under the Common seal of the Company, affixation thereof to be witnessed by one or both of the above named Directors and by Mr. _____, (insert the name and designation of the concerned official of the Company) or as per the Memorandum and Articles of Association of the Company.

Signature and stamp of Company Secretary / Managing Director/Director of Bidder

Notes:

1. This certified true copy should be submitted on the letterhead of the Company, signed by the Company Secretary / Managing Director/Director of the Bidder.
2. The contents of the format may be suitably re-worded indicating the identity of the entity passing the resolution.
3. In the event the Board resolution is from a company incorporated outside India, the same needs to be notarized by a notary in the home country of company passing the resolution and legalized by the Indian Embassy there. However, in case such company is from a country which has signed The Hague Legislation Convention 1961, then the Board Resolution is not required to be legalized by the Indian Embassy if it carries a conforming Apostille certificate.
4. This format may be modified only to the limited extent required to comply with the local regulations and laws applicable to a foreign entity submitting this resolution. For example, reference to Companies Act 1956 may be suitably modified to refer to the law applicable to the entity submitting the resolution. However, in such case, the foreign entity shall submit an unqualified opinion issued by the legal counsel of such foreign entity, stating that the Board resolutions are in compliance with the applicable laws of the respective jurisdictions of the issuing company and the authorizations granted therein are true and valid.

(B) Format for the Board resolution to be passed by Lead Member of Consortium (applicable in case the Bidder is a consortium)

The Board, after discussion, at the duly convened Meeting on (Insert date), with the consent of all the Directors present and in compliance of the provisions of the Companies Act, 1956, passed the following Resolution:

RESOLVED THAT pursuant to the applicable provisions of the Companies Act, 1956 and as permitted under the Memorandum and Articles of Association of the Company, approval of the Board be and is hereby accorded to submit a Bid in response to the Bidding Documents dated _____ issued by Maharashtra Metro Rail Corporation Limited (**Maharashtra Metro Rail Corporation Limited**) for '.....' [name of the work] for **Pune Metro Rail Project** in consortium with _____ (insert the name and address of the other consortium members).

FURTHER RESOLVED THAT pursuant to the applicable provisions of the Companies Act, 1956 and as permitted under the Memorandum and Articles of Association of the Company, approval of the Board be and is hereby accorded to execute a Consortium Agreement as per the format annexed to the aforesaid Bidding Documents with _____ (insert the name and address of the other consortium members).

FURTHER RESOLVED THAT approval of the Board be and is hereby accorded to the Company to accept and act as the Lead Member of the aforesaid Consortium and also as true and lawful attorney to do in the name and on behalf of the Consortium, all such acts, deeds and things necessary in connection with or incidental to submission of Consortium's Bid in response to the Bidding Documents dated _____ issued by **Maharashtra Metro Rail Corporation Limited** for '.....' [name of the work] including signing and submission of the Bid and all documents related to the Bid as specified in the Bidding Documents, including but not limited to undertakings, letters, certificates, acceptances, clarifications, guarantees or any other document, which **Maharashtra Metro Rail Corporation Limited** may require us to submit and carrying out the Contract and doing all necessary deeds and things as maybe required in respect of the above and also for making representations to MAHA-METRO and providing information / responses to **Maharashtra Metro Rail Corporation Limited**, representing the Consortium in all matters before **Maharashtra Metro Rail Corporation Limited**, and generally dealing with MAHA-METRO and/or any other authority in all matters in connection with Consortium's Bid, till completion of the bidding process in accordance with the Bidding Documents and further till the Contract is entered into with **Maharashtra Metro Rail Corporation Limited** and thereafter till the expiry of the Contract.

FURTHER RESOLVED THAT Mr./Ms....., (insert the name and designation of the concerned official of the Company) be and is hereby authorized to take all the steps required to be taken by the Company for submission of the Consortium's Bid, including in particular, signing the Bid, making changes thereto and submitting amended Bid, signing and executing all the documents related to the Bid, certified copy of this Board resolution or letter or undertakings, etc., required to be submitted to **Maharashtra Metro Rail Corporation Limited** as part of the Bid or such other documents as may be necessary in this regard and to do in the name and on behalf the Consortium all or any of the acts, deeds or things necessary or incidental to submission of said Bid including signing and executing the Contract Documents, making representations to MAHA-METRO or any other authority, & providing information / responses to MAHA-METRO, representing the Consortium in all matters before **Maharashtra Metro Rail Corporation Limited**, and generally dealing with **Maharashtra Metro Rail Corporation Limited** in all matters in connection with our Bid till the completion of the bidding process as per the terms of the above said Bidding Documents and further till the Contract is entered into with the Company and thereafter till the expiry of the Contract.

FURTHER RESOLVED THAT a power of attorney as per the draft attached to the Bidding Documents be issued in favour of the above named person, _____, to be executed by Mr. _____ or Mr. _____, Directors of the Company under the Common seal of the Company, affixation thereof to be witnessed by one or both of the above named Directors and by Mr. _____, (insert the name and designation of the concerned official of the Company) or as per the Memorandum and Articles of Association of the Company.

Signature and stamp of Company Secretary / Managing Director/Director of Bidder

Notes:

1. This certified true copy should be submitted on the letterhead of the Company, signed by the Company Secretary / Managing Director/Director of the Bidder.
2. The contents of the format may be suitably re-worded indicating the identity of the entity passing the resolution.
3. In the event the Board resolution is from a company incorporated outside India, the same needs to be notarized by a notary in the home country of company passing the resolution and legalized by the Indian Embassy there. However, in case such company is from a country which has signed The Hague Legislation Convention 1961, then the Board Resolution is not required to be legalized by the Indian Embassy if it carries a conforming Apostille certificate.
4. This format may be modified only to the limited extent required to comply with the local regulations and laws applicable to a foreign entity submitting this resolution. For example, reference to Companies Act 1956 may be suitably modified to refer to the law applicable to the entity submitting the resolution. However, in such case, the foreign entity shall submit an unqualified opinion issued by the legal counsel of such foreign entity, stating that the Board resolutions are in compliance with the applicable laws of the respective jurisdictions of the issuing company and the authorizations granted therein are true and valid.

(C) Format for the Board resolution to be passed by a Member other than the Lead Member of Consortium (applicable in case the Bidder is a consortium)

The Board, after discussion, at the duly convened Meeting on (Insert date), with the consent of all the Directors present and in compliance of the provisions of the Companies Act, 1956, passed the following Resolution:

RESOLVED THAT pursuant to the applicable provisions of the Companies Act, 1956 and as permitted under the Memorandum and Articles of Association of the Company, approval of the Board be and is hereby accorded to submit a Bid in response to the Bidding Documents dated _____ issued by Maharashtra Metro Rail Corporation Limited (**Maharashtra Metro Rail Corporation Limited**) for '.....' [name of the work] for **Pune Metro Rail Project** in consortium with _____ (insert the name and address of the other consortium members).

FURTHER RESOLVED THAT pursuant to the applicable provisions of the Companies Act, 1956 and as permitted under the Memorandum and Articles of Association of the Company, approval of the Board be and is hereby accorded to execute a Consortium Agreement as per the format annexed to the aforesaid Bidding Documents with _____ (insert the name and address of the other consortium members).

FURTHER RESOLVED THAT approval of the Board be and is hereby accorded to constitute, appoint and authorize _____ (name and registered office address of the Lead Member), which is one of the Members of the Consortium, to act as the Lead Member of the aforesaid Consortium and also as true and lawful attorney, to do in the name and on behalf of the Consortium, all such acts, deeds and things necessary in connection with or incidental to submission of Consortium's Bid in response to the Bidding Documents dated _____ issued by **Maharashtra Metro Rail Corporation Limited** for '.....' [name of the work] including signing and submission of the Bid and all documents related to the Bid as specified in the Bidding Documents, including but not limited to undertakings, letters, certificates, acceptances, clarifications, guarantees or any other document, which **Maharashtra Metro Rail Corporation Limited** may require us to submit and carrying out the Contract and doing all necessary deeds and things as may be required in respect of the above and also for making representations to **Maharashtra Metro Rail Corporation Limited** and providing information / responses to **Maharashtra Metro Rail Corporation Limited**, representing the Consortium in all matters before **Maharashtra Metro Rail Corporation Limited**, and generally dealing with **Maharashtra Metro Rail Corporation Limited** and/or any other authority in all matters in connection with our Bid, till completion of the bidding process in accordance with the Bidding Documents and further till the Contract is entered into with **Maharashtra Metro Rail Corporation Limited** and thereafter till the expiry of the Contract.

FURTHER RESOLVED THAT a power of attorney as per the draft attached to the Bidding Documents be issued in favour of the above said Lead Member, _____, to be executed by Mr. _____ or Mr. _____, Directors of the Company under the Common seal of the Company, affixation thereof to be witnessed by one or both of the above named Directors and by Mr.

_____, (insert the name and designation of the concerned official of the Company) or as per the Memorandum and Articles of Association of the Company.

FURTHER RESOLVED THAT a power of attorney as per the draft attached to the Bidding Documents be issued in favour of Mr./Ms....., (insert the name and designation of the concerned official of the Company) to be executed by Mr. _____ or Mr. _____, Directors of the Company under the Common seal of the Company, affixation thereof to be witnessed by one or both of the above named Directors and by Mr. _____, (insert the name and designation of the concerned official of the Company) or as per the Memorandum and Articles of Association of the Company.

FURTHER RESOLVED THAT Mr./Ms....., (insert the name and designation of the concerned official of the Company) be and is hereby authorized to take all the steps required to be taken by the Company for submission of the aforesaid Bid, including in particular, signing and executing all the documents related to the Bid, certified copy of this Board resolution or letter or undertakings, etc., required to be submitted to **Maharashtra Metro Rail Corporation Limited** as part of the Bid or such other documents as may be necessary in this regard and to do in our name and our behalf all or any of the acts, deeds or things necessary or incidental to give effect to this resolution.

Signature and stamp of Company Secretary / Managing Director/Director of Bidder

Notes:

1. This certified true copy should be submitted on the letterhead of the Company, signed by the Company Secretary / Managing Director/Director of the Bidder.
2. The contents of the format may be suitably re-worded indicating the identity of the entity passing the resolution.
3. In the event the Board resolution is from a company incorporated outside India, the same needs to be notarized by a notary in the home country of company passing the resolution and legalized by the Indian Embassy there. However, in case such company is from a country which has signed The Hague Legislation Convention 1961, then the Board Resolution is not required to be legalized by the Indian Embassy if it carries a conforming Apostille certificate.
4. This format may be modified only to the limited extent required to comply with the local regulations and laws applicable to a foreign entity submitting this resolution. For example, reference to Companies Act'1956 may be suitably modified to refer to the law applicable to the entity submitting the resolution. However, in such case, the foreign entity shall submit an unqualified opinion issued by the legal counsel of such foreign entity, stating that the Board resolutions are in compliance with the applicable laws of the respective jurisdictions of the issuing company and the authorizations granted therein are true and valid.

(D) Power of Attorney to be provided by each of the Members of the Consortium (other than the Lead Member) in favour of the Lead Member

WHEREAS Maharashtra Metro Rail Corporation Limited, (the Company) has issued the Bidding Documents on _____ for inviting Bids for '.....' [name of the work] for **Pune Metro Rail Project** on the terms and contained in the Bidding Documents;

AND WHEREAS, and (Insert names of all Members of Consortium) the Members of the Consortium are desirous of submitting a Bid in response to the Bidding Documents, and if selected, undertaking the responsibility of '.....' [name of the work] as per the terms of the Bidding Documents;

AND WHEREAS all the Members of the Consortium have agreed under the Consortium Agreement dated entered into between all the Members and submitted along with the Bid to appoint (Insert the name and address of the Lead Member) as Lead Member to represent all the Members of the Consortium for all matters regarding the Bidding Documents and the Bid;

AND WHEREAS pursuant to the terms of the Bidding Documents and the Consortium Agreement, we, the Members of the Consortium hereby designate M/s (Insert name of the Lead Member) as the Lead Member to represent us in all matters regarding the Bid and the Bidding Documents, in the manner stated below:-

Know all men by these presents, We (Insert name and address of the registered office of the Member-1)..... (Insert name and address of the registered office of the Member-2) (Insert name and address of the registered office of the Member-n) do hereby constitute, appoint and authorize.....(name and registered office address of the Lead Member), which is one of the Members of the Consortium, to act as the Lead Member and our true and lawful attorney, to do in our name and on our behalf, all such acts, deeds and things necessary in connection with or incidental to submission of Consortium's Bid in response to the Bidding Document dated _____ issued by the Company for '.....'[name of the work] including signing and submission of the Bid and all documents related to the Bid as specified in the Bidding Documents, including but not limited to undertakings, letters, certificates, acceptances, clarifications, guarantees or any other document, which the Company may require us to submit and carrying out the Contract and doing all necessary deeds and things as may be required in respect of the above. The aforesaid Attorney shall be further authorized for making representations to the Company named in the Bidding Documents, and providing information / responses to the Company named in the Bidding Documents, representing us and the Consortium in all matters before the Company named in the Bidding Documents, and generally dealing with the Company named in the Bidding Documents and/or any other authority in all matters in connection with our Bid, till completion of the bidding process in accordance with the Bidding Documents and further till the Contract is entered into with the Company and thereafter till the expiry of the Contract.

We, as Members of the Consortium, hereby agree to ratify all acts, deeds and things done by our said attorney pursuant to this Power of Attorney and that all acts, deeds and things done by our aforesaid attorney shall be binding on us and shall always be deemed to have been done by us.

All the terms used herein but not defined shall have the meaning ascribed to such terms in the Bidding Documents.

Signed by the within named
[Insert the name of the executant company]
 through the hand of
 Mr.
 duly authorized by the Board to issue such Power of Attorney

Dated this day of

Accepted

.....
 Signature of Attorney
 (Name, designation and address of the Attorney)

Attested

 (Signature of the executant)

(Name, designation and address of the executant)

.....
 Signature and stamp of Notary of the place of execution

Common seal of has been affixed in my/our presence pursuant to Board of Director's Resolution dated.....

WITNESS:

1.
 (Signature)
 Name
 Designation.....
 2.
 (Signature)
 Name
 Designation.....

Notes:

1. The mode of execution of the power of attorney should be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the executant(s) and the same should be under common seal of the executant affixed in accordance with the applicable procedure. Further, the person whose signatures are to be provided on the power of attorney shall be duly authorized by the executant(s) in this regard.
2. In the event, power of attorney has been executed outside India, the same needs to be notarized by a notary in the home country of company executing this power of attorney and legalized by the Indian Embassy there. However, in case such company is from a country which has signed The Hague Legislation Convention 1961, then the said power of attorney is not required to be legalized by the Indian Embassy if it carries a conforming Apostille certificate.
3. Also, wherever required, the executant(s) should submit for verification the extract of the chartered documents and documents such as a Board resolution / power of attorney, in favour of the person executing this power of attorney for delegation of power hereunder on behalf of the executant(s).

(E) Format for PoA for Lead Member**POWER OF ATTORNEY**

(To be on non-judicial stamp paper of appropriate value as per Stamp Act relevant to place of execution. Foreign companies submitting Bids are required to follow the applicable law in their country)

Power of Attorney to be provided by the Bidder Company/ Lead Member in favour of its representative as evidence of authorized signatory's authority.

Know all men by these presents, We(name and address of the registered office of the Bidding Company or Lead Member of the Bidding Consortium, as applicable) do hereby constitute, appoint and authorize Mr./Ms.....(name and residential address) who is presently employed with us and holding the position of _____, as our Attorney to do in our name and our behalf all or any of the acts, deeds or things necessary or incidental to submission of our Bid for '.....' [name of the work] for **Pune Metro Rail Project** in response to the Bidding Document dated _____ issued by Maharashtra Metro Rail Corporation Limited (**Maharashtra Metro Rail Corporation Limited**) (the Company) including signing and submission of the Bid and all other documents related to the bidding, including but not limited to undertakings, letters, certificates, acceptances, clarifications, guarantees or any other document which the Company may require us to submit and also signing and executing the Contract Documents. The aforesaid Attorney is further authorized for making representations to the Company or any other authority, and providing information / responses to the Company, representing us in all matters before the Company, and generally dealing with the Company in all matters in connection with our Bid till the completion of the bidding process as per the terms of the Bidding Documents and further till the Contract is entered into with the Company and thereafter till the expiry of the Contract.

We hereby agree to ratify all acts, deeds and things done by our said attorney pursuant to this Power of Attorney and that all acts, deeds and things done by our aforesaid attorney shall be binding on us and shall always be deemed to have been done by us.

(Add in the case of a Consortium)

Our firm is a Member/Lead member of the Consortium of _____, _____ and _____

All the terms used herein but not defined shall have the meaning ascribed to such terms under the Bidding Documents.

Signed by the within named

.....[Insert the name of the executant's company]

through the hand of

Mr.

duly authorized by the Board to issue such Power of Attorney

Dated this day of

Accepted

.....

Signature of Attorney

(Name, designation and address of the Attorney)

Attested

.....
(Signature of the executant)
(Name, designation and address of the executant)
.....
Signature and stamp of Notary of the place of execution

Common seal of has been affixed in my/our presence pursuant to Board of Director's Resolution dated.....

WITNESS

1.
(Signature)
Name
Designation.....
2.
(Signature)
Name
Designation.....

Notes:

1. The mode of execution of the power of attorney should be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the executant(s) and the same should be under common seal of the executant affixed in accordance with the applicable procedure. Further, the person whose signatures are to be provided on the power of attorney shall be duly authorized by the executant(s) in this regard.
2. In the event, power of attorney has been executed outside India, the same needs to be duly notarized by a notary public of the jurisdiction where it is executed.
3. Also, wherever required, the executant(s) should submit for verification the extract of the charter documents and documents such as a board resolution / power of attorney, in favour of the person executing this power of attorney for delegation of power hereunder on behalf of the executant(s).

(F) Format for PoA for Other Member(s)

POWER OF ATTORNEY

(To be on non-judicial stamp paper of appropriate value as per Stamp Act relevant to place of execution. Foreign companies submitting Bids are required to follow the applicable law in their country)

Power of Attorney to be provided by each Member other than the Lead Member in favour of its representative as evidence of authorized signatory's authority. (applicable to consortium only)

Know all men by these presents, We(name and address of the registered office of the Member of the Consortium, as applicable) do hereby constitute, appoint and authorize Mr./Ms.....(name and residential address) who is presently employed with us and holding the position of _____, as our Attorney to sign and execute the Contract Agreement and any other requisite document in our name and our behalf for '.....' [name of the work] for **Pune Metro Rail Project** in response to the Bidding Document dated _____ issued by Maharashtra Metro Rail Corporation Limited(**Maharashtra Metro Rail Corporation Limited**) (the Company) and to do all or any of the acts, deeds or things necessary or incidental to the above.

We hereby agree to ratify all acts, deeds and things done by our said attorney pursuant to this Power of Attorney and that all acts, deeds and things done by our aforesaid attorney shall be binding on us and shall always be deemed to have been done by us.

(Add in the case of a Consortium)

Our firm is a Member of the Consortium of _____, _____ and _____

All the terms used herein but not defined shall have the meaning ascribed to such terms under the Bidding Documents.

Signed by the within named

.....[Insert the name of the executant company]through the hand of Mr.
.....duly authorized by the Board to issue such Power of Attorney Dated this
..... day of

Accepted

.....
Signature of Attorney
(Name, designation and address of the Attorney)

Attested

.....
(Signature of the executant)
(Name, designation and address of the executant)

.....
Signature and stamp of Notary of the place of execution

Common seal of has been affixed in my/our presence pursuant to Board of Director's Resolution dated.....

WITNESS

1.
(Signature)
Name
Designation.....
2.
(Signature)
Name

Designation.....

Notes:

1. The mode of execution of the power of attorney should be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the executant(s) and the same should be under common seal of the executant affixed in accordance with the applicable procedure. Further, the person whose signatures are to be provided on the power of attorney shall be duly authorized by the executant(s) in this regard.
2. In the event, power of attorney has been executed outside India, the same needs to be duly notarized by a notary public of the jurisdiction where it is executed.
3. Also, wherever required, the executant(s) should submit for verification the extract of the charter documents and documents such as a board resolution / power of attorney, in favour of the person executing this power of attorney for delegation of power hereunder on behalf of the executant(s).

10. Bid Index

The Bidder shall include with its Bid an index which cross refers all of the Employer's bidding requirements elaborated in these documents to all the individual sections within Package 1: Technical Package and Package 2: Financial Package which the Bidder intends to be the responses to each and every one of those requirements.

The Packages submitted must be clearly presented, all pages numbered and laid out in a logical sequence with main and subheadings to facilitate evaluation.

11. Form for seeking clarification on Bidding Documents

Name of the Bidder:

S.No.	Volume No.	Clause No.	Bid Condition	Bidder's Queries
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

12. Not Used

13. Letter of Undertaking Regarding Confidentiality of Bid Information

(This document is to be prepared by the Bidder and submitted on Bidder's Letterhead as part of Technical Package as per Instructions to Bidder BDSITB 11.4.1.16)

To:

Date:

Managing Director
Office of Maharashtra Metro Rail Corporation Limited,
1st Floor, The Orion,
Opposite Don Bosco Youth Centre,
Koregaon Park,
Pune-411001.
Maharashtra, INDIA

Sub: Tender No P1 Misc-28/2022: Design of Graphics, Fabrication, Supply, Installation, Testing and Commissioning of Signage of 4 stations viz. Dapodi, Bopodi, Khadki & Range Hill of Reach 01 and 4 stations viz. Deccan Gymkhana, Sambhaji Park, PMC & Civil Court Elevated of Reach 02 of Pune Metro Rail Project.

Contract No. P1 Misc-28/2022- Regarding Letter of Undertaking

We (Name of Bidder / Consortium) hereby undertake that the Bid drawings, both in hardcopy and digitized format, and the Bidding documents purchased as a necessary part of our preparation of this Bid shall be used solely for the preparation of the Bid and that if the Bid is successful, shall be used solely for the execution of Works.

We further undertake that the aforesaid Bid drawings and documents prepared by MAHAMETRO, shall not be used in whole, in part or in any altered form on any other project, scheme, design or proposal that the Bidder / Consortium / Members of Consortium or its/their parent companies or sub-contractors of the Bidder / Consortium are, or will be involved with either in India or in any other Country.

Signed:

For and on behalf of
(Name of Bidder / Joint Venture / Consortium)
(To be signed by each member of the Joint Venture / Consortium, as applicable)

14. Undertaking for Downloaded Bidding Documents

We hereby confirm that, we have downloaded the complete set of Bid Documents along with the set of enclosures hosted in e-tendering portal <http://mahametroRails.etenders.in>. We confirm that the Bidding Documents has not been edited or modified by us. In case, it is observed by **Maharashtra Metro Rail Corporation Limited** that the Bidding Documents have been edited or modified, we agree for the rejection of our Bid by **Maharashtra Metro Rail Corporation Limited**.

Company name
Name
Signature
Postal address
E-mail ID
Phone Fax

15. Sample Format for Banking Reference for Liquidity

(to be submitted on the letter head of the Bank with Contact details, Address, Phone Number, E Mail id, etc.)

BANK CERTIFICATE

This is to certify that M/s is a reputed company with a good financial standing

If the contract for the work, namely.....is awarded to the above firm, we shall provide overdraft / credit facilities to the extent of Rs..... to meet their working capital requirements for executing the above contract.

Signature: - _____
Name of Bank: _____
Senior Bank Manager _____
Address of the Bank _____

Change the text as follows for Joint Venture / JVA / Consortium

This is to certify that M/s who has formed a JV / Consortium with M/s and M/sfor participating in this bid, is a reputed company with a good financial standing.

If the contract for the work, namely.....is awarded to the above joint venture / Consortium, we shall provide overdraft / credit facilities to the extent of Rs..... to M/s to meet their working capital requirements for executing the above contract.

Signature: - _____
Name of Bank: _____
Senior Bank Manager _____
Address of the Bank _____

[This should be given by the JV/CONSORTIUM members in proportion to their financial participation]

16. Form of Certificate confirming submission of all documents of Financial Package in the Technical Package with prices left blank

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

SIGNATURE OF BIDDER

17. Form of Certificate confirming receipt of all Bidding Documents and Addenda
(To be submitted on Bidder's Letter head)

This is to certify that we, M/s _____ [* Name of the Bidder] have received all Bidding Documents Addenda for Contract No. **P1 Misc-28/2022** as listed below:

1. Addendum No.
2.
3.
4.

SIGNATURE OF BIDDER

* In case of a Consortium, to be submitted by the Authorized representative of the Lead Member.

18. Form of Declaration for non-engagement of any agent, middleman or intermediary
(To be submitted on Bidder's Letter head)

[We hereby declare / We hereby jointly and severally]@ declare that the submission of this Bid confirms that no agent, middleman or any intermediary has been, or will be engaged to provide any services, or any other item or work related to the award and performance of this Contract. We further confirm and declare that no agency commission or any payment, which may be construed as an agency commission, has been, or will be paid and that the Bid price does not include any such amount. We acknowledge the right of the Employer, if it finds to the contrary, to declare our Bid to be non-compliant and if the Contract has been awarded to declare the Contract NULL and VOID.

SIGNATURE OF THE BIDDER

(In case of a partnership, joint venture or consortium, to be submitted by each constituent member)@
Strike out whichever is not applicable

**19. Form of certificate confirming careful examination of all the contents of Bidding Documents
and signing of all pages of Bidder's proposal**
(To be submitted on Bidder's Letter head)

This is to certify that we, M/s_____ [*Name of the company/consortium] have carefully examined all the contents of the Bidding Documents including Addenda (if any) and all the pages of our proposal have been signed and stamped by our authorized signatory.

SIGNATURE OF BIDDER

@In case of a joint venture or consortium, such pages to be signed by authorized signatory of the Lead member.

20. Undertaking for ensuring supply of critical spares and availability of technical support

(To be submitted on Bidder's Letter head)

Dated:.....

To:

Managing Director
Office of Maharashtra Metro Rail Corporation Limited,
1st Floor, The Orion,
Opposite Don Bosco Youth Centre,
Koregaon Park,
Pune-411001.
Maharashtra, INDIA

Letter of Undertaking

Tender No.P1 Misc-28 : Design of Graphics, Fabrication, Supply, Installation, Testing and Commissioning of Signage of 4 stations viz. Dapodi, Bopodi, Khadki & Range Hill of Reach 01 and 4 stations viz. Deccan Gymkhana, Sambhaji Park, PMC & Civil Court Elevated of Reach 02 of Pune Metro Rail Project.

We hereby certify that we will make credible arrangements for ensuring supply of critical spares and availability of technical support for maintenance and up gradation of equipment / systems / Machinery & Plant / Software, etc., which will become part of the Permanent Works executed under the contract (P1 Misc-28/2022) during their service life.

Signed.....
For on behalf of
(Name of Bidder / Consortium)

21. Undertaking for passing on benefits of exemptions to Maharashtra Metro Rail Corporation Limited and for adjustment of amounts due from balance due

(To be submitted on Bidder's Letterhead)

Dated:

Letter of Undertaking

Tender No .P1 Misc-28: **Design of Graphics, Fabrication, Supply, Installation, Testing and Commissioning of Signage of 4 stations viz. Dapodi, Bopodi, Khadki & Range Hill of Reach 01 and 4 stations viz. Deccan Gymkhana, Sambhaji Park, PMC & Civil Court Elevated of Reach 02 of Pune Metro Rail Project**

I _____ (State Name of Director/Partner/ Karta/Authorized Person) in capacity of _____ of _____ (State name of the undertaking organization) here by undertake to reimburse / pass on benefit of any duty draw back / export, import incentive / exemption / concession / benefit etc. obtained for the **Maharashtra Metro Rail Corporation Limited** project to **Maharashtra Metro Rail Corporation Limited**. I will maintain proper records as required by **Maharashtra Metro Rail Corporation Limited** and relevant statute. I will furnish such records to **Maharashtra Metro Rail Corporation Limited** as and when required by them.

I agree to adjustment of any benefits/ duty draw back / export, import incentive / exemptions / concessions to be made from the balance due to me without any prejudice.

I also undertake to indemnify **Maharashtra Metro Rail Corporation Limited** in case of any loss caused due to non-reimbursement / passing on the benefit of duty draw back / export, import incentive / exemption / concession etc.

I state that everything declared by me is true and correct to my belief.

Signed.....

For on behalf of

(Name of Bidder / Consortium)

22. Undertaking for obtaining registrations under various fiscal and labour laws

(To be submitted on Bidder's Letterhead)

Dated:.....

Letter of Undertaking

Tender No. P1 Misc-28/2022: Design of Graphics, Fabrication, Supply, Installation, Testing and Commissioning of Signage of 4 stations viz. Dapodi, Bopodi, Khadki & Range Hill of Reach 01 and 4 stations viz. Deccan Gymkhana, Sambhaji Park, PMC & Civil Court Elevated of Reach 02 of Pune Metro Rail Project

I _____ (State Name of Director/Partner/ Karta/Authorized Person) in capacity of _____ of _____ (State name of the undertaking organization) here by undertake to get registered under _____ (state the type of registration to be obtained) before _____ (state time line) (preferably immediately after award of Contract).

I also undertake to indemnify **Maharashtra Metro Rail Corporation Limited** in case of any loss caused due to non-registration.

I state that everything declared by me is true and correct to my belief.

Signed.....

For on behalf of

(Name of Bidder / Consortium)

23. Declaration of Undertaking

(To be submitted on Bidder's Letter head)

We underscore the importance of a free, fair and competitive procurement process that precludes abusive practices. In this respect we have neither offered nor granted directly or indirectly any inadmissible advantages to any public servant or other person nor accepted such advantages in connection with our bid, nor will we offer or grant or accept any such incentives or conditions in the present procurement process or, in the event that we are awarded the contract, in the subsequent execution of the contract. We also declare that no conflict of interest exists in the meaning of the kind described in the corresponding Guidelines⁶. We also underscore the importance of adhering to minimum social standards ("Core Labour Standards") in the implementation of the project. We undertake to comply with the Core Labour Standards ratified by the country of @ (name of country). We will inform our staff about their respective obligations and about their obligation to fulfil this declaration of undertaking and to obey the laws of the country of @ (name of country). We also declare that our company/all members of the consortium has/have not been included in the list of sanctions of the United Nations, nor of the EU, nor of the German Government, nor in any other list of sanctions and affirm that our company/all members of the consortium will immediately inform the client and Funding Agency / Source if this situation should occur at a later stage.

We acknowledge that, in the event that our company (or a member of the consortium) is added to a list of sanctions that is legally binding on the client and/or Funding Agency / Source, the client is entitled to exclude our company/the consortium from the procurement procedure and, if the contract is awarded to our company/the consortium, to terminate the contract immediately if the statements made in the Declaration of Undertaking were objectively false or the reason for exclusion occurs after the Declaration of Undertaking has been issued.

..... (Place)..... (Date)

(Name of company)

(Signature(s))

⁶ See "Guidelines for the Assignment of Consultants in Financial Cooperation with Partner Countries" and "Guidelines for Procurement of Goods, Works and associated Services in Financial Cooperation with Partner Countries"

Annexure III - Deleted
Form CER

24 Quality Management / Environmental, Social, Health and Safety (ESHS) Certification

Bidder's Legal Name: _____ Date: _____
Bidder's JV/CONSORTIUM Member name: _____ NCB No.: _____

DESCRIPTION	INFORMATION
Identification of the certificate	_____ [insert full name of the certificate]
First award date	_____ [insert day, month, year of first certificate award]
Last update of the certificate	_____ [insert day, month, year of latest renewal, if any]
Issuers Name	_____ [insert full name]
Address	_____ [insert street / number / town or city / country]
Telephone/fax number	_____ [insert phone/fax no., incl. country & city area codes]
E-mail	_____ [insert e-mail address, if available]
Compliance with international standards	The certificate is [ISO 9001, ISO 14001, OHSAS 18001] [select as appropriate] <input type="checkbox"/> Yes / <input type="checkbox"/> No
If no, proof of conformity with ISO standards by the Bidder	The Bidder shall provide a conformity assessment of its certificate by an internationally recognized Accredited Certification Body

The Bidder shall fill this Form for each Certification required under sub criteria 4.2(b) of Section III - Evaluation and Qualification Criteria

Maha Metro Rail Corporation Limited (Maha-Metro)

**PUNE METRO RAIL PROJECT
BID DOCUMENTS
FOR**

Design of Graphics, Fabrication, Supply, Installation, Testing and Commissioning of Signage of 4 stations viz. Dapodi, Bopodi, Khadki & Range Hill of Reach 01 and 4 stations viz. Deccan Gymkhana, Sambhaji Park, PMC & Civil Court Elevated of Reach 02 of Pune Metro Rail Project

TENDER NO.

P1 Misc-28/2022

PART I: BIDDING PROCEDURE

**Section V. Eligibility Criteria and Social and Environmental
responsibility**

Section V-A. Agency Policy - Corrupt and Fraudulent Practices

Section V. Eligibility Criteria and Social and Environmental responsibility

1. Natural or legal persons (including all members of a joint venture or any of their subcontractors) shall not be awarded contract if, on the date of submission of an application or of a bid or on the date of award of a contract, they:
 - i. are bankrupt or being wound up or ceasing their activities, are having their activities administered by the courts, have entered into receivership, or are in any analogous situation arising from a similar procedure;
 - ii. have been convicted within the past five years by court decision, which has the force of *res judicata* in the country where the project is implemented, of fraud or corruption or any other offence committed during the procurement or performance of a contract, unless they provide supporting information together with their Covenant of Integrity (Form available as Appendix to Letter of Bid) which shows that this conviction is not relevant in the context of this project;
 - iii. are listed for financial sanctions by the United Nations, the European Union and/or France for the purposes of fight against terrorist financing or threat to international peace and security;
 - iv. have committed serious professional misconduct within the past five years during the procurement or performance of a contract, as evidenced by any means by the Employer;
 - v. have not fulfilled their obligations regarding the payment of social security contributions or taxes in accordance with the legal provisions of Employer's country;
 - vi. have been convicted within the past five years by court decision, which has the force of *res judicata* of fraud or corruption or any other offence committed in contract procurement or performance;
 - vii. Are subject to an exclusion decision of the World Bank, and are listed on the website <http://www.worldbank.org/debarr>, unless they provide supporting information together with their Covenant of Integrity (Form available as Appendix to Letter of Bid)
 - viii. have committed misrepresentation in documentation requested by the Employer as part of the contract procurement procedure;
2. Bidders that are Government-owned enterprises or institutions may participate only if they can establish that they (i) are legally and financially autonomous (ii) operate under commercial law. To be eligible, a government-owned enterprise or institution shall establish to the Agency's satisfaction, through all relevant documents, including its Charter and other information the Agency may request, that it: (i) is a legal entity separate from their government (ii) does not currently receive substantial subsidies or budget support; (iii) operates like any commercial enterprise, and, inter alia, is not obliged to pass on its surplus to their government, can acquire rights and liabilities, borrow funds and be liable for repayment of its debts, and can be declared bankrupt.
3. In order to promote sustainable development, The Employer seeks to ensure that internationally recognised environmental and social standards are complied with. Candidates shall consequently undertake in the Covenant of Integrity to:
 - i. comply with and ensure that all their subcontractors comply with international environmental and labour standards, consistent with applicable law and regulations in the country of implementation of the Project, including the fundamental conventions of the International Labour Organisation (ILO) and international environmental treaties;
 - ii. adopt any environmental and social risk mitigations measures as defined in the environmental and social management plan or in the environmental and social impact notice issued by the Employer.

Section V-A. Agency Policy - Corrupt and Fraudulent Practices

1.1.1 Grounds for Exclusion

1.1.1.1 Bidders (either natural or legal persons including any of their subcontractors) shall not be awarded this contract if, on the date of submission of an application or of a bid or on the date of award of a contract, they have been the subject of a conviction by final judgment for one of the following reasons:

- a. where the bidder is bankrupt or is the subject of insolvency or winding-up proceedings, where its assets are being administered by a liquidator or by the court, where it is in an arrangement with creditors, where its business activities are suspended or it is in any analogous situation arising from a similar procedure under national laws and regulations;
- b. bidder have not fulfilled their obligations regarding the payment of social security contributions or taxes in accordance with the legal provisions of the country where they are established or the Employer's country.
- c. where the Employer can demonstrate by any appropriate means a violation by the bidder of applicable obligations in the fields of environmental, social and labour law established by national law, collective agreements or by the international environmental, social and labour law provisions;
- d. where the Employer has sufficiently plausible indications to conclude that the bidder has entered into agreements with other bidder(s) aimed at distorting competition;
- e. where the bidder has shown significant or persistent deficiencies in the performance of a substantive requirement under a prior public contract, a prior contract with the Employer or a prior concession contract which led to early termination of that prior contract, damages or other comparable sanctions;
- f. bidder have been convicted within the past five years by a court decision, which has the force of residential jurisdiction in the country where the project is implemented, of fraud or corruption or any other Prohibited Conduct committed during the procurement or performance of a contract, unless they provide supporting information together with their Covenant of Integrity which shows that this conviction is not relevant in the context of this project;
- g. bidder is listed for financial sanctions by the United Nations and /or European Union for the purposes of fight against terrorist financing or threat to international peace and security;
- h. bidder including JV/ Consortium members should not be excluded by the EU Institutions or any major Multilateral Development Bank (including World Bank Group, African Development Bank, Asian Infrastructure Investment Bank, Asian Development Bank, European Bank for Reconstruction and Development, European Investment Bank or Inter-American Development Bank) from participation in a tendering procedure on the grounds of Prohibited Conduct as defined in the Covenant of Integrity.
- i. where the Employer can demonstrate by appropriate means that the bidder is guilty of grave professional misconduct, which renders its integrity questionable;
- j. where a conflict of interest within the meaning of Sub-Clause 4.2 in ITB cannot be effectively remedied by other less intrusive measures;
- k. where a distortion of competition from the prior involvement of the bidder in the preparation of the procurement procedure, as referred to in Sub-Clause 3.1 in ITB, cannot be remedied by other, less intrusive measures;
- l. where the bidder has been guilty of serious misrepresentation in supplying the information required for the verification of the absence of grounds for exclusion or the fulfilment of the selection criteria, has withheld such information or is not able to submit the supporting documents required pursuant to sub-clause BDS ITB 4.18; or
- m. where the bidder has undertaken to unduly influence the decision-making process of the Employer, to obtain confidential information that may confer upon its undue advantages in the procurement procedure or to negligently provide misleading information that may have a material influence on decisions concerning exclusion, selection or award.

1.1.1.2 Notwithstanding point (a) of Sub-Clause 1.1.1.1 above, Employer might not exclude a bidder which is in one of the situations referred to in that point, where the Employer has established that the bidder in question will be able to perform the contract, taking into account the applicable national rules and measures on the continuation of business in the case of the situations referred to in point (a).

1.1.1.3 Any bidder that is in one of the situations referred to in the above paragraph may provide evidence to the effect that measures taken by the bidder are sufficient to demonstrate its

reliability despite the existence of a relevant ground for exclusion. If such evidence is considered as sufficient, the bidder concerned will not be excluded from the procurement procedure.

- 1.1.1.4 For this purpose, the bidder shall prove that it has paid or undertaken to pay compensation in respect of any damage caused by the criminal offence or misconduct, clarified the facts and circumstances in a comprehensive manner by actively collaborating with the investigating authorities and taken concrete technical, organizational and personnel measures that are appropriate to prevent further criminal offences or misconduct.
- 1.1.1.5 The measures taken by the bidder will be evaluated taking into account the gravity and particular circumstances of the criminal offence or misconduct. Where the measures are considered to be insufficient, the bidder shall receive a statement of the reasons for that decision.
- 1.1.1.6 Bidders will also be required to confirm and declare that no agent, middleman or any intermediary has been, or will be, engaged to provide any services, or any other items of work related to the award and performance of this contract.
- 1.1.2 Prohibited Conduct
 - 1.1.2.1 In pursuance of the Funding Agency's (EIB's) Anti-Fraud Policy (refer <http://www.eib.org/en/infocentre/publications/all/anti-fraud-policy.htm>), Prohibited Conduct includes corruption, fraud, coercion, collusion, obstruction, money laundering and financing of terrorism defined as follows:
 - a. A corrupt practice, is the offering, giving, receiving, or soliciting, directly or indirectly, anything of value to influence improperly the actions of another party.
 - b. A fraudulent practice, is any act or omission, including a misrepresentation that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation.
 - c. A coercive practice, is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party.
 - d. A collusive practice, is an arrangement between two or more parties designed to achieve an improper purpose, including influencing improperly the actions of another party.
 - e. An obstructive practice is (a) deliberately destroying, falsifying, altering or concealing of evidence material to the investigation; and/or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation, or (b) acts intended to materially impede the exercise of the EIB's contractual rights of audit or access to information or the rights that any banking, regulatory or examining authority or other equivalent body of the European Union or of its Member States may have in accordance with any law, regulation or treaty or pursuant to any agreement into which the EIB has entered in order to implement such law, regulation or treaty.
 - f. Money laundering is,
 - i. the conversion or transfer of property, knowing that such property is derived from criminal activity or from an act of participation in such activity, for the purpose of concealing or disguising the illicit origin of the property or of assisting any person who is involved in the commission of such activity to evade the legal consequences of his action;
 - ii. the concealment or disguise of the true nature, source, location, disposition, movement, rights with respect to, or ownership of property, knowing that such property is derived from criminal activity or from an act of participation in such activity;
 - iii. the acquisition, possession or use of property, knowing, at the time of receipt, that such property was derived from criminal activity or from an act of participation in such activity;
 - iv. participation in, association to commit, attempts to commit and aiding, abetting, facilitating and counselling the commission of any of the actions mentioned in the foregoing points.
 - g. Financing of terrorism is the provision or collection of funds, by any means, directly or indirectly, with the intention that they should be used or in the knowledge that they are to be used, in full or in part, in order to carry out any of the offences within the meaning of Articles 1 to 4 of the Council Framework Decision 2002/475/JHA of 13 June 2002 on combating terrorism.
 - 1.1.2.2 The Employer will declare a firm ineligible, either indefinitely or for a stated period of time, for any Employer's contract, if at any time determines that the firm has engaged in Prohibited Conduct in competing for, or in executing, a borrowed financed contract in general.
 - 1.1.3 Each Bidder (each member in the case of joint venture or consortium or partnership) is required to confirm and declare with their Tender that they (as the case may be) have not engaged in any fraudulent and corrupt practice as defined in 1.1.2.1 above and that no agent, middleman or any intermediary has been, or will be, engaged to provide any services, or any

other item or work related to the award and performance of this Contract and declare that no agency commission or any payment which may be construed as an agency commission has been, or will be, paid and that the tender price will not include any such amount. To fulfil this requirement, the Bidder (each member in case of JV / Consortium) shall sign and execute the Covenant of Integrity given as Appendix - 2.2A and the declaration given as Appendix - 2.2B. If the Employer subsequently finds these has not been provided, the Employer reserves the right to declare the Bidder as non-compliant and declare any Contract if already awarded to the Bidder to be null and void.

- 1.1.4 The Bidder/Contractor grant the Employer, the Funding Agencies and auditors appointed by either of them, as well as any authority or European Union Institution or body having competence under European Union law, the right to inspect and copy the books and records of the bidder, contractor, supplier or consultant.
- 1.1.5 Canvassing or offer of an advantage or any other inducement by any person with a view to influencing acceptance of a Tender will be an offence under laws of India. Such action will result in the rejection of the Tender, in addition to other punitive measures.
- 1.1.6 If it is established to the required standards that a project-related party has engaged in Prohibited Conduct in the course of a procurement process or implementation of a contract to be financed, the Funding Agency:
 - a. may seek appropriate remediation of the Prohibited Conduct to its satisfaction;
 - b. may declare ineligible such project-related party to be awarded the contract; and/or
 - c. may withhold the Funding Agency's no objection to contract award and may apply appropriate contractual remedies, which may include suspension and cancellation, unless the Prohibited Conduct has been dealt with to the satisfaction of the Funding Agency.
- 1.1.7 Furthermore, within the framework of the Funding Agency's Exclusion Policy (see the EIB's Exclusion Policy: <https://www.eib.org/en/publications/exclusion-policy.htm>), the Funding Agency may declare such project related party ineligible to be awarded a contract under any EIB project or to enter into any relationship with the Funding Agency.

Maha Metro Rail Corporation Limited (Maha-Metro)

**PUNE METRO RAIL PROJECT
BID DOCUMENTS
FOR**

Design of Graphics, Fabrication, Supply, Installation, Testing and Commissioning of Signage of 4 stations viz. Dapodi, Bopodi, Khadki & Range Hill of Reach 01 and 4 stations viz. Deccan Gymkhana, Sambhaji Park, PMC & Civil Court Elevated of Reach 02 of Pune Metro Rail Project

TENDER NO.

P1 Misc-28/2022

PART I: BIDDING PROCEDURE

SECTION VI: PRICING DOCUMENT / BOQ

List of Contents

Clause

SECTION 1 - PREAMBLE

SECTION 2 - BILL OF QUANTITIES (BOQ)

SECTION 1 PREAMBLE

1. The Bill of Quantities shall be read in conjunction with the instructions to Tenderers, Conditions of Contract, Notice Inviting Tender, Technical Specifications, Tender Drawings, Schedule, Annexure and Addendums.
2. The quantities given in the "Bill of Quantities" are provisional and are given to provide a common basis for tendering. The basis of payment will be the actual quantities of work ordered and carried out, as measured by the Contractor and verified by the Maha-Metro Engineer and valued at the quoted price on the estimated rate for each item in the accepted priced "Bill of Quantities", where applicable.
3. The BOQ is meant for reference so as to understand the item description. The quoted rates are for completed and finished items of work as per specifications and complete in all respects. Rates to be quoted in BOQ and final amount in "Annexure - 1 to BOQ".
4. Tenderer's offer shall be inclusive of -
 - a. All design facilities, fabrication space, tools, machinery, labour, supervision, materials, lead, lift, fuel, consumables, electric power, water, transportation, all temporary works and scaffolding, packaging and protection of sign parts, lighting, night working, inspection facilities, safety measures at work sites for workmen and road users, preparation of design and drawings pertaining to the fabrication, supply and installation etc, establishment and overhead charges, insurance costs for labour and works, contractor's profit, all taxes, royalties, duties, cess, GST and other charges together with all general risks, liabilities and obligations set out or implied in the contract and including remedy of any defects during the Defect Liability Period, unless otherwise provided in BOQ.
 - b. Cost of complying with the provisions of the Contract.
 - c. Considering field constraints, availability of front, preparation of detailed scheme for taking necessary clearance and approval from the concerned authority and other local bodies etc.
 - d. All Taxes, Levies, Duties, GST and other charges levy-able and payable to the authorities including taxes to be deducted at source. The Employer shall deduct Tax at source from the payments made to the Contractor, which the Employer will be required by law for deposition with statutory authorities in India. The Employer shall further furnish to the Contractor a certificate for such tax deducted at source.
5. All columns in the "Annexure-1" to BOQ shall be filled in ink or type written and the total tender amount shown in the bottom. The person authorized to sign on behalf of the tenderer shall sign in full at bottom of all pages and at the end of schedule with date, name and designation.
6. General directions and description of works and materials are not necessarily repeated or summarized in the Bill of Quantities.
7. The method of measurement of completed work for payment shall be in accordance with the requirements as stated in the individual sections of the Technical Specifications and Special Conditions of Contract (SCC).
8. Errors will be corrected by the Employer for any arithmetical errors in computation or summation as indicated in Contract Document.
9. In the defined grade of concrete mix, the first figure defines the strength of concrete and second figure defines the maximum size of coarse aggregates to be used for production of particular concrete mix. e.g. M 35/20 means "M-35" is the grade of concrete and "20" is the maximum size of coarse aggregate in mm to be used.
10. Tenderer shall maintain complete records of duties; levies, GST etc., payable to various authorities in relation to the works and submit receipts/records for verifications, as and when demanded by the Employer.
11. Following list of items to be prototyped. Please note

- 1.1.1 Suspended sign, Illuminated, 2 sided
 - 1.1.2 Suspended sign, Non-Illuminated, 2 sided
 - 1.1.3 Suspended Sign, Non-Illuminated, 1 sided
 - 2.1.1 Face mounted sign, Illuminated, 1 sided
 - 2.1.3 Face mounted plate sign, Non-illuminated, 1 sided
 - 2.1.4 Face mounted opaque vinyl sticker, Non-illuminated, 1 sided
 - 2.1.7 Face mounted Channel letter, Illuminated, 1 sided
 - 3.1.1 Post mounted Sign, Non-Illuminated, 1 sided
 - 3.1.2 Post mounted Sign, Non-Illuminated, 2 sided
 - 3.1.3 Post mounted Sign, Illuminated, 2 sided
- a. No extra payments will be given on account of prototyping of given listed sign
 - b. Prototype Sign have to be installed at the specific location as marked in Sign drawings.
 - c. Prototype, which will be approved, will remain at the place and shall be accepted as the sign installed against BOQ Quantity.
 - d. Prototype sign (rejected) has to be reinstalled after reworking or re-fabrication, modification and improvement required at the risk and cost of the contractor.
 - e. Prototypes or Sample signages will be approved by MAHA-METRO.
12. Items considered as item rates and will be paid after on site actual measurements of elements installed. This specially applies to the sign fixings like Suspender, projected and post mounted signs.
13. The Contractor should comply with all labor enactments.

SECTION II - BILL OF QUANTITIES (BOQ)

The Bill of Quantities consists of five schedules. The Grand Summary collects all prices in the five schedules and carries the total for all schedules forward to the Tender Price.

The prices shall be expressed in Indian Rupees.

The price quoted by bidders shall be deemed to be inclusive of all kinds of duties, taxes, Cess and other levies payable as per GST, Custom tariff act etc. and as prevailing on 28 days (Base Date) prior to final date of submission of bid (Closing time & date of submission of online bid).

The price quoted by the bidders shall be inclusive of Design fees.

The Bidder shall complete and submit all bill sheets endorsed by the signature of his representative.

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

In accordance with the accompanying and signed Form of Tender, we offer to supply, install, test and commission including Integrated Testing and Commissioning and remedying any defects therein in the whole of the said Works in conformity with the said Drawings, Conditions of Contract, Employer's Requirements, and Bill of Quantities, for the sum of:

(In words) _____ Indian Rupees
(In figures) _____

Witness:

Signature:

Name:

Address:

Witness:

Signature:

Name:

Address:

Date:

Signature:

Name:

For and on behalf of:

Address:

Date:

Signature:

Name :

APPENDIX A

Monthly Cash Flow for the Contract

This Document is to be prepared by the Bidder and submitted as part of Appendix 2 to the Form of Tender.

Grand Summary		
Schedule	Particulars	Total (incl. taxes)
Sch A	Suspended Signage	
Sch B	Face Mounted Signage	
Sch C	Post Mounted Signage	
Sch D	Floor Vinyl Signage	
Sch E	Street Signage	
GRAND TOTAL (incl taxes)		

Schedule A - Suspended Signage							
BOQ Item No.	All Sizes	Item Description	Unit	Rate with taxes	Qty.		Amount with taxes
					1 Station	8 Stations	
1.1.1		Suspended sign, Illuminated, 2 sided					
	Drg. No.	1.1.1a,b,c,d,e					
		Providing and fixing illuminated signs including all operations from fabrication to installation all complete as per relevant drawings, technical specifications, signage schedule and to the satisfaction of the Engineer-in-Charge.>>					
		Sign Box					
		The sign box 80mm wide shall be fabricated out of 2 mm thick aluminium extrusion channel of 25mm depth. The frame work is to be completed with internally blind revetting and brackets. Complete sign box is to be powder coated in RAL classic 7046 .					
		Sign panel - 2 side Illuminated face					
		Providing and fixing of sign panel double side of sign box with 5mm thick Opal white acrylic. On both sides, plotter cut blackout self adhesive vinyl as per specified Pantone Code should be applied over a translucent white vinyl. The entire sign panel face is covered with a protective over-laminate to wrap around the edge of the acrylic to a distance of 25mm on the back side.					
		Illumination					
		Providing and fixing the LED strips for proper illumination. Please see "Technical Specification" for LED Specification.					
		Above description generally holds good for the following signage unless otherwise specified except due modifications with special mention>>					

Schedule A - Suspended Signage							
BOQ Item No.	All Sizes	Item Description	Unit	Rate with taxes	Qty.		Amount with taxes
					1 Station	8 Stations	
		Accessories: Providing and fixing all accessories such as nut-inserts, screws , rivets, bolts, washers, nuts, etc. complete as per drawing.>>					
	Sizes						
1.1.1a	1200 x 300	Interior Direction Sign	No s.		8	64	
1.1.1b	1500 x 300	Interior Direction Sign	No s.		42	336	
1.1.1c	1800 x 300	Interior Direction Sign	No s.		20	160	
1.1.1d	600 x 300	Way to ETS at Platform	No s.		14	112	
1.1.1e	1200 x 300	Way to ETS at Platform	No s.		2	16	
1.1.2		Suspended sign, Non-Illuminated, 2 sided					
	Drg. No.	1.1.2 a,b					
		Providing and fixing non-illuminated signs including all operations from fabrication to installation all complete as per relevant drawings, technical specifications, signage schedule and to the satisfaction of the Engineer-in-Charge.>>					
		Sign Box					
		The sign box 80mm wide shall be fabricated out of 2 mm thick aluminium extrusion channel of 25mm depth. The frame work is to be completed with internally blind revetting and brackets. Complete sign box is to be powder coated in RAL classic 7046.					
		Sign panel - 2 side Non-illuminated face					

Schedule A - Suspended Signage							
BOQ Item No.	All Sizes	Item Description	Unit	Rate with taxes	Qty.		Amount with taxes
					1 Station	8 Stations	
		Providing and fixing of sign panel double side of sign box with 5mm thick Opal white acrylic. On both sides, plotter cut blackout self adhesive vinyl as per specified Pantone Code should be applied over a translucent white vinyl. The entire sign panel face is covered with a protective over-laminate to wrap around the edge of the acrylic to a distance of 25mm on the back side.					
		Above description generally holds good for the following signage unless otherwise specified except due modifications with special mention>>					
		Accessories: Providing and fixing all accessories such as nut-inserts, screws , rivets, bolts, washers, nuts, etc. complete as per drawing.>>					
	Sizes						
1.1.2a	1200 x 300	Interior Identification Sign - Women Only	No s.		2	16	
1.1.2b	450 x 450	Platform Number sign	No s.		4	32	
1.1.3		Suspended Sign, Non-Illuminated, 1 sided					
	Drg. No.	1.1.3a					
		Providing and fixing non-illuminated signs including all operations from fabrication to installation all complete as per relevant drawings, technical specifications, signage schedule and to the satisfaction of the Engineer-in-Charge.>>					
		Sign Box					

Schedule A - Suspended Signage							
BOQ Item No.	All Sizes	Item Description	Unit	Rate with taxes	Qty.		Amount with taxes
					1 Station	8 Stations	
		The sign box 80mm wide shall be fabricated out of 2 mm thick aluminium extrusion channel of 25mm depth. The frame work is to be completed with internally blind revetting and brackets. Complete sign box is to be powder coated in RAL classic 7046.					
		Sign panel - 1 side Non-Illuminated face					
		Providing and fixing of sign panel on front side of sign box with 5mm thick Opal white acrylic. On front side, plotter cut blackout self adhesive vinyl as per specified Pantone Code should be applied over a translucent white vinyl. The entire sign panel face to be covered with a protective over-laminate to wrap around the edge of the acrylic to a distance of 25mm on the back side. ACP to be used at the back as per description mentioned in technical specification.					
		Above description generally holds good for the following signage unless otherwise specified except due modifications with special mention>>					
		Accessories: Providing and fixing all accessories such as nut-inserts, screws , rivets, bolts, washers, nuts, etc. complete as per drawing.>>					
	Sizes						
1.1.3a	450 x 700	TVM Sign	No s.		2	16	
1.1.4		Suspended Sign fixing :					
		1.1.4a					

Schedule A - Suspended Signage							
BOQ Item No.	All Sizes	Item Description	Unit	Rate with taxes	Qty.		Amount with taxes
					1 Station	8 Stations	
		Suspender - Providing and fixing Suspended support for signs using 75mm dia NB 3mm thick MS hollow sections and 50mm dia NB 2.6mm thick MS hollow sections based on the sign length, as shown in the Structural Drawing, cut and finished to required length and welded to the bracket as per design. The entire assembly shall be finished in Powder Coat RAL CLASSIC 7046 color to match as per drawing and as approved by the Engineer -in-charge. Including fixing at site after due site checking and making good all the surface finishes after the sign is installed perfectly aligned and levelled. The rate mentioned here is for Suspender of one unit(2 pipes/per Signage)of Suspender for 2.0 meter length with pipe dia 50mm, including the top and bottom plates and bolts. When the suspender height required beyond 2 meter, for length after 1meter dia 75mm pipe to be used and per meter of 75mm dia pipe will be Rs. 1000/meter. The Calculation will be rounded of next or below meter. The final calculation will be based on the actual installation length, as per measured site condition. For Suspenders with sigle pipe, the rate will calculated as half of INR 2500(i.e. 2500/2).					
	Sizes						
1.1.4a		Suspenders	Mtr s.		376	3008	
						Total for Sch-A	

Schedule B - Face Mounted Signage							
BOQ Item No.	All Sizes	Item Description	Unit	Rate with taxes	Qty.		Amount with taxes
					1 Station	8 Stations	
2.1.1		Face mounted sign, Illuminated, 1 sided					
	Drg. No.	2.1.1a,b,c Providing and fixing illuminated signs including all operations from fabrication to installation all complete as per relevant drawings, technical specifications, signage schedule and to the satisfaction of the Engineer-in-Charge.>>					
		Sign Box					
		The sign box 80mm wide shall be fabricated out of 2 mm thick aluminium extrusion channel of 25mm depth. The frame work is to be completed with internally blind revetting and brackets. Complete sign box is to be powder coated in RAL classic 7046.					
		Sign panel - 1 side Illuminated face					
		Providing and fixing of sign panel on front side of sign box with 5mm thick Opal white acrylic. On front side, plotter cut blackout self adhesive vinyl as per specified Pantone Code should be applied over a translucent white vinyl. The entire sign panel face to be covered with a protective over-laminate to wrap around the edge of the acrylic to a distance of 25mm on the back side. ACP to be used at the back as per description mentioned in technical specification.					
		Illumination					

Schedule B - Face Mounted Signage							
BOQ Item No.	All Sizes	Item Description	Unit	Rate with taxes	Qty.		Amount with taxes
					1 Station	8 Stations	
		Providing and fixing the LED strips for proper illumination. Please see "Technical Specification" for LED Specification.					
		Above description generally holds good for the following signage unless otherwise specified except due modifications with special mention>>					
		Accessories: Providing and fixing all accessories such as nut-inserts, screws, rivets, bolts, washers, nuts, etc. complete as per drawing.>>					
	Sizes						
2.1.1 a	1500x300	Interior Identification Sign - Ticket Office	Nos.		2	16	
2.1.1 b	2100x300	Interior Identification Sign - Customer Care	Nos.		2	16	
2.1.1 c	600x300	Way to emergency exit	Nos.		8	64	
2.1.2		Face mounted sign, Non-illuminated, 1 sided					
	Drg. No.	2.1.2a,b					
		Providing and fixing non-illuminated signs including all operations from fabrication to installation all complete as per relevant drawings, technical specifications, signage schedule and to the satisfaction of the Engineer-in-Charge.>>					
		Sign Box					

Schedule B - Face Mounted Signage							
BOQ Item No.	All Sizes	Item Description	Unit	Rate with taxes	Qty.		Amount with taxes
					1 Station	8 Stations	
		The sign box 80mm wide shall be fabricated out of 2 mm thick aluminium extrusion channel of 25mm depth. The frame work is to be completed with internally blind revetting and brackets. Complete sign box is to be powder coated in RAL classic 7046.					
		Sign panel - 1 side Non-Illuminated face					
		Providing and fixing of sign panel on front side of sign box with 5mm thick Opal white acrylic. On front side, plotter cut blackout self adhesive vinyl as per specified Pantone Code should be applied over a translucent white vinyl. The entire sign panel face to be covered with a protective over-laminate to wrap around the edge of the acrylic to a distance of 25mm on the back side. ACP to be used at the back as per description mentioned in technical specification.					
		Above description generally holds good for the following signage unless otherwise specified except due modifications with special mention>>					
		Accessories: Providing and fixing all accessories such as nut-inserts, screws , rivets, bolts, washers, nuts, etc. complete as per drawing.>>					
	Sizes						
2.1.2a	1500x300	Lift to Ground/Concourse/Platform Sign	Nos.		8	64	

Schedule B - Face Mounted Signage							
BOQ Item No.	All Sizes	Item Description	Unit	Rate with taxes	Qty.		Amount with taxes
					1 Station	8 Stations	
2.1.2b	118 9x8 41	Area Map/System Map/AFC/Prohibited Items/Penalties/Evacuation Plan	Nos.		35	280	
2.1.3		Face mounted plate sign, Non-illuminated, 1 sided					
	Drg. No.	2.1.3a,b,c					
		Providing and fixing non-illuminated signs including all operations from fabrication to installation all complete as per relevant drawings, technical specifications, signage schedule and to the satisfaction of the Engineer-in-Charge.>>					
		Sign plate					
		Providing and fixing plate signs made in 2mm Aluminium brush finish sheet neatly trimmed and corners rounded and dressed with holes punched/drilled as per size given in drawing. Graphics to be plotter cut over self adhesive vinyl as per artwork and complete plate covered with an protective overlamine as specified and duly approved by Engineer-in-charge. Cost to include fixing of sign at location on to door/plastered surface/concrete/granite cladding/toughened glass etc., including all marking, alignment, drilling, plugs, Philips hexagonal head stainless steel screws and 3mm thick EPDM Rubber spacers etc complete as specified in drawings and at locations approved by the Engineer-in-charge >>					

Schedule B - Face Mounted Signage							
BOQ Item No.	All Sizes	Item Description	Unit	Rate with taxes	Qty.		Amount with taxes
					1 Station	8 Stations	
		Above description generally holds good for the following signage unless otherwise specified except due modifications with special mention>>					
		Accessories: Providing and fixing all accessories such as nut-inserts, screws , rivets, bolts, washers, nuts, etc. complete as per drawing.>>					
	Sizes						
2.1.3 a	297 x 210	Door names	Nos.		78	624	
2.1.3 b	210 x 300	Danger/Emergency Sign/Fire Hose	Nos.		8	64	
2.1.3 c	450 x 300	Restricted Entry	Nos.		4	32	
2.1.4		Face mounted opaque vinyl sticker, Non-illuminated, 1 sided					
	Drg. No.	2.1.4a,b,c					
		Providing and fixing non-illuminated signs including all operations from fabrication to installation all complete as per relevant drawings, technical specifications, signage schedule and to the satisfaction of the Engineer-in-Charge.>>					
		Sign Vinyl					

Schedule B - Face Mounted Signage							
BOQ Item No.	All Sizes	Item Description	Unit	Rate with taxes	Qty.		Amount with taxes
					1 Station	8 Stations	
		Providing and fixing graphics printed on opaque vinyl directly pasted on the glass surfaces. Printed over opaque self adhesive vinyl as per artwork and completed and laminated with protective overlamine as specified and duly approved by Engineer-in-charge. Cost to include fixing of sign at location on to glass surface including its cleaning, marking, alignment; complete as specified in drawings and at locations approved by the Engineer-in-charge					
		Above description generally holds good for the following signage unless otherwise specified except due modifications with special mention>>					
		Accessories: Providing and fixing all accessories such as nut-inserts, screws , rivets, bolts, washers, nuts, etc. complete as per drawing.>>					
	Size s						
2.1.4 a	150 x225	<i>Lift Statutory</i>	Nos.		16	128	
2.1.4 b	297 x210	<i>Danger/Fire Hose</i>	Nos.		6	48	
2.1.4 c	450 x300	<i>Danger/Restricted Area</i>	Nos.		2	16	
2.1.5		Face mounted vinyl sign, Non-illuminated, 1 sided					
	Drg. No.	2.1.5a,b,c					

Schedule B - Face Mounted Signage							
BOQ Item No.	All Sizes	Item Description	Unit	Rate with taxes	Qty.		Amount with taxes
					1 Station	8 Stations	
		Providing and fixing non-illuminated signs including all operations from fabrication to installation all complete as per relevant drawings, technical specifications, signage schedule and to the satisfaction of the Engineer-in-Charge.>>					
		Sign Plate					
		Providing and fixing frame signs made in 4mm thick ACP sheet, fabricated as tray with a 29mm return with corners joined on inside with silicon sealant and neatly finished on outside and mounted on a frame made out of 3mm thick MS fabricated equal angels 25x25 powder coated to match colour Grey. Printed graphics over self adhesive vinyl as per artwork to be pasted on the sign face wrapped on the sides and complete plate covered with an protective overlamine as specified and duly approved by Engineer-in-charge. Cost to include fixing of sign at location on to plastered surface/concrete/Granite cladding/column etc.,					
		Above description generally holds good for the following signage unless otherwise specified except due modifications with special mention>>					
		Accessories: Providing and fixing all accessories such as nut-inserts, screws , rivets, bolts, washers, nuts, etc. complete as per drawing.>>					

Schedule B - Face Mounted Signage							
BOQ Item No.	All Sizes	Item Description	Unit	Rate with taxes	Qty.		Amount with taxes
					1 Station	8 Stations	
	Size s						
2.1.5 a	300 x475	Safety Messages-ESP/Emergency Help Point	Nos.		4	32	
2.1.5 b	450 x700	Safety Messages-Surveillance	Nos.		6	48	
2.1.6		Face mounted transparent vinyl sticker, Non-illuminated, 1 sided					
	Drg. No.	2.1.6a					
		Providing and fixing non-illuminated signs including all operations from fabrication to installation all complete as per relevant drawings, technical specifications, signage schedule and to the satisfaction of the Engineer-in-Charge.>>					
		Sign Face					
		Providing and pasting digitally printed signs on transparent self adhesive vinyl directly pasted on the backside of glass surfaces(contents seen from customer end), and applying frosted film on top of that, duly approved by Engineer-in-charge. Cost to include fixing of sign at location on to back surface of glass including its cleaning, marking, alignment; complete as specified in artwork drawings and at locations approved by the Engineer-in-charge					
		Above description generally holds good for the following signage unless otherwise specified except due modifications with special mention>>					
	Size s						

Schedule B - Face Mounted Signage							
BOQ Item No.	All Sizes	Item Description	Unit	Rate with taxes	Qty.		Amount with taxes
					1 Station	8 Stations	
2.1.6a	300 0x8 00	<i>TOM/EFO Counter</i>	Nos.		10	80	
2.1.7		Face mounted Channel letter, Illuminated, 1 sided					
	Drg. No.	2.1.7a,b					
		Providing and fixing illuminated letters and signs for respective stations including all operations from fabrication to installation all complete as per drawings, technical specifications and the satisfaction of the Engineer-In-Charge. All exterior signs shall be manufactured considering harsh outdoor conditions, weatherproofing techniques.					
		Letters					
		Letters made up of Korean Aluminium profiles of 18 gauge top and bottom part.					
		Letter Face					
		Plotter cut 3M vinyl of approved colour pasted on polycarbonate/acrylic.					
		Back and Side Channel					
		Back and side channel to be made of Aluminium profile of front part 26mm and back part of 80mm in which top part is mounted with acrylic.					
		Trim Caps					
		Trim caps of approved colour shall be provided as per the satisfaction of the Engineer-In-Charge.					
		Illumination					
		LED module with Electronic controllers and wiring with 3 years warranty of IP 68 grade.					

Schedule B - Face Mounted Signage							
BOQ Item No.	All Sizes	Item Description	Unit	Rate with taxes	Qty.		Amount with taxes
					1 Station	8 Stations	
		ACP					
		Above description generally holds good for the following signage unless otherwise specified except due modifications with special mention>>					
	Sizes						
2.1.7a	AS/SITE	Station Entry/Gable Entry Channel Letter	Sq.ft.		12	96	
						Total for Sch-B	

Schedule C- Post Mounted Signage							
BOQ Item No.	All Sizes	Item Description	Unit	Rate with taxes	Qty.		Amount with taxes
					1 Station	8 Stations	
3.1.1		Post mounted Sign, Non-Illuminated, 1 sided					
	Drg. No.	3.1.1a,b,c					
		Providing and fixing non-illuminated signs including all operations from fabrication to installation all complete as per relevant drawings, technical specifications, signage schedule and to the satisfaction of the Engineer-in-Charge.>>					
		Sign Box					
		The sign box 80mm wide shall be fabricated out of 2 mm thick aluminium extrusion channel of 25mm depth. The frame work is to be completed with internally blind revetting and brackets. Complete sign box is to be powder coated in RAL classic 7046.					
		Sign panel - 1 side Non-Illuminated face					
		Providing and fixing of sign panel on front side of sign box with 5mm thick Opal white acrylic. On front side, plotter cut blackout self adhesive vinyl as per specified Pantone Code should be applied over a translucent white vinyl. The entire sign panel face to be covered with a protective over-laminate to wrap around the edge of the acrylic to a distance of 25mm on the back side. ACP to be used at the back as per description mentioned in technical specification.					
		Post					

Schedule C- Post Mounted Signage							
BOQ Item No.	All Sizes	Item Description	Unit	Rate with taxes	Qty.		Amount with taxes
					1 Station	8 Stations	
		Providing a Sign post of 60mm dia NB 2 mm thick SS 316 Grade hollow sections including welded Base plate in 8mm thick SS Plate and as per drawing with concrete footing. The post shall closed with a 300 mm Dia and 150 mm thick approved stone or concrete as per the drawing to ensure a rigid connection at site. The post shall be always be a single continuous element without any joints. Cost to include all activities and temporary props used for a perfect vertical in plumb installation, shim Plates for adjustment of levels and filling the gap with concrete slurry etc required for fixing the sign in an external location.					
		Above description generally holds good for the following signage unless otherwise specified except due modifications with special mention>>					
		Accessories: Providing and fixing all accessories such as nut-inserts, screws , rivets, bolts, washers, nuts, etc. complete as per drawing.>>					
	Sizes						
3.1.1a	1189x84	Area Map/System Map/AFC/Prohibited Items/Penalties/Evacuation Plan (On Double Post)	Nos.		35	280	
3.1.1b	600x180	Single Line Map (On Single Post)	Nos.		14	112	
3.1.1c	450 x 800	Safety Measures (On Single Post)	Nos.		4	32	
3.1.1d	1800x600	Station name on platform sign (On Double Post)	Nos.		4	32	
3.1.1e		Single Post	Nos.		18	144	
3.1.1f		Double Post	Nos.		39	312	
						Total for Sche-C	

Schedule D- Floor Vinyl Signage							
BOQ Item No.	All Sizes	Item Description	Qty.				
			Unit	Rate with taxes	1 Station	8 Stations	Amount with taxes
4.1.1		Print on Self Adhesive flooring film					
	Drg. No.	4.1.1a,b,c,d,e,f					
		Providing and fixing non-illuminated signs including all operations from printing to installation all complete as per relevant drawings, technical specifications, signage schedule and to the satisfaction of the Engineer-in-Charge.>>					
		Sign Face					
		Providing and fixing graphics Printed on 3M self Adhesive Floor Vinyl as per artwork with Matt laminate, directly pasted on the floor surfaces. Completed as specified and duly approved by Engineer-in-charge. Cost to include fixing of sign at location on to floor surface including its cleaning, marking, alignment, complete as specified in drawings and at locations approved by the Engineer-in-charge					
		Above description generally holds good for the following signage unless otherwise specified except due modifications with special mention>>					

Schedule D- Floor Vinyl Signage							
BOQ Item No.	All Sizes	Item Description			Qty.		
			Unit	Rate with taxes	1 Station	8 Stations	Amount with taxes
	Sizes						
4.1.1a	300x300	PwD Floor Vinyl	Nos.		2	16	
4.1.1b	140200 x100	Warning Strip Floor Vinyl	Nos.		2	16	
4.1.1c	1224 x370	Women Only Floor Vinyl	Nos.		8	64	
4.1.1d	516 x240	Women Zone Floor Vinyl	Nos.		2	16	
4.1.1e	2953 x1100	Coach Door Marking Floor Vinyl	Nos.		24	192	
						Total for Sch-D	

Schedule E- Street Signage							
BOQ Item No.	All Sizes	Item Description			Qty.		
			Unit	Rate with taxes	1 Station	8 Stations	Amount with taxes
5.1.1		Post mounted Sign, Non-Illuminated, 2 sided					
	Drg. No.	5.1.1a,b,c					
		Traffic Sign					
		Providing and fixing Non-illuminated signs including all operations from fabrication to installation all complete as per drawings, signage schedule and to the satisfaction of the Engineer-in- Charge. All exterior signs should be manufactured considering harsh outdoor conditions, weatherproofing techniques and materials shall be used.>>					
		Sign Face					
		Providing and fixing sign face panels 2 mm thick Aluminium sheet fabrication, Aluminium sheet fixed to sign structure. White retro-reflective vinyl pasted over edge to edge aluminium sheet. Graphics to be printed over white retro-reflective vinyl.					
		Sign Structure					

Schedule E- Street Signage							
BOQ Item No.	All Sizes	Item Description	Unit	Rate with taxes	Qty.		Amount with taxes
					1 Station	8 Stations	
		The sign plate to be fixed on MS Square section and provided with same material ties at centre of length welded to top and bottom member, provided with holes for fixing to the back surface. All fabrication shall be done using CNC machines. Complete mounting frame to be powder coated with RAL code duly approved by Engineer in-Charge. . >> The actual structural design of the sign for its stability shall be responsibility of the contractor including all civil work like foundation, etc as per the satisfaction of Engineer in-Charge.					
		Above description generally holds good for the following signage unless otherwise specified except due modifications with special mention>>					
		Accessories: Providing and fixing all accessories such as nut-inserts, screws , rivets, bolts, washers, nuts, etc. complete as per drawing.>>					
	Sizes						
5.1.1a	600 x600	International Symbol of Accessibility, Parking (Square)	Nos.		3	24	-
5.1.1b	800 x 800	Parking for Specially abled	Nos.		2	16	-
5.1.1c	600 x 600	Footpath, Cycle Track, Shared Cycle Track (Round)	Nos.		8	64	-

Schedule E- Street Signage							
BOQ Item No.	All Sizes	Item Description	Unit	Rate with taxes	Qty.		Amount with taxes
					1 Station	8 Stations	
5.1.1d	1500 x 700	Parking (AutoRickshaw, Cycle, Scooter, Taxi)	Nos.		10	80	-
5.1.1e	600 x 600, 600 x 200	No Parking (Picto, Text)	Nos.		2	16	-
5.1.1f	600 x 600, 600 x 450	Drop Off Bay- Specially Abled, No Parking (Picto, Text)	Nos.		3	24	-
5.1.1g	600 x 600, 600 x 200, 600 x 900	Drop Off Lane (Bus), No Parking (Picto, Text)	Nos.		2	16	-
5.1.1h	600 x 600, 600 x 200, 600 x 450	Drop Off Lane (Car, Taxi, Auto-Rickshaw), No Parking (Picto, Text)	Nos.		6	48	-
5.1.1i	450 x 600	Service Lane, FOB	Nos.		4	32	-
5.1.1j	450 x 600	Subway	Nos.			5	-
5.1.2		Post mounted Sign, Illuminated, 2 sided					
	Drg. No.	5.1.2a					

Schedule E- Street Signage							
BOQ Item No.	All Sizes	Item Description	Unit	Rate with taxes	Qty.		Amount with taxes
					1 Station	8 Stations	
		Providing and fixing illuminated and 2 sided totem in exterior areas of stations with NMRL Symbol close to the entrance visible from approach road including all operations from fabrication to installation all complete as per relevant drawings, technical specifications, signage schedule and to the satisfaction of the Engineer-in-charge.					
		Sign structure					
		The sign box 300mm deep shall be fabricated out of 6 mm thick MS sheet. The frame work is to be completed with internally blind revetting and brackets. Complete sign box is to be powder coated in RAL classic 7046.					
		Sign Panel :8mm thick 040 Acrylic fixed to the MS frame router cut and 15mm thick 040 Acrylic router cut according to logo profile.					
		Illumination					
		Providing and fixing the LED strips for proper illumination. Please see "Technical Specification" for LED Specification.					
		Post					

Schedule E- Street Signage							
BOQ Item No.	All Sizes	Item Description	Unit	Rate with taxes	Qty.		Amount with taxes
					1 Station	8 Stations	
		Providing a Sign post of 150mm dia NB 3 mm thick SS 316 Grade hollow sections including welded Base plate in 8mm thick SS Plate and as per drawing with Concrete footing. The post shall closed with a 300 mm Dia and 150 mm thick Sadarahalli Stone OR Concrete as per the drawing to ensure a rigid connection at site. Providing a 6A SPN MCB electrical junction box welded to the post as specified location and making holes in the post for passing the electrical cable. The Post shall be always be a single continuous element without any joints. Cost to include all activities and temporary props used for a perfect vertical in plumb installation, shim Plates for adjustment of levels and filling the gap with concrete slurry etc required for fixing the sign in an external location.					
		Foundation and Pedestal					

Schedule E- Street Signage							
BOQ Item No.	All Sizes	Item Description	Unit	Rate with taxes	Qty.		Amount with taxes
					1 Station	8 Stations	
		Providing and laying foundation for the Totem sign in PCC (concrete M20) including its compaction and all activities like Excavation, PCC base layer, Casting of holding down HTS anchor J bolts of 16mm dia using a sized template in MS 8mm thick for locating and accurate spacing of bolts as per drawing. Providing and fixing in position Sadarhalli stone of Dia. 300 x 1200mm pedestal in hand dressed rough finish surface in required size and shape as per drawing in 2 parts. Making cavity in stone for accommodating electrical box installing the two halves joined together by filling Plain cement concrete (M25) keeping a clear groove of 25mm wide recessed and finished as per drawing. 2mm thk SS clamps bolted and set into 3mm thk groove made 150mm from top and 200mm from bottom of the pedestal to keep it intact and flushed to face. The item cost includes cutting and opening the floor finish at location, and making good the location to the match the original finish after fixing and installation of sign >>					

Schedule E- Street Signage							
BOQ Item No.	All Sizes	Item Description	Unit	Rate with taxes	Qty.		Amount with taxes
					1 Station	8 Stations	
		Above description generally holds good for the following signage unless otherwise specified except due modifications with special mention>>					
		Accessories: Providing and fixing all accessories such as nut-inserts, screws , rivets, bolts, washers, nuts, etc. complete as per drawing.>>					
	Sizes						
5.1.2a	1060 x 4388	Totem	Nos.		2	16	-
						Total for Sch-E	-

Annexure II-A
(Toolkit For using E-Tender Portal of Pune Metro Rail Project)
TENDERING PROCEDURE

A] Tender Forms.

- i. Tender Forms can be purchased from the e-Tendering Portal of MAHA-METRO, i.e. <https://mahametrorail.etenders.in> after paying Tender Fees via online mode as Per the **Tender Schedule**.
- ii. Bidder should have valid class II/III digital signature certificates (DSC) obtain from any certifying authorities.
- iii. Bidder should install the Java and NxtCrypto service available on the Home Page of Download section URL :- <https://mahametrorail.etenders.in>

B] Pre-requisites to participate in the Tenders processed by MAHA-METRO:

- i. Enrolment of Contractors on Electronic Tendering System:
The Contractors interested in participating in the Tenders of MAHA-METRO processed using the Electronic Tendering System shall be required to enroll on the Electronic Tendering System to obtain User ID.

If the information is found to be complete, the enrolment submitted by the Vendor shall be approved automatically.

The Contractors may obtain the necessary information on the process of enrolment either from Helpdesk Support Team or may visit the information published under the link Help manual and tutorials on the Home Page of the Electronic Tendering System.

- ii. Obtaining a Digital Certificate:

The Bid Data that is prepared online is required to be encrypted and the hash value of the Bid Data is required to be signed electronically using a Digital Certificate (Class - II or Class -III). This is required to maintain the security of the Bid Data and also to establish the identity of the Contractor transacting on the System.

The Digital Certificates are issued by an approved Certifying Authority authorized by the Controller of Certifying Authorities of Government of India through their Authorized Representatives upon receipt of documents required to obtain a Digital Certificate.

Bid data / information for a particular Tender may be submitted only using the Digital Certificate which is used to encrypt the data / information and sign the hash value during the Tender Submission stage. In case during the process of preparing and submitting a Bid for a particular Tender, the Contractor loses his/her Digital Signature Certificate (i.e. due to virus attack, hardware problem, operating system problem); he / she may not be able to submit the Bid online.

Hence, the Users are advised to store his / her Digital Certificate securely and if possible, keep a backup at safe place under adequate security to be used in case of need.

In case of online tendering, if the Digital Certificate issued to an Authorized User of a Partnership Firm is used for signing and submitting a bid, it will be considered equivalent to a no objection certificate / power of attorney to that User to submit the bid on behalf of the Partnership Firm. The Partnership Firm has to authorize a specific individual via an authorization certificate signed by a partner of the firm (and in case the applicant is a partner, another partner in the same form is required to authorize) to use the digital certificate as per Indian Information Technology Act, 2000.

Unless the Digital Certificate is revoked, it will be assumed to represent adequate authority of the Authority User to bid on behalf of the Firm for the Tenders processed on the Electronic Tender Management System of Government of Maharashtra as per Indian Information Technology Act, 2000. The Digital Signature of this Authorized User will be binding on the Firm. It shall be the responsibility of Partners of the Firm to inform the Certifying Authority or Sub Certifying Authority, if the Authorized User changes, and apply for a fresh Digital Signature Certificate. The procedure for application of a Digital Signature Certificate will remain the same for the new Authorized User.

The same procedure holds true for the Authorized Users in a Private / Public Limited Company. In this case, the Authorization Certificate will have to be signed by the Director of the Company or the Reporting Authority of the Applicant.

For information on the process of application for obtaining Digital Certificate, the Contractors may visit the section Digital Signature Forms on the Home Page of the Electronic Tendering System.

iii. Recommended Hardware and Internet Connectivity:

To operate on the Electronic Tendering System, the Contractors are recommended to use Computer System with at least 1 GB of RAM and broadband connectivity with minimum 512 kbps bandwidth.

iv. Set up of Computer System for executing the operations on the Electronic Tendering System:

To operate on the Electronic Tendering System of MAHA-METRO, the Computer System of the Contractors is required be set up. The Contractors are required to install Utilities available under the section Downloads on the Home Page of the System.

The Utilities are available for download freely from the above-mentioned section. The Contractors are requested to refer to the Help manual and Tutorials available online on the Home Page to understand the process of setting up the System, or alternatively, contact the Helpdesk Support Team on information / guidance on the process of setting up the System.

C) The e-tender portal contains two section Technical Bid Submission & Financial Bid Submission.

- i. Technical Bid Section: - Technical Bid Section shall contain all Documents and enclosures as directed in NIT, ITT and EQ. Bidder shall upload the PDF copy of such documents in Technical Section only.
- ii. Financial Bid Section: - All prices/Commercial offers/ or any information pertain to commercial offer required by MAHA-METRO from the bidders, shall be filled/uploaded (If directed by MAHA-METRO) in Financial bid Section only.
- iii. No information pertaining to Financial Bid section should be uploaded/disclosed in Technical Bid Section or vice versa.

D) Steps to be followed by Contractors to participate in the e-Tenders processed by MAHA-METRO.

- i. Preparation of online Briefcase:

All Contractors enrolled on the Electronic Tendering System of MAHA-METRO are provided with dedicated briefcase facility to store documents / files in digital format. The Contractors can use the online briefcase to store their scanned copies of frequently used documents / files to be submitted as a part of their bid response. The Contractors are advised to store the relevant documents in the briefcase before starting the Tender Submission stage.

In case, the Contractors have multiple documents under the same type (e.g. multiple Work Completion Certificates) as mentioned above, the Contractors advised to either create a single .pdf file of all the documents of same type or compress the documents in a single compressed file in .zip or .rar formats and upload the same.

Note: Uploading of documents in the briefcase does not mean that the documents are available to MAHA-METRO at the time of Tender Opening stage unless the documents are specifically attached to the Tender during the Tender Submission stage.

- ii. Online viewing of Detailed Notice Inviting Tenders:

The Contractors can view the Detailed **Tender Notice (NIT)** along with the Time Schedule (Key Dates) for all the Live Tenders released by MAHA-METRO and **Eligibility Criteria (EQ)** on the home page of MAHA-METRO e-Tendering Portal on

<https://mahametrorail.etenders.in> under the section Online Tenders. Viewing & downloading the NIT & EQ is free of cost.

iii. Download of Tender Documents:

After going through the NIT & EQ, if bidder finds himself eligible for the bidding, he may purchase the complete bid document via online mode by paying the cost of Tender Document by Debit Card/Credit Card/ Net Banking as described on E-Tender Portal. After paying the cost of the document, bidder may download the complete bid documents.

iv. Online Submission of Bid:

- a. At the stage of EMD Payment which bidder has to pay online (as per requirement of tender as specified in BDS in ITB) using any one online pay mode as **RTGS , NEFT, Debit Card, Credit Card & Net Banking** or payment get way . For EMD payment, if bidder use NEFT or RTGS then system will generate a challan (in two Copies) with unique challan No specific to the tender. Bidder will use this challan in his bank to make NEFT/RTGS Payment against the challan.
- b. Bidder should ensure the payment of online EMD, 72 Hours (Excepting Holiday if any) prior to the final submission date of the Bid.*
- c. Bidder have the option to pay EMD either at the initial stage of submission of bid or at the final stage of submission of bid, when all mandatory formats/ documents filled/ uploaded.
- d. Bidder shall download the Complete Bid Document along with all Corrigendum/Addendum/Clarification etc. by logging in with E-Tender Portal using his DSC (i.e. DSC of POA/ Owner) & read the all tender Instruction & clauses carefully.
- e. For submission of Tender Document and Corrigendum, Tick (✓) Submission Process has been enabled in Technical section of E-Tender Portal of MAHA-METRO. Bidders have to tick (✓) the corresponding checkbox provided in the Technical Section of E-Tendering portal as a token of acceptance of these bid documents & corrigendum / Addendums. By clicking the tick (✓) the bid documents & corrigendum /addendum shall automatically attached to offer of bidder. Further bidder may proceed for submission by clicking submit button.
- f. If the bidder has completed the submission process of his bid before due date of submission and in between employer issue a corrigendum, in this circumstances the bidder has to re-submit his bid by “clicking tick (✓)” to the new added corrigendum, in case the new corrigendum has any implications to his already submitted bid. Bidder may, at his option, amend his bid accordingly & re-submit it.
- g. Physical Sign & seal of bidder on each page of Bid Documents available online is not required.
- h. All required enclosures as per bid document shall be uploaded in “Technical Envelope” / “Technical Section” of E-Tender portal by using DSC of bidder.
- i. The “Technical Envelope” / “Technical Section” of E-Tender portal has been provided with facilities to upload a file of maximum size of 10 MB only at each entity.

- j. If bidder are desirous to upload a file more than 10mb size , he shall spilt the file in two or more parts of 10mb or lesser than 10mb each and can upload the same at appropriate **Technical Template** or **“Additional Document”** section of **“Technical Envelope/section”** of E-Tender Portal.

Note:-

- * **Realization of NEFT/RTGS payment normally takes 24 hours, so it is advised to make Sure that NEFT/RTGS payment activity should be completed well before time.**
- * **NEFT/RTGS option will be depend on the amount of EMD.**
- * **Help File regarding use of e-Payment Gateway can be downloaded from e-Tendering Portal.**

- v. Short listing of Contractors for Financial Bidding Process:

The Tendering Authority will first open the Technical Bid documents of all Contractors and after scrutinizing these documents will shortlist the Contractors who are eligible for Financial Bidding Process. The shortlisted Contractors will be intimated by email.

- vi. Opening of the Financial Bids:

The Contractors may remain present in the Office of the Tender Opening Authority at the time of opening of Financial Bids.

- vii. Tender Schedule (Key Dates):

All the online activities are time tracked and the Electronic Tendering System enforces time-locks that ensure that no activity or transaction can take place outside the Start and End Dates and Time of the stage as defined in the Tender Schedule.

At the sole discretion of the Tender Authority, the time schedule of the Tender stages may be extended.

Note: - For details illustrations, please refer or down load the PPT demonstration available on E-Tender portal of <https://mahametrorail.etenders.in>

Terms and Conditions for Online-Payments

The Terms and Conditions contained herein shall apply to any person ("User") using the services of MAHA-METRO, hereinafter referred to as "Merchant", for making Tender fee and Earnest Money Deposit (EMD) payments through an online Payment Gateway Service ("Service") offered by ICICI Bank Ltd. in association with E Tendering Service provider and Payment Gateway Service provider through MAHA-METRO website i.e. <https://mahametrorail.etenders.in> Each User is therefore deemed to have read and accepted these Terms and Conditions.

Privacy Policy:

The Merchant respects and protects the privacy of the individuals that access the information and use the services provided through them. Individually identifiable information about the User is not willfully disclosed to any third party without first receiving the User's permission, as covered in this Privacy Policy.

This Privacy Policy describes Merchant's treatment of personally identifiable information that Merchant collects when the User is on the Merchant's website. The Merchant does not collect any unique information about the User (such as User's name, email address, age, gender etc.) except when you specifically and knowingly provide such information on the Website. Like any business interested in offering the highest quality of service to clients, Merchant may, from time to time, send email to the User and other communication to tell the User about the various services, features, functionality and content offered by Merchant's website or seek voluntary information from The User.

Please be aware, however, that Merchant will release specific personal information about the User if required to do so in the following circumstances:

- a) In order to comply with any valid legal process such as a search warrant, statute, or court order, or available at time of opening the tender.
- b) if any of User's actions on our website violate the Terms of Service or any of our guidelines for specific services, or
- c) to protect or defend Merchant's legal rights or property, the Merchant's site, or the Users of the site or;
- d) to investigate, prevent, or take action regarding illegal activities, suspected fraud, situations involving potential threats to the security, integrity of Merchant's website/offerings. General

Terms and Conditions for E-Payment

1. Once a User has accepted these Terms and Conditions, he/ she may register on Merchant's website and avail the Services.

2. Merchant's rights, obligations, undertakings shall be subject to the laws in force in India, as well as any directives/ procedures of Government of India, and nothing contained in these Terms and Conditions shall be in derogation of Merchant's right to comply with any law enforcement agencies request or requirements relating to any User's use of the website or information provided to or gathered by Merchant with respect to such use. Each User accepts and agrees that the provision of details of his/ her use of the Website to regulators or police or to any other

3.

4. in order to resolve disputes or complaints which relate to the Website shall be at the absolute discretion of Merchant.

5. If any part of these Terms and Conditions are determined to be invalid or unenforceable pursuant to applicable law including, but not limited to, the warranty disclaimers and liability limitations set forth herein, then the invalid or unenforceable

provision will be deemed superseded by a valid, enforceable provision that most closely matches the intent of the original provision and the remainder of these Terms and Conditions shall continue in effect.

6. These Terms and Conditions constitute the entire agreement between the User and Merchant. These Terms and Conditions supersede all prior or contemporaneous communications and proposals, whether electronic, oral, or written, between the User and Merchant. A printed version of these Terms and Conditions and of any notice given in electronic form shall be admissible in judicial or administrative proceedings based upon or relating to these Terms and Conditions to the same extent and subject to the same conditions as other business documents and records originally generated and maintained in printed form.

5. The entries in the books of Merchant and/or the Payment Gateway Service Providers kept in the ordinary course of business of Merchant and/or the Payment Gateway Service Providers with regard to transactions covered under these Terms and Conditions and matters therein appearing shall be binding on the User and shall be conclusive proof of the genuineness and accuracy of the transaction.

6. Refund for Charge Back Transaction: In the event there is any claim for/ of charge back by the User for any reason whatsoever, such User shall immediately approach Merchant with his/ her claim details and claim refund from Merchant alone. Such refund (if any) shall be affected only by Merchant via payment gateway or by means of a demand draft or such other means as Merchant deems appropriate. No claims for refund/ charge back shall be made by any User to the Payment Gateway Service Provider(s) and in the event such claim is made it shall not be entertained.

7. In these Terms and Conditions, the term "**Charge Back**" shall mean, approved and settled credit card or net banking purchase transaction(s) which are at any time refused, debited or charged back to merchant account (and shall also include similar debits to Payment Gateway Service Provider's accounts, if any) by the acquiring bank or credit card company for any reason whatsoever, together with the bank fees, penalties and other charges incidental thereto.

8. Refund for fraudulent/duplicate transaction(s): The User shall directly contact Merchant for any fraudulent transaction(s) on account of misuse of Card/ Bank details by a fraudulent individual/party and such issues shall be suitably addressed by Merchant alone in line with their policies and rules.

9. Server Slow Down/Session Timeout: In case the Website or Payment Gateway Service Provider's webpage, that is linked to the Website, is experiencing any server related issues like 'slow down' or 'failure' or 'session timeout', the User shall, before initiating the second payment,, check whether his/her Bank Account has been debited or not and accordingly resort to one of the following options:

- i. In case the Bank Account appears to be debited, ensure that he/ she does not make the payment twice and immediately thereafter contact Merchant via e-mail or any other mode of contact as provided by Merchant to confirm payment.
- ii. In case the Bank Account is not debited, the User may initiate a fresh transaction to make payment.

However, the User agrees that under no circumstances the Payment Gateway Service Provider shall be held responsible for such fraudulent/duplicate transactions and hence no claims should be raised to Payment Gateway Service Provider. No communication received by the Payment Gateway Service Provider(s) in this regard shall be entertained by the Payment Gateway Service Provider.

Limitation of Liability

1. Merchant has made this Service available to the User as a matter of convenience. Merchant expressly disclaims any claim or liability arising out of the provision of this Service. The User agrees and acknowledges that he/ she shall be solely responsible for his/ her conduct and that Merchant reserves the right to terminate the rights to use of the Service immediately without giving any prior notice thereof.
2. Merchant and/or the Payment Gateway Service Providers shall not be liable for any inaccuracy, error or delay in, or omission of (a) any data, information or message, or (b) the transmission or delivery of any such data, information or message; or (c) any loss or damage arising from or occasioned by any such inaccuracy, error, delay or omission, non-performance or interruption in any such data, information or message. Under no circumstances shall the Merchant and/or the Payment Gateway Service Providers, its employees, directors, and its third party agents involved in processing, delivering or managing the Services, be liable for any direct, indirect, incidental, special or consequential damages, or any damages whatsoever, including punitive or exemplary arising out of or in any way connected with the provision of or any inadequacy or deficiency in the provision of the Services or resulting from unauthorized access or alteration of transmissions of data or arising from suspension or termination of the Services.
3. The Merchant and the Payment Gateway Service Provider(s) assume no liability whatsoever for any monetary or other damage suffered by the User on account of:
 - (i) the delay, failure, interruption, or corruption of any data or other information transmitted in connection with use of the Payment Gateway or Services in connection thereto; and/ or
 - (ii) any interruption or errors in the operation of the Payment Gateway.
4. The User shall indemnify and hold harmless the Payment Gateway Service Provider(s) and Merchant and their respective officers, directors, agents, and employees, from any claim or demand, or actions arising out of or in connection with the utilization of the Services.

The User agrees that Merchant or any of its employees will not be held liable by the User for any loss or damages arising from your use of, or reliance upon the information contained on the Website, or any failure to comply with these Terms and Conditions where such failure is due to circumstance beyond Merchant's reasonable control.

Miscellaneous Conditions:

Any waiver of any rights available to Merchant under these Terms and Conditions shall not mean that those rights are automatically waived.

1. The User agrees, understands and confirms that his/ her personal data including without limitation details relating to debit card/ credit card transmitted over the Internet may be

susceptible to misuse, hacking, theft and/ or fraud and that Merchant or the Payment Gateway Service Provider(s) have no control over such matters.

2. Although all reasonable care has been taken towards guarding against unauthorized use of any information transmitted by the User, Merchant does not represent or guarantee that the use of the Services provided by/ through it will not result in theft and/or unauthorized use of data over the Internet.
3. The Merchant, the Payment Gateway Service Provider(s) and its affiliates and associates shall not be liable, at any time, for any failure of performance, error, omission, interruption, deletion, defect, delay in operation or transmission, computer virus, communications line failure, theft or destruction or unauthorized access to, alteration of, or use of information contained on the Website.
4. The User may be required to create his/ her own User ID and Password in order to register and/ or use the Services provided by Merchant on the Website. By accepting these Terms and Conditions the User agrees that his/ her User ID and Password are very important pieces of information and it shall be the User's own responsibility to keep them secure and confidential. In furtherance hereof, the User agrees to;
 - i. Choose a new password, whenever required for security reasons.
 - ii. Keep his/ her User ID & Password strictly confidential.
 - iii. Be responsible for any transactions made by User under such User ID and Password.

The User is hereby informed that Merchant will never ask the User for the User's password in an unsolicited phone call or in an unsolicited email. The User is hereby required to sign out of his/ her Merchant account on the Website and close the web browser window when the transaction(s) have been completed. This is to ensure that others cannot access the User's personal information and correspondence when the User happens to share a computer with someone else or is using a computer in a public place like a library or Internet cafe.

Debit/Credit Card, Bank Account Details

1. The User agrees that the debit/credit card details provided by him/ her for use of the aforesaid Service(s) must be correct and accurate and that the User shall not use a debit/ credit card, that is not lawfully owned by him/ her or the use of which is not authorized by the lawful owner thereof. The User further agrees and undertakes to provide correct and valid debit/credit card details.
2. The User may make his/ her payment (Tender Fee/Earnest Money deposit) to Merchant by using a debit/credit card or through online banking account. The User warrants, agrees and confirms that when he/ she initiates a payment transaction and/or issues an online payment instruction and provides his/ her card / bank details:
 - i. The User is fully and lawfully entitled to use such credit / debit card, bank account for such transactions;
 - ii. The User is responsible to ensure that the card/ bank account details provided by him/ her are accurate;

- iii. The User is authorizing debit of the nominated card/ bank account for the payment of Tender Fee and Earnest Money Deposit
- iv. The User is responsible to ensure sufficient credit is available on the nominated card/ bank account at the time of making the payment to permit the payment of the dues payable or the bill(s) selected by the User inclusive of the applicable Fee.

Personal Information

1. The User agrees that, to the extent required or permitted by law, Merchant and/ or the Payment Gateway Service Provider(s) may also collect, use and disclose personal information in connection with security related or law enforcement investigations or in the course of cooperating with authorities or complying with legal requirements.
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Maharashtra Metro Rail Corporation Limited

(A Joint Venture of Government of India and Government of Maharashtra)

PUNE METRO RAIL PROJECT

Design of Graphics, Fabrication, Supply, Installation, Testing and Commissioning of Signage of 4 stations viz. Dapodi, Bopodi, Khadki & Range Hill of Reach 01 and 4 stations viz. Deccan Gymkhana, Sambhaji Park, PMC & Civil Court Elevated of Reach 02 of Pune Metro Rail Project.

TENDER NO.

P1 Misc-28/2022

PART II: WORK REQUIREMENTS

Scope of Work:

General Scope of the proposed Supply and Installation (including manufacturing & fabrication) works of Signage and Graphics including all transportation, loading and unloading, etc. is as below:

The contractor will procure materials, manufacture, finish, print, assemble, execute illumination, install and erect the signages at the designated locations within the specified time(s) based on designs, specifications and drawings provided by the Employer/Engineer for Signage and Graphic Design for Pune Metro Rail Project.

System wide color specifications:

Pantone Codes as approved by Maha-Metro:

All the Signage and Graphics for Pune Metro Rail Project shall use the following colors **Vinyl Films**: Vinyl films have been developed with manufacturers for the specific shades, with the desired specification for a minimum performance requirement. The Engineer shall use these films for all the signage execution after approval. All material and execution of vinyl films shall conform to the detailed technical specifications and notes for quality of workmanship given in this document. The Engineer-In-charge shall approve any other color used in vinyl films prior to its use.

Powder Coating: All powder coating shall conform to the detailed technical specifications and notes for quality of workmanship given in this document

Painting: All painting shall conform to the detailed technical specifications and notes for quality of workmanship given in this document.

Printing: The Employer/Engineer shall duly approve Printing of graphics for information and safety signs shall be done as per specified printing process and workmanship quality as described in this document and approved samples of all colors. Every batch of printing shall be approved for color matching.

All Materials and their workmanship specifications:

For all other material required for the works, the approval of the Engineer shall be obtained by the Contractor prior to the use of the material in the works

Contractors are expected to provide the standard warranty and the invoices from the manufacturers covering all the materials used.

1 Acrylic

- 1.1 White Cast acrylic sheets with 40% light transmission shall be used as face of all illuminated signs.
- 1.2 The acrylic should have excellent weather-ability and UV stability for min 10 years.
- 1.3 Acrylics made from virgin polymers shall be used for the sign faces.
- 1.4 A 8mm thick Acrylic sheet is proposed for illuminated sign faces with a +/- 0.6mm tolerance for the thickness.
- 1.5 Approved make shall be as per the list below or equivalent duly approved based on a sample presented to Employer/Engineer.
 - Perspex® from Lucite®
 - SHINKOLITE PX cast acrylic sheet developed by Mitsubishi Rayon Co., Ltd.
 - Plexiglas from Evonik industries

2 Polycarbonate

- 2.1 All polycarbonate sheets should be UV stabilized outdoor grade
- 2.2 No visual defects are allowed by inspection from a close inspection and the material should offer a min 10 years warranty against yellowing and loss of light transmission.
- 2.3 Approved make shall be as per the list below or equivalent duly approved based on a sample presented to Employer / Engineer.

3 Workmanship for both Acrylic and Polycarbonate

- 3.1 The surfaces of Acrylic come covered with a masking film on both surfaces for protection during transport, storage and fabrication. The masking film should be left in place during fabrication work and all marking-out drawn on the film. It is recommended not to remove the marking film until necessary to prevent dust collection and accidental surface scoring or scratching. However, care should be taken not to have the surface scratched during handling.
- 3.2 Before pasting the vinyl graphics it is advised to wash the sheet surfaces to be decorated with clean, fresh water using a soft cloth. This has the advantage of removing all traces of static charge from the sheet after removal of the film which

might otherwise attract dust. For all general-purpose cleaning operations, acrylic should be washed simply with clean cold water to which a little detergent has been added. The use of any solvents such as methylated spirits, turpentine, white spirit or proprietary window cleaning products is neither necessary nor recommended.

- 3.3 Flatness of the sheets is very important for the signs to appear neat.
- 3.4 The cutting shall be done using powered saw to a tolerance of +/- 1mm. The edges shall be cleaned of any bur and chamfered to make the acrylic comfortably sit inside the frame.

4 Vinyl Films

4.1 Block out vinyl films

- 4.1.1 Cast films should to provide complete light blocking characteristics with less than 0.001% light transmission.
- 4.1.2 A luster/matt finish colour matching to Pantone 2768C and 382C or equivalent or as approved by Maha-Metro on the outside and uniformly white on the adhesive side
- 4.1.3 A cast vinyl face film of thickness between 100 to 130 micron, with clear acrylic based permanent pressure sensitive adhesive.
- 4.1.4 The film shall provide strong adhesion to a wide variety of substrates with perfect dimensional stability and perform well as second surface media.
- 4.1.5 The films should have self-extinguishable property.
- 4.1.6 Should have a performance guarantee against colour fading, peeling, cracking

4.2 Translucent Vinyl film

- 4.2.1 Translucent Graphic Film to allow light transmission
- 4.2.2 Cast vinyl film of thickness (0.05 mm) with clear pressure sensitive adhesive
- 4.2.3 A cast vinyl film with a clear, permanent, pressure-sensitive adhesive and a translucent synthetic liner that does not split if wet
- 4.2.4 The films should have self-extinguishable property.
- 4.2.4 Should have a performance guarantee against color fading, peeling, cracking
- 4.2.5 Should be able to withstand temperatures in the range -45° to +77°C

4.3 Protective over-laminate

Shall be a luster/semi-matt cast films resistant to chemicals and abrasion while cleaning.

All other following listed below products, will have to be used with a maximum life specified within the range manufactured by supplier and all warranties for the above products shall apply.

4.4 Diffuser films

4.5 Frosted vinyl

4.6 Printable vinyl

4.7 Opaque vinyl

4.8 Printable floor application

4.9 Floor laminate

4.10 Photoluminescent

4.11 Suggested product names for various products from approved manufacturer

- 1) 3M or equivalent with the approval of Employer/Engineer
- 2) Avery (Optional with pre approval from Maha-Metro) or equivalent with the approval of Employer/Engineer

Specifications (Primary and Compulsory)	
Specification	Color/Feature
3630-126 DK EME GREN 48INX50YD	Purple colour or as approved
3630-236 48IN X 50YD	Turquoise or as approved
3630-124 BURNTORANGE 48INX50YD	Burnt Orange or as approved
3630-57 48"X50Y O.BLUE	Olympic Blue or as approved
3635-100 Light Enhancement	Light Enhancement Film or as approved
3635-22B BLACK BLOCKOUT MATTE	Black Block Out Film or as approved
3635-20B 48"X50Y WHITE	White Block Out Film or as approved
3635-30 48"X50Y Diffuser Film	Diffuser Film or as approved
Matte Overlamine 3660M	Overlamine for Color Vinyl or as approved
180C-10 Printable Film	Printable Film or as approved
8520 Matte Over lamination	Over lamination for 180C-10 or as approved

Specifications			
Alternate Selection (Optional with pre approval from Maha-Metro)			
Equivalent Shade	Block Out	Translucent Vinyl	Warranty
3435 C or as approved	5300/ 205A Green	5500 QM/4120A Green	5 Years
3272 C or as approved	5300/ 204A Green	5500 QM/4121A Green	5 Years
306 C or as approved	5300/203A Blue	5500 QM/4122A Blue	5 Years

All the vinyl film shall be from the approved vendor/supplier and shall be approved by the Employer/Engineer before ordering.

5 Workmanship for Vinyl pasting (Plotter cut Vinyl sheet graphics/text)

- 5.1 Vinyl shall be pasted on Acrylic sheets and on ACM after removing the masking film.
- 5.2 Proper preparation of application surface is essential to obtain high quality and long-lasting markings.
- 5.3 Application:
 - 5.3.1 Clean the substrate as per recommendation of vinyl manufacturer.
 - 5.3.2 Remove entire liner from adhesive side of film.
 - 5.3.3 Align the film and press one edge to surface with finger.
 - 5.3.4 With a squeeze, apply remaining film using overlapping strokes. Hold the film away from surface to avoid pre adhesion.
- 5.4 The plotted vinyl sheet should be applied to the substrates with the use of approved application tape to insure correct placement and accuracy.

Vinyl application should be done in a dust free environment.

5.5 Remove pre-mask:

Remove application film from the face of the film by pulling tape back upon itself at a 180-degree angle. Application film should be removed after 24 hours of application.

5.6 Re-squeeze all edges to prevent edge lifting. This must be done after application of film removal. Use firm even pressure. If not thoroughly re squeezed after pre mask removal, the adhesion at edges of film loosened by pre mask removal may start peeling off due to dirt or moisture and subsequently lift or be susceptible to damage from pressure washing.

5.7 For all the sign faces - the film should be wrapped around the edge of acrylic with up to a min distance of 25mm on all sides.

5.8 Remove entrapped air:

All film pasting on the surface including the over laminate should be free from air bubbles. Inspect the film in flat areas for bubbles. To eliminate the bubbles, puncture the film at one end of the bubble with a pin and press the entrapped air with the thumb or squeeze or moving towards the puncture.

5.9 Self matching and complementing films should be used for all situations involving layers of films laminated in a single sign.

5.10 The graphics for the Blockout Vinyl sheet should be plotted in accordance with specified artwork accurately on a computerized plotter cutter. The edges of the plotter cut vinyl sheet should be clean and smooth. Vinyl sheet should be plotted in a dust free environment.

5.11 The final applied graphics shall be free from any kinds of wrinkles, air bubbles and placement/orientation problems.

5.12 Contractors are expected to provide the standard warranty and the invoices from the vinyl manufacturers covering all the vinyl used.

6 Printing

6.1 The graphics and text of the signage system shall be printed with inkjet printers

6.2 Ink type: solvent ink, designed for 2 years outdoor application

6.3 Provide a hard lamination film to resist scuffing, scratching

6.4 Ink color: cyan, magenta, yellow, black

6.5 Same colours of the signages shall be uniform as specified and shall not vary from sign to sign. Printer has to get approval on all printed colours in graphics matching to specified colours and submit 3 copies of each swatch 100mm X 100mm

6.6 Facility of printing directly onto a variety of specially treated vinyls and other materials

6.7 Machine to accommodate media widths of up to 62 inches and offers resolution of 300dpi

6.8 Graphics and text shall be without any ink bleeding and smudging

6.9 The printer agrees to produce and maintain high quality standards

7 Aluminum Composite Material (ACM/ACP) :

7.1 Composition:

Low-density polyethylene (LDPE) core sandwiched between two skins of aluminum alloy.

For exterior signs Overall thickness of ACM/ACP: 4 mm

7.2 Surface Finish:

7.2.1 Front side: Factory pre-finished by the manufacturer with a PVDF Kynar 500(70:30) or LUMIFLON or DURAGLOSS 5000 or equivalent based coating by presenting a sample to the Employer / Engineer.

- The finished surface shall be factory protected with a self-adhesive peel-off-foil.
- Peel-off-foil to withstand at least 6 months exposure to local weather condition without losing the original peel off characteristic or causing stains or other damages to the painted panel surface.

7.2.2 Reverse side: Reverse side of the panel surface shall be coated in a factory applied protection lacquer or protective primer, without protective peel-off-foil. Total dry-film thickness of the protection lacquer/ protective primer shall be minimum 4 microns or mill finish if Marine grade Aluminum EN-AW-5005A (AlMg-1)/ EN-AW-3004 (AlMn1Mg1) is used.

7.3 Colour Definitions:

The approved colour panel to be used in all signs shall be approved prior to its use by presenting a sample to the Employer / Engineer.

7.4 Warranty:

ACM/ACP manufacturer shall provide a 10 (TEN) years Warranty against defects such as but not limited to:

- De-lamination.
- Color fading
- Loss of gloss.

For this purpose, Original of Manufacturer's Warranty certificate in the name of the contractor to be submitted with the bill.

7.5 Mandatory identification marks:

7.5.1 Each ACM/ACP panels shall bear markings as follows: On Peel-off-foil:

- Manufacturer's name/brand printed clearly for easy identification.
- Direction of grains for metallic colors, by way of an arrow.

The reverse side of the panel to have the following minimum information printed:

- Production batch identification number or Date & Time of production of ACM/ACP panel for establishing linkage with the batches.
- Any other information as per manufacturer's policy such as paint reference number etc.
- Manufacturer's name/brand printed clearly for easy identification.

7.6 General Conditions:

7.6.1 Contractor must ensure that ACM/ACP supplier shall provide technical assistance to the selected converters using their material. The training/ assistance to include advice on the use of appropriate equipment and hardware for ACM/ACP fabrication and installation. The training/ assistance to include training to the selected ACM/ACP converters' personnel in India/ Abroad, for correct methodology to be adopted for ACM/ACP fabrication and installation.

7.6.2. Employer / Engineer may ask for training schedule/ report from the converter and/ or manufacturer under (inter-alia) following conditions:

- Inability to produce designs as per specifications despite efforts on the part of the converter.
- If the workmanship of signage elements is found to be unacceptable/ poor.

- No further application of paint by means of any method shall be permitted after first painting of ACM/ACP at the manufacturer's factory. No repair/ touch-up of factory finished paint coated surface shall be permitted at any time. Employer/Engineer may reject such sign elements at no cost to PMRP.

7.7 ACM/ACP (Aluminum Composite material) panel should

conform to following standards:

Table			
S. No.	Description	Standard Test	Acceptable Value/Result
A.	Physical Tests For ACM/ACP		
1.	Overall Thickness of ACM/ACP	Visual Check/ Measurement as per QAP	4mm (± 0.2 mm) Exterior 3mm (± 0.2 mm) Interior

Table			
S. No.	Description	Standard Test	Acceptable Value/Result
2.	Aluminum Skin Thickness (each side)	Visual Check/ Measurement as per QAP	0.5mm(+0.04mm)/(-.025 mm) Exterior 0.25mm(+0.04mm)/(-.025 mm) Interior
3.	Panel weight (ACM/ACP)	Visual Check/ Measurement as per QAP	5.5 Kg/m ² ($\pm 5\%$) Exterior 3.8 Kg/m ² ($\pm 5\%$) Interior
B.	Mechanical Properties of ACM/ACP		
1.	Peel off strength Drum Peel Test	ASTM D 1781 or ASTM D 903	> 72 mmN/mm or More than 4N/mm
C.	Properties of Aluminum Skin		
1.	Tensile strength (Rm)	ASTM E8	Minimum 110 N/mm ²
2.	Modules of elasticity	ASTM E8	Min 68000 N/mm ²
3.	Elongation	ASTM E8	A5 2%
4.	0.2% proof stress	ASTM E8	Minimum 100 N/mm ²
D.	Properties of Paint Finish (Front Side Only)		
1.	Coating Type	Using FTIR (instrument) or chemical method	DURAGLOSS - Cycloaliphatic Polymer Resin Cross-Linked with a specific melamine blend LUMIFLON - Fluoro Ethylene Alkyl Vinyl Ether PVDF - polyvinylidene difluoride
2.	D.F.T. (Dry Film Thickness) of paint	ASTM D 1400 or ECCA T1	23.75 Micron to 45 Micron
3.	Specular Gloss	ASTM D 523 or ECCA T2	Solid Colors 25-40% Metallic Colors 20-35%
4.	Abrasion Resistance	ASTM D 968 or ASTM D 4060	>25 liters per unit < 45mg/ 1000 cycles (weight loss)
5.	Gloss Retention	ASTM 523 or ECCA T2	Min 60% (after 10 years)
6.	Color Retention	ASTM D 2244 or ECCA T3	5 units (Max.) over 4000 hrs.
7.	Chalk Resistance	ASTM D4214 or ECCA T14	Max rating 8 units after 4000 hrs.
8.	Adhesion	ASTM D3359 or ECCA T6	No adhesion loss permitted

8 CRCA (Cold Rolled Close Annealed) M.S. Sheets

The CRCA mild M.S sheets to be used in the work shall conform to IS 513 - normal D-grade type mild steel.

9 Fabrication work for CRCA Mild Steel sheets

- 9.1 The Metal handling and Fabrication work for CRCA Mild Steel sheets shall be got executed from a specialized agency.
- 9.2 CRCA mild Steel sheets Fabrication shall be executed with CNC bending, CNC Laser and punching machines with precise work control and quality generation. Besides the specified machines, the Metal handling and Fabrication must have in-house CO₂ welding and skilled CAD/CAM facilities, engineers and skilled and trained personnel and adequate storage facilities.
- 9.3 Sheet metal blanking shall be preferably done using laser cutting to save on material, reduce wastage, have less burr on cut blanks, speed of execution and achieve accuracy. All surfaces exposed to view shall be clean and free from dirt, stains, grease, scratches, distortion, waves, dents, buckles, tool marks, burrs and other defects which mark the appearance of finished work. Cutting edges shall be smooth and free from all defects.
- 9.4 All surfaces exposed to view shall be straight and true to lines or curves. Arises and angles shall be as sharp as practicable. Miter joints shall be formed in true alignment with profiles accurately intersecting and all joints carefully eased to a radius of approximately 1 mm unless otherwise shown. Metal corners shall be bent to the smallest radius possible without causing grain separation or otherwise impairing the work.
- 9.5 All exposed connections shall be formed with hairline joints flush and smooth. All face panels must be flat, true and free from weld stud witness or other surface imperfections/blemishes. Edges shall be machined and finished free from cutter marks (not guillotined). All fabrication should have dressed welds, bend radii, finish, permitted texture levels, squareness of construction, no twist or warp or sagging of shape.
- 9.6 The Tolerances in the fabrication work shall be as under:

Linear dimensions :	+/-
0.5 mm	
Hole and Slot Punches :	0.3 mm
Finished edge radius :	0.3 mm - 0.5 mm
- 9.7 If the work for sheet metal is done with specialized agency the contractor shall be required to submit to the PMRP copies of all the vouchers received from the approved fabricator and cheques/drafts paid by him to the approved fabricator as well as the copies of the documents establishing the excise paid by the fabricator for this work.
- 9.8 Finish for sheet metal 0.062" (1.6 mm) CRCA
- 9.9 Surfaces indicated "A" finished to match sample
- 9.10 Surfaces without identification or indicated "C" to be unfinished.
- 9.11 Parts to be free of visible defects on "A" and "B" surfaces.
- 9.12 Flat surfaces to have: Flatness tolerance of 0.05 mm per 25 mm. Not to exceed 0.50 mm over the entire surface.
- 9.13 Each Part to be approved by Employer / Engineer prior to production.
- 9.14 Definitions:
 - "A" surface: The top or front, most often viewed surface by consumer.
 - "B" surface: Generally, the front edge/sides or back/bottom of a part. Not viewed as often as an "A" surface.
 - "C" surface: Internal surfaces. Part surfaces not normally seen. Normally "C" surfaces are not inspected for cosmetic attributes.

10 Aluminum Sections:

- 10.1 Aluminum plates and extrusion sections of 2mm thickness shall conform to Aluminum alloy of grade 63400 WP of IS-733.

- 10.2 sections shall be used, which secure type is requiring a special tool to open. Image included below for reference.
- 10.3 These sections shall be capable to hold a total infill panel up to a maximum thickness of 8mm and shall have the rigidity to make A0 size panel frames.
- 10.4 All sections shall be perfectly straight, free from surface damages, bends and twists.
- 10.5 Bent profiles shall not be forcefully straightened.
- 10.6 Straightness tolerance shall not exceed of 1.5mm per 1000 mm.

11 Structural Steel

All structural steel shall be of tested quality and shall conform to one of the following standards:
IS:226 Structural steel (Standard Quality)
IS:2062 Structural steel (Fusion welding quality) Grade A (1992)
IS:961 High Tensile Structural Steel (Ordinary)
IS:1161 Steel Tubes for Structural purposes Grade B (1992)
IS:4923 Hollow steel sections for Structural use

The Contractor shall supply to the Employer/Engineer copies of the manufacturer certificate that the steel brought to the site for incorporation in the works is of a quality fully complying with the specification. If required by the Employer/Engineer, the Contractor shall arrange for testing of the steel samples as per IS:1608 - 1599.

12 Welding Electrodes:

Welding electrodes used for the works shall conform to IS:814/latest and shall be supplied by manufacturer approved by the Employer/Engineer and shall be of the grade approved by the Employer/Engineer. All Electrodes shall be kept under dry conditions. Any electrode which has part of its flux coating broken away or is damaged shall be rejected.

13 Bolts and Nuts

Bolts and nuts used for the works shall unless otherwise specified be black bolts and nuts supplied by manufacturer approved by the Engineer and shall conform to IS:1367 and 1367 (1980) For the truss hot-dip galvanized (@300 gm/sqm) bolt sleeve of mild steel grade 'B' conforming to IS:2062 and 4 dia. 12mm anchor bars welded to same as per detailed drawing and instruction of the engineer shall be provided. The Length and diameter of sleeve shall be 300mm and 60mm respectively. The sleeve shall receive hexagon head bolt IS:1363 (part-I)- ISO 4016-M-20x90-8.8. Hexagon head bolt shall be provided with galvanized spring washer as per the detailed drawing and instruction of the Engineer.

14 Washers

Plain washers shall be made of mild steel conforming to IS:5369 (1975), unless otherwise specified. One washer shall be supplied with each bolt and, in case of special types of bolts, more than one washer as needed for the purpose shall be supplied. An additional double coil helical spring washer, conforming to IS:6755 (1980), shall be provided for bolts carrying dynamic or fluctuating loads and those in direct tension. Tapered washers, conforming to IS:5372 (1975) and IS:5374 (1975), shall be used for channels and beams respectively wherever required.

15 Structural steel works:

- 15.1 These specifications shall be read in conjunction with the CPWD specifications 1996 and other relevant reference specifications described in the section 1 of these specifications.

The Contractor will provide all materials and equipment required to complete the works in every respect, whether such materials are required as part of the permanent structures or temporary for fabrication or erection or maintenance

including specifically structural steel plates, flats, bars, welding rods, rivets, bolts and nuts, paint, welding sets in the shop and at site, all workshop facilities, derricks, cranes, pulley blocks, wire ropes, hemp or manila ropes, winches, erection cleats and temporary braces or supports and all other materials required to deliver the Works complete in every respect.

All labour required for fabrication and erection for any cleaning, making good, rectifying, hauling, painting and for any other ancillary work required to complete fabrication and erection.

The Contractor shall observe all safety requirements for erection of structural steelwork as covered in IS:7205.

15.2 Drawings:

- 15.2.1 The Engineer will supply to the Contractor profile drawings showing sizes of all structural members and typical connection details. (Annexure-3)
- 15.2.2 Should there be any discrepancy in the drawings the Contractor is to refer the matter to the Engineer. The Contractor shall further provide a drawing showing the accurate setting out to line and level of all the anchor bolts intended for the work in sufficient time for their inclusion in the work so as to maintain the building program.
- 15.2.3 The Contractor is to prepare all the necessary fabrication shop drawings and these shall be submitted to the Engineer in duplicate and be approved by him before fabrication is commenced. All such drawings shall show the dimensions of all parts, method of construction, welding and bolting. A further set of all approved fabrication drawings shall be supplied by the Contractor for use of the Engineer as required.
- 15.2.4 Approval by the Engineer of drawings or any other particulars submitted by the Contractor shall not relieve the Contractor of full responsibility for any discrepancies, errors or omissions therein. The Contractor shall at his own expense supply such additional copies of his working drawings as are required for the use of the interested parties.

15.3 Workmanship and Fabrication:

- 15.3.1 For all the works, workmanship shall be of first class quality, throughout, in conformity with IS:800 (latest), and true to line, level and dimension as shown in the drawings or instructed by the Engineer.
- 15.3.2 All parts assembled for bolting shall be in close contact over the whole surface and all bearing stiffeners shall bear tightly at top and bottom without being drawn or caulked. The component parts shall be so assembled that they are neither twisted nor otherwise damaged as specified cambers if any shall be provided. Drilling done during assembling shall not distort the metal or enlarge holes. The butting surfaces at all joints shall be so cut and milled so as to butt in close contact throughout the finished joints.
- 15.3.3 Cutting shall be done automatically. Hand flame cutting will not be permitted.
- 15.3.4 The edges and ends of all cut/sheared flange plates, web plates of plate girders, and all cover plates, and the ends of all angles, tees, channels and other sections forming the flanges of plate girders, shall be planed/ground.
- 15.3.5 Holes for bolts shall be drilled to conform to clause 10 of IS:7215 (1974). Punching of holes will not be permitted. All drilling shall be free from burrs. No holes shall be made by gas cutting process.

- 15.3.6 All welding for the works shall be carried out by first class welders and shall be in accordance with IS:816, IS:819, IS:1024, IS:1261, IS:1323 and IS:9595. The Engineer may at his discretion order periodic tests of the welder and/or of the welds produced by them. All such tests, shall be carried out by the Contractor at his cost. Safety requirements should conform to IS:7205, IS : 7273 and IS : 7269 as applicable and should conform to safety, economy and rapidity.
- 15.3.7 As much work as possible shall be welded in shops. The pieces shall be manipulated to ensure down hand welding for all shop joints as far as possible. All parts to be welded shall be arranged so as to fit properly on assembly. After assembly and before the general welding is to commence the parts are to be tack welded with small fillet or butt welds as the case may be. The tack welding must be strong enough to hold the parts together but small enough to be covered by the general welding. The welding procedure shall be so arranged that the distortion and shrinkage stresses are reduced to a minimum.
- 15.3.8 All joints required in structure to facilitate transport or erection shall be shown on the drawings or as specified by the Engineer. Should the Contractor need to provide joints in locations other than those specified by the Engineer he shall submit his proposals and obtain the prior sanction of the Engineer for such joints. The lengths of structural shall be the maximum normally available in the market jointing of shorter length in order to make up lengths required shall not be permitted.
- 15.3.9 Each piece of steel work shall be marked distinctly before delivery, indicating the position and direction in which it is to be fixed. Three copies of a complete marking plan are to be supplied to the Engineer before erection commences.
- 15.3.10 In the case of welded fabrication any distortion remaining in the member after welding operations are completed shall be rectified by and/or at the expense of the Contractor to the approval of the Engineer.
- 15.3.11 All members of trusses and lattice girders shall be straight throughout their length, unless shown otherwise on the drawings, and shall be accurately set to the lines shown on the drawings. Sheared edges of gussets or other members to be straightened and dressed where necessary.
- 15.3.12 Templates and jigs used throughout the work shall be all steel. In cases where actual materials have been used as templates for drilling similar pieces, the Engineer shall decide whether they are fit to be used as parts of the finished structure.
- 15.3.13 Apart from the requirements of welding specified under the above sub clauses, sections above, the Contractor shall ensure the following requirements in the welded joints.
- Strength-quality with parent metal.
 - Absence of defects
 - Corrosion resistance of the weld shall not be less than that of parent material in an aggressive environment.
- 15.3.14 No gasket or other flexible material shall be placed between the holes. The holes in parts to be joined shall be sufficiently well aligned to permit bolts to be freely placed in position. Driving of bolts is not permitted. The nuts shall be placed so that the identification marks are clearly visible after tightening. Nuts and bolts shall always be tightened in a staggered pattern and, where there are more than four bolts in any one joint, they shall be tightened from the centre of the joint outwards.

15.4 Testing of Welds:

- 15.4.1 Butt welds - Radiographic testing of 5% of welds as per IS 1182.

- 15.4.2 Fillet Welds- Ultrasonic testing of 5% of welds.
- 15.4.3 All welded connections shall be inspected as per IS:822.
- 15.4.4 All welds shall be tested by “dye penetration test” as per current practices.
- 15.4.5 Agency for testing of weld shall be approved by the Engineer prior to testing.
- 15.4.6 Defected welds shall be repaired or replaced as decided by the engineer. The repaired or replaced welds shall be tested using the same methods as above. Additionally, when defective welds are found, the cause of the defective weldingshall be determined and the contractor shall institute immediate corrective action.
- 15.4.7 No extra payable shall be made for the tests indicated above.

15.5 Protection of Steel Works (IS:8629) :

- 15.5.1 Sand blasting where specified shall be carried out in accordance with IS:1477.
- 15.5.2 Painting work shall be carried out in accordance with IS:8629 (Parts I to III). Painting shall be applied under the temperature requirement specified by the manufacturer.
- 15.5.3 The steel work, prior to delivery, shall be cleaned from scale, rust, dirt and grease etc., by means of chipping, scraping and wire brushing using skilled operators as described in the painting systems below. The cleaning shall proceed each day over the extent of surfaces which can be painted on that day. The paint shall be applied by brushing or spraying as per approval of the Engineer.

Paint brushes round/oval and flat shall be conforming to IS:487 and IS:384 codes respectively, if painting with brushing is approved by Engineer.

The spraying equipment shall be compatible with the paint material, fitted with necessary gauges and controls and approved by the Engineer.

- 15.5.4 Site weld locations shall be left free from paint within 50mm of the weld position, and contact surfaces in connection using High Strength Friction Grip Bolts shall not be painted. Immediately after completion of erection all damaged paint shall be scraped off and made good to the approval of the Engineer.
The Steelwork specialist shall also clean down and apply one coat of primer to all site bolts, site bolted connections and site weld locations and the paint work generally shall be left in sound condition for any subsequent painting.
- 15.5.5 All paints and primers shall be of best quality and in original sealed containers as packed by the paint manufacturer conforming to the relevant Indian Standards and shall be procured directly from the manufacturers. All paint to be used shall be stored under cover in such conditions as will preserve it from extreme of temperature and the paint shall be used and applied strictly in accordance with the manufacturer's instructions.
- 15.5.6 In addition, the following specification shall apply to the shop painting of contact and inaccessible surfaces:

- Surfaces to be painted shall be thoroughly cleaned from scale, rust, dirt, grease etc. by means of sand/grit/shot blasting or other equivalent means.
- Surfaces which are to be brought permanently into close contact or made inaccessible either in the shops or upon erection shall, after cleaning, be given two coats of Red Lead Priming Paint. The surfaces shall be brought into contact while the paint is still wet.
- Contact surfaces in connection using High Strength Friction Grip bolts shall not be painted or oiled and shall be free from dirt, loose

scale, burrs, pits and any other defects which would prevent the solid seating of the parts and would interfere with the development of friction between them.

- All enclosed surfaces of box members shall be completely sealed by oiling or by coating with approved bitumen paint and all such members and tubes shall have their ends closed by suitable plates welded in position.

15.5.7 Surfaces in contact during shop assembly shall not be painted. Surfaces which cannot be painted, but require protection, shall be given a rust inhibitive grease conforming to IS:958 (1975), or solvent deposited compound conforming to IS:1153 (1975) or IS:1674 (1960), or treated as specified in the drawings.

15.5.8 Surfaces to be in contact with concrete shall not be painted.

15.5.9 The Contractor shall take all precautions to prevent dust and dirt coming in contact with freshly painted surfaces or with surface being painted. The secondcoat of paint shall only be applied when the first coat has dried.

15.5.10 Surfaces not in contact but inaccessible after shop assembly shall receive the specified protective treatments before assembly.

15.5.11 Exposed machined surfaces shall be adequately protected.

15.5.12 A uniform film thickness of paint is to be ensured throughout the work.

15.5.13 Surfaces, which have not been shop coated, but require surface treatment shall be given necessary surface preparation and coats at site as specified in the painting system.

15.6 Erection & Site Work:

15.6.1 The Contractor shall be responsible for checking the alignment and level of foundation and correctness of foundation bolt centers, well in advance of starting erection work, and shall be responsible for any consequences for non-compliance thereof. Discrepancies if any shall immediately be brought to the notice of the Engineer for his advice.
The structure should be divided into erectable modules as per the total scheme. This should be pre-assembled in a suitable yard/platform and its matching with members of the adjacent module checked by trial assembly before erection.

Immediately prior to erection any rust in the paint area shall be removed by power wire brushing to a standard equivalent to SA3.

15.6.2 During erection the rough handling of fabricated materials such as bending, straining or pounding with sledges shall be avoided. Any damage to the structure during transportation or erection shall be immediately rectified by the Contractor at his own cost. The straightening of bend edges of plates, angles and other sections shall be done by methods which will not cause fracture. Following the completion of the straightening, the surface of the member shall carefully be inspected for damage and got approved by the Engineer before further use.

15.6.3 The Contractor shall be responsible for accurately positioning, leveling and plumbing of all steelwork and placing of every part of the structure in accordance with the approved drawings and to the satisfaction of the Engineer. All stanchion base, beam and girder bearings etc. shall be securely supported on suitable steel packs. All reference and datum points shall be fixed near the work site for facilitating the erection work.

- 15.6.4 All equipment used by the Contractor shall be sufficient for the purpose and for the erection of the steel work, in the time specified in the contract. Any lifting or erecting machinery shall be to the approval of the Engineer and shall be removed from the site if he considers such appliances dangerous or unsuitable for their functions. The approval of the Engineer shall not relieve the Contractor of the responsibilities for the loads to which the erection equipment shall be called upon to carry. Adequate arrangement shall be made to resist wind loads and lateral forces arising at the time of erection.
- 15.6.5 The Contractor is entirely responsible for the stability of the structure during erection and shall arrange that sufficient tack bolts, braces or guy ropes are used to ensure that work will remain rigid until final bolting, riveting or welding is completed. The Contractor shall supply and fix, without extra charge, any temporary bracing which may be necessary.
- 15.6.6 All steelwork shall be erected in the exact position as shown on the drawings. All vertical members shall be truly vertical throughout and all horizontal members truly horizontal, fabrication being such that all parts can be accurately assembled and erected. No permanent bolting, welding or grouting shall be done until proper alignment has been obtained and checked by the Engineer.
- 15.6.7 At stanchion splices and at other positions where concrete cover to the steel is liable to be restricted, bolts will be placed with their heads on the outside of the members.
- 15.6.8 All field assembly bolting and welding shall be executed in accordance with the requirements for shop fabrication excepting such as manifestly apply to shop conditions only. Where steel has been delivered painted the paint shall be removed before field welding for a distance of at least 50mm on either side of the joints. The number of washers on permanent bolts shall not be more than two for the nut and one for the bolt head.

15.7 Inspection:

- 15.7.1 The contractor shall inform the Engineer of the progress in fabrication and as to when individual pieces are ready for inspection. All gauge templates necessary to satisfy the Engineer shall be supplied by the contractor. The Engineer may at his discretion check the results obtained at the contractor's works by independent tests and should the material so tested be found unsatisfactory, the cost of such tests shall be borne by the contractor. During inspection, the component/member shall not have any load or external restraint.
- 15.7.2 Structural steel and components viz., bolts, nuts, washers, welding consumables, etc. should be tested for mechanical and chemical properties as per the requirement of the relevant IS or any other specified codes/standard.

15.8 Holding down and Anchor bolts:

- 15.8.1 The holding down and anchor bolts should conform to the requirements laid down in IS:624 or as directed by the Engineer.
- 15.8.2 **Installation:** Individual bolts in groups of holding down bolts shall be positioned accurately within a tolerance of +6mm. The bolts shall be set vertically to a tolerance of not more than 1 in 250.
- 15.8.3 During the casting of concrete the contractor shall ensure that space between the bolt and sleeves is kept clean after removal of shuttering. The contractor shall provide and fix timber plugs to maintain this space in a clean condition. The projecting threads of bolts shall be protected by

approved wrapping materials.

- 15.8.4 Grouting of bolt tubes shall be carried out after the steelwork or equipment have been aligned, plumbed and leveled.

15.9 Tolerances:

- 15.9.1 All tolerances shall be in accordance with IS:7215 unless otherwise specified.
- 15.9.2 The maximum deviation for line and level shall be + 3.0mm for any part of the structure including for location of column centers.
- 15.9.3 The maximum deviation from plumb for columns shall be +3.0mm in 10.0m height subject to a maximum of +6.0mm in a total height of 30.0m.
- 15.9.4 The deviation at the centre of the upper chord member from vertical plane running through the centre of the bottom chord shall not be more than 1/1500 of span but in no case more than 10.0mm. The lateral displacement of top chord at centre of span from vertical plane running through centre of supports shall not be more than 1/250 of the depth of truss but in no case more than 20.0mm.
- 15.9.5 Tolerances for anchor fasteners shall be as specified by respective manufacturers in their Technical and Specifications publication booklets.

16 LED Specification:

16.1

Color	Cool White
Color Temp (K)	8000
Luminous (Flux (lm/PCS))	144
Luminous per Watts	100
Power (w/module)	1.44
Input Voltage (PCS)	12V with CCR and with Over Load Technology

Following is the typical arrangement of the LED for one signage box of size 1200mm x 300mm x 130mm. Contractor should produce one sample according to this and analyses LED requirement, and if any change should inform Maha-Metro same to get approval and proceed manufacturing.

TYPICAL USE OF LED MODULES PER SIGNAGE BOX					
BOX SIZE	LED USED	TOTAL MODULES	TOTAL WATTS	TOTAL AREA	60Watts ps
1200x300x130	LTMAZEXL655V00	18	26	3.5sq.ft	1

16.2 LED FLOOD LIGHT for outdoor Purpose.

Wattage	15W
Output	100 Lumens per Watt
Life Span	50000 Burning Hours
IP Rating	IP 65
LED color	White/Warm White
Material	Die cast Aluminium

- 16.3 Contractors are expected to provide the standard warranty and the invoices from the manufacturers covering all the lights and cables used.

17 Specifications for electrical works:**17.1 Wiring for Indoor Signs:****Illuminated direction and emergency signs**

- 17.1.1 All lights mounted in an individual internally lit sign shall be switched ON & OFF in group, through a switch and controlled through a M.C.B. (The switches controlling circuits and M.C.Bs. are not in the scope of this tender.) The wiring in the signage will be with FR Wires. The contractor shall provide a Bakelite connector on each sign for connection to feeding wire outside, which shall be extendable in flexible conduit up to a distance of 2.0 M. from the sign. This extendable wiring shall either be laid within the provision made in the supporting structure or in flexible conduit.
For all the suspended and projected signs this provision shall be made through one of the suspender or the connection member to the sign respectively.
- 17.1.2 The contractor shall also ensure that all the connections inside the sign are made through Bakelite connectors and thimbles & screws are used for end terminations of wires. Thimbles wherever installed shall be properly covered with insulated sleeves and no temporary taping is done at any point. All the connectors shall be ISI marked.
- 17.1.3 All connectors and joints shall be mounted or fixed to the internal structures of signs with insulating fixtures
- 17.1.4 The interconnecting wiring between light fixtures within the sign shall not be less than 1.5 Sq.mm and shall be FRLS, PVC insulated 1.1 KV grade, with multi-stranded copper conductor.
- 17.1.5 If specified - An earth terminal shall be provided on each of the lit sign which shall be connected with the earthing conductor laid along with incoming circuit wiring.
- 17.1.6 All wiring within the sign enclosure shall be covered with flexible conduit which shall be properly fixed with clamps, saddles etc. in such a way that no shadow is cast on the illuminated surfaces. In no case any loose wiring shall be left inside the sign enclosure.

17.2 Wiring for Outdoor Signs : Totem sign

- 17.2.1 The pole box proposed within the stone pedestal of **Totem sign at entrances** shall have provision of one SPN M.C.B. of 6A (10 KA breaking capacity) for control / Isolation of incoming and outgoing cables / wires. The wiring within the sign from pole box shall be provided by the contractor which shall be of 2.5 sq.mm. FRLS, PVC insulated 1.1 KV grade, with multi-stranded copper conductor for phase and neutral and 1.5 sq.mm. with solid copper conductor wire for earth. The incoming cable up to pole box shall not be in the scope of this tender, but its terminations shall be the responsibility of the contractor. An earth terminal for connecting the earth wire shall be provided in the pole box.
Pole box (junction box) shall be made out of polycarbonate/compressed molded fiberglass polyester and designed to insulate and protect the controller and component in outdoor/indoor application making it water proof. It shall be Lockable with a universal lock/ quarter turn lock and UV stabilized for outdoor usage. This Junction box shall have a front openable hinged door provided with appropriate gasket And all metal components/fittings should be non-corrosive made of brass to withstand moist condition.

Station name

- 17.2.2 The Junction Control Box proposed for **Station name sign on exterior**

sign shall have provision of mounting 2 Nos. S.P. M.C.Bs. of 6A (10 KA breaking capacity) for control / Isolation of incoming and outgoing cables / wires along with separate neutral link and earth link. This junction box shall be of size 150x225x100 mm. Fabricated out of 16 S.W.G M.S. sheet duly painted of same shade and as per specifications specified for painting of structure. This shall have a front openable hinged door, provided with Neoprene gasket and double screwed knobs for closing. The complete junction control box shall be weatherproof and shall have Index of Protection of I.P. - 53.

Two separate out-going circuits shall emanate from the Control Junction Box. Each of them shall control 3 Nos. alternative luminaires by looping the main circuit wiring. All the interconnecting wiring from junction control box to luminaires shall be laid in Heavy Duty M.S. conduits. The phase and neutral wires of each circuit shall be of size 2.5 sq.mm. FRLS, PVC insulated 1.1 KV grade, with multi-stranded copper conductor and earth wire shall be of 1.5 sq.mm. with solid copper conductor laid along with circuit. The size of wire for looping at each luminaire shall not be less than 1.5 sq.mm. FRLS, PVC insulated 1.1 KV grade, with multi-stranded copper conductor for phase & neutral and 1.0 sq.mm. with solid copper conductor wire for earth.

The M.S. conduits for wiring shall be properly fixed with clamps, saddles, nut-bolts etc. The complete conduiting shall be duly painted as per specified shade of the supporting structure. The jointing in the M.S. conduit with T - Junction boxes, sockets, bends, etc. shall be done by threading. All the threaded joints, outlets of wires etc. shall be sealed so as to resist entrance of Moisture, Dust and Vermin's etc.

17.3 Index of Protection:

Since most of the lights/ luminaires are to be installed within the signs the following Index of Protection are proposed for different locations to ward off ingress of dust, vermin and moisture :

- | | | |
|--------------------------------------|---|-----------|
| 1. Indoor signs | - | I.P. - 54 |
| 2. Lights fixtures for Outdoor signs | - | I.P. - 65 |
| 3. Pole Box | - | I.P. - 65 |

Test reports shall be produced at the cost of contractor.

17.4 List of Items (With Prior Approval of Employer/Engineer)

Item
Wires and Cables
Luminaires
Lighting Electronics/Ballasts
Lamp Holder & Support Bracket
M.C.B.

17.5 Typical Items use in signing

Item	Code/ Specific No.
20A LED	240 W
5A LED	60 W
Electronic Ballast	Appropriate for the above
Connectors 5/20 Amp.	ISI mark and approved by Employer / Engineer

Junction box	Polycarbonate/ compressed molded fiberglass polyester
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- ISI marked connectors shall be used
- Switch boxes etc. shall be got fabricated at approved workshops only
- The tenderer shall quote a specific make from approved make above, in absence of this information, the tenderer will be asked to supply first approved material.
- For items not covered in the above list, the sample shall be got approved by The Engineer-In-Charge. Makes offered should comply with technical specification of tender.
- Glass
Glass used for signages shall be laminated safety glass as per the specifications for fire exit signs. Approved make shall be duly approved based on a sample presented to Employer/Engineer

18 CONCRETE WORKS

18.1 General

These specifications shall be read in conjunction with the CPWD specifications 1996 and other relevant specifications described in the Section 1 of these Specifications. Relevant IS and BIS codes will have to be referred to for detailed specification of concrete work.

18.2 Blending of aggregates

In order to obtain optimum workability, individual aggregates of nominal size 20mm, 10mm, 4.75mm and 2.36mm will be blended in such a way that the grading curve for all in aggregates will be a smooth curve from size 0.15mm to 25mm falling within the established envelop grading curve. Contractor shall establish envelop grading curve for each grade of concrete for given maximum size of aggregates and get it approved by Engineer before finalizing the mix design.

18.3 Grade of Concrete:

The concrete is designated as follows:

Concrete M 25

The letter M refers to the mix

The number 25 represents the characteristic compressive strength of 15cm cubes at 28 days in MPa (Mega Pascals: 1 Mpa : 10 kg/cm² approximately). M25 concrete thus has a characteristic strength of 250 kg/cm². Other design mixes will also be denoted in same way.

18.4 Mix Design:

It is the complete responsibility of the Contractor to design the concrete mixes by approved standard methods and to produce the required concrete conforming to the specifications and the strength, workability requirements approved by the Engineer.

The approved mix design will contain strength requirements, grade of concrete, type of cement, maximum size of aggregates, workability, quality of water and admixture, if allowed.

Mix Design once approved must not be altered without prior approval of Engineer. However, should the contractor anticipate any change in quality of future supply of materials than that used for preliminary mix design, he should inform the Engineer quite in advance and bring fresh samples sufficiently in advance, to carry out fresh trial mixes. Design mix will indicate by means of graphs and curves etc., the extent of variation in the grading of aggregates which can be allowed.

Limits of Water and Cement

ContentsMaximum
water/cement ratio
For RCC members - 0.45

Cement Content

Cement content in concrete shall not be less than 380 kg/ cum for RCC under normal exposure. Ordinary Portland cement (OPC) of 43 and 53 grade conforming to IS: 8112 and IS: 12269 respectively shall be used. However, for nominal mixes, CPWD specification and DSR will be followed. The requirement of the relevant codes, standards and directions of the Engineer shall be followed.

18.5 Finishes:

Unless otherwise instructed the face of exposed concrete placed against formwork shall be rubbed down immediately on removal of the formwork to remove irregularities. The face of concrete for which formwork is not provided other than slab shall be smoothed with a float to give a finish equal to that of the rubbed down face, where formwork is provided. The top face of a slab which is not intended to be covered with other materials shall be leveled and floated to a smooth finish at the levels or fall shown on the drawings or as directed. The floating shall be done so as not to bring an excess of mortar to the surface of the concrete. The top face of a slab intended to be surfaced with other material shall be left with a spaded finish. Faces of concrete intended to be plastered shall be roughened by approved means to form of a key.

18.6 Grouting of base plates & bolt holes:

Mixing:

Dry grout should be mixed in a mechanical mixer: the conventional 200/400-litre capacity concrete mixer can be used to mix four bags of dry grout; alternatively, paddle type mortar mixers can be used. The quantity of grout to be mixed at one time should not exceed that amount which can be placed in approximately 10 to 15 minutes.

Cleaning and preparation of the surface:

The base concrete should be clean and strong, and its surface should be properly hacked; all dust should be removed suction or compressed air. The surface should be thoroughly wetted with water for several hours. Before the grout is poured, all free water should be removed and the flat surfaces coated with thin cement slurry.

Curing:

The grout should not dry out where external restraint is provided in the form of form-work, the top opening and all stray openings should be covered with wet sack for at least 7 days.

18.7 Reinforced Concrete

18.7.1 Materials:

Formwork shall be of timber, plywood (including marine plywood), steel or any other suitable material capable of resisting damage to the contact faces under normal conditions of erecting forms, fixing steel and placing concrete. The selection of materials suitable for formwork shall be made by the Contractor based on the quality consistent with the specified finishes and safety. For designated areas prominently in public view such as piers, caps, portals, viaduct, parapets etc., preferably steel shuttering will be used. Material shall be approved by the Engineer before erected at site. However, the choice of material shall be decided by the Engineer. The entire responsibility of planning, designing, erection, dismantling, shifting and safety of false work lies with the contractor.

All formwork supports (centring, props, scaffolds etc.) shall only be in structural steel and preferably of pipes conforming to IS:806, IS:1161, IS:1239, IS:2750. Wooden ballies shall not be permitted as props/formwork supports. All props shall be properly braced using x &

k bracings.

18.7.2 Timber:

Timber used for formwork shall be easily workable with nails without splitting. It shall be stable and not liable to warp when exposed to sun and rain or wetted during concreting.

18.7.3 Plywood:

Plywood used for formwork shall be minimum 12 mm thick. Shuttering quality plywood complying with IS:4990 and of make approved by the Engineer. Suitable stiffeners and walkers shall be provided depending on the shuttering design.

18.7.4 Steel:

Steel formwork shall be made of minimum 4 mm thick black sheets stiffened with angle iron frame made out of M.S. angles 40 mm x 6 mm supported at suitable spacing.

19 Powder Coating

19.1 Powder coating on Aluminum Plates

19.1.1 Wherever specified the aluminum plates shall be coated in approved colour and shade with pure polyester powder of Berger / Interpon / Asian Paints / Nerocoat or equivalent to a minimum thickness of 75 microns.

19.1.2 The pure polyester powder coating shall be got executed from specialized agency.

The pure polyester powder shall have following properties:-

- Free Flow-ability : Satisfactory
- Particle size : < 50-70 microns suitable for electrostatic spray.
- Specific gravity : 1.1 to 1.5 depending on the colour.
- Shelf life : 6 months.
- Stoving Schedule : 200° C for 10 mins. (metal temp.)
- Test Certificates from approved laboratory for the representative samples shall be submitted by the Contractor. Testing will be done in presence of Employer's representatives at the cost of contractor.

19.1.3 The curing schedule shall be as specified by the manufacturer of pure polyester powder.

19.1.4 The properties of cured powder films shall be:-

- Scratch hardness: Equal to or more than 4 Kg.
- Impact resistance: Min 150 Kg cm
- Pencil hardness: 3H to 4H
- Salt spray resistance: 500 Hrs.
- Water soak at room temperature: No change after 500 Hrs.
- Detergent resistance: No attack after 500 Hrs.
- Cross Hatch adhesion: GT= 0 (ASTM D-3359)
- Cured Film thickness: Min 75 microns.

19.1.5 Tests for properties of cured film as given above shall be carried out at frequency specified in relevant IS/BS/ASTM codes or as specified by the Employer / Engineer.

19.1.6 The surface of aluminum shall be prepared and pretreated as follows before powder coating:-

- Removal of all foreign matter.
- Chromatisation of aluminum surface as specified by the manufacturer of pure polyester powder by at least a five stage process consisting of alkali degrease, rinse and chromate conversion followed by two rinses. The chromate coating and alkali degrease shall be as per requirement of the pure polyester powder manufacturer.
- Proper curing at required temperature shall be done for specified time period so as to achieve the desired properties.

19.1.7 The pure polyester coated surface shall be of uniform texture, colour and gloss and shall be free from cracks, warps and other imperfections.

19.1.8 The pure polyester powder is to be used within its shelf life from the date of manufacturing as specified by the manufacturer.

19.2 Powder coating on M.S-CRCA MILD Steel, Aluminum.

19.2.1 Wherever specified the M.S mild Steel plates and sections shall be coated in approved colour and shade with pure polyester powder of Berger/Interpon/Asian paints /Nerocoat or equivalent to a minimum thickness of 75 microns.

19.2.2 The pure polyester powder coating shall be got executed from specialized agency as given in 19.1.2 to 5, 19.1.7 and 8. edit as per number in Aluminum above

19.2.3 The surface of steel shall be prepared and pretreated as follows before powder coating:-

- Removal of all foreign matter.
- Low weight Zinc Phosphate conversion treatment of M.S and CRCA mild Steel surface as specified by the manufacturer of pure polyester powder by at least a seven stage process consisting of oxide and scale removal, alkali degrease, rinse twice and Zinc Phosphate conversion treatment followed by two rinses. The Zinc Phosphate conversion treatment and alkali degrease shall be as per requirement of the pure polyester powder manufacturer. Last wash shall be from diluted acid and immediately after that powder coating process shall be started without wasting much time.
- Proper curing at required temperature shall be done for specified time period so as to achieve the desired properties.

19.2.4 The pure polyester coated surface shall be of uniform texture, colour and gloss and shall be free from cracks, warps and other imperfections.

20 Galvanizing

Galvanizing, wherever specified, shall be minimum 80 microns thick and shall conform to IS-4759.

21 Polyurethane Painting

21.1 The Polyurethane painting, wherever specified, shall conform to CPWD Specifications 1996, volume I - VI), relevant IS codes and standard specifications.

21.2 PU paints matched to shades as per colour specifications shall be of Asian paints/Berger/Kansai Nerolac or equivalent.

21.3 PU paint applications shall be done in following steps or as instructed by each manufacturer.

- **Surface cleaning:** Remove grease, oil and other contaminants by using a degreasing solvent using mechanical tools. Ensure that all the dust particles

are removed by suction or air blast and surface is fully dry and cleaned.

- **Application of primer:** Stir the components thoroughly and then mix base and catalyst in proportions by volume as instructed in the product specifications to uniform consistency. Avoid agitation of mixing. Add 10 % thinner immediately before application. However additional thinner may be added if required to achieve a good workability. For Airless spray use any standard equipment having pump ratio 45:1. This requires an over coating interval of minimum one over night and a dust free environment.
- **Application of the final finish:** Stir the base thoroughly and then mix base and catalyst by volume as instructed in the product specifications to uniform consistency. Allow the mixture to mature for 30 minutes and stir again before use and application. Apply using a conventional spray. Add 10 % thinner depending on conditions. Use any standard equipment at an atomizing pressure of 3.5 - 4.9 kg/cm². Two coats could be applied for a good result.
- Contractors are expected to provide the standard warranty and the invoices from the manufacturers.

22 Approved Granite Stone

- 22.1 Stone is used as pedestals for all the exterior post mounted signs. The stone shall be locally procured dressed at factory and brought to site.
- 22.2 Proper care shall be taken while transportation to avoid chipping, cracking.
- 22.3 A sample of stone shall be shown and approved by the Engineer-in-charge.
- 22.4 All stone used shall be free from cracks, quarrying holes and a damaged piece shall be entirely replaced and not joined at the site.
- 22.5 Substitute to this, Pre-Cast Concrete Blocks can be used, with pre-approval from GC/Maha-Metro.

23 EPDM Gasket

Description: Ethylene Propylene Diene Monomer in the form of a strip with required thickness. This could be glued to one surface. The gasket would get compressed in between two surfaces and gives the right sealing.

EPDM gaskets manufactured by Hanu Industries/Anand Lescuyer/Tremco or equivalent shall be used.

24 Mechanical Fasteners

Dash Fasteners of required diameter and length manufactured shall be provided by the prior approval of Employer/Engineer.

25 Scroller signs

- 25.1 This is a backlit sign that displays many images or frames in a single sign. The images are printed on a polyester scroll and then attached to a scrolling spool system that displays each image for a customer-determined amount of time that is easily set using the scrolling system controller. Images can be advanced consecutively in both scroll directions, or they can be displayed consecutively and rewound to the beginning and displayed again and again, either in landscape or portrait mode

- 25.2 These displays are equipped with an internal controller that allows the display time for the frames to be adjusted. There are also manual controls that allow the frames to be displayed in a static position if desired. An optional remote control is available for even more flexibility.
- 25.3 They can be wall mounted or attached to a floor stand.
- 25.4 They come in different standard sizes on to which the required graphic could be incorporated.
- 25.5 Screen Motion display

26 Photoluminescent signs

All Photoluminescent signs shall be procured from specialized agency providing signs with following specifications but not limited to:

- 26.1 Water proof Non corrosive (Tested as per IMO Specifications)
- 26.2 Withstand temperatures from 30° C up to 65° C.
- 26.3 Non corrosive (Tested as per IMO Specifications).
- 26.4 Tested to ASTM G53-88 Standard (Accelerated UV weathering test)
- 26.5 Non reactive to Dilute Alkalis and Acids.
- 26.6 Glow time in-excess of 2 mcd/m² after 60 minutes
- 26.7 UV-stable and weather-resistant for outdoor applications.
- 26.8 Ability to absorb energy from almost any light source (sunlight, fluorescent, incandescent) and then to emit light when ambient darkness occurs.
- 26.9 The light produced is yellow-green in color and is highly visible, lasting up to 10 hours.

27 Signage Fixings

27.1 Suspended Signs.

- 27.1.1 Suspender have been designed for 2 levels for all signs mounted with bottom at 2.4 m above floor
 - Smaller lighter suspenders for all signs with fixings to a maximum of 1.8m, and
 - Heavier suspenders fixing to the lighter suspenders to reach beyond 1.8 upto 3.5m.
- 27.1.2 This suspender arrangements cover almost all the situations inside stations up to a clear height of 6m for suspending the sign. A sign with suspenders beyond 3.5m will not be installed as suspended signs and will be changed to a projected or post-mounted sign. Any situations observed by the contractor shall be brought to the notice of Employer/Engineer and prior approval shall be taken before any variation in fixing is done.
- 27.1.3 The quoted rates of contractor for the suspended signages shall be for suspending the specified suspenders from any medium, RCC Beams/Slabs, and Structural Steel Sections of any shape and size etc.. Nothing extra whatsoever shall be admissible on this account.
- 27.1.4 In BOQ 1 and 2 suspenders of length 2m suspenders have been calculated for each sign. Payment for this item will be done after deducting or adding to this quantity based on calculating the suspender lengths of installed signs.
The contractor has to quote for per running meter of both the heavy and light suspenders.
- 27.1.5 Nothing extra whatsoever shall be admissible for any variations in the lengths and all necessary erection arrangements from site to site for installation of signs.

27.2 Post mounted signs

- 27.2.1 These signs will have a dedicated special structure and will be calculated per unit for fixing at the location. Height variations will not happen beyond the drawings shown.
- 27.2.2 The quoted rates of contractor for the Post mounted signs shall be for erection of the post mounted signs on base/floor of any medium, RCC or CC floor etc. with or without floor finishes of any type. Nothing extra whatsoever shall be admissible on this account for arrangements for fixing signs from site to site.

27.3 Face fixed Signs

- 27.3.1 The quoted rates of contractor for the Face fixed. signages shall be for face mounting the signs at all heights and to any medium, RCC Beams/Slabs or Brick Wall etc. with or without cladding. Nothing extra whatsoever shall be admissible on this account.
- 27.3.2 Nothing extra whatsoever shall be admissible for any variations of the required face fixing arrangements from site to site of work.
- 27.3.3 Variation will be admissible only in case of being asked to fabricate and fix a new fixing bracket in place of the bracket fabricated as per the Good for Construction drawings included in Tender Documents. Variation of amount in this case will be mutually decided and approval of the Employer/Engineer will be obtained before fabricating such brackets.

27.4 Projection signs

- 27.4.1 The projected signs are fixed using projected bracket fixed to the wall or column with a length proportional to the sign length. The contractor has to quote for each bracket separately as described in the BOQ.
- 27.4.2 The quoted rates of contractor for the projected signs shall be for each length of bracket separately at all heights and to any medium RCC Beams/Slabs or Brick Wall etc. with or without cladding. Nothing extra whatsoever shall be admissible on this account.

27.5 Special mounting for signs

- 27.5.1 There will be few situations where the details are not provided for fixing or a special customized detail has to be made for the sign to fix to specific beams, columns etc. in such cases, the contractor will check the site condition, workout a detail for the fixing in consultation with SGDC and get it approved with the Employer/Engineer. The contractor has to quote a rate per Kg of MS used including providing, fabricating, finishing complete with all accessories like nuts, bolts, washers and props etc used at site for installation of the bracket fixing the sign.
- 27.5.2 The BOQ provides an Item to quote a Unit Rate for fabricating customized fixings for signs. such a rate will be considered for Variation will be admissible only in case of being asked to fabricate and fix a new fixing bracket in place of the bracket fabricated as per provided a customized Good for Construction drawings provided by the Employer/Engineer. Variation of amount in this case will be mutually decided and approval of the Employer will be obtained before fabricating such brackets.

Maharashtra Metro Rail Corporation Limited

(A Joint Venture of Government of India and Government of Maharashtra)

PUNE METRO RAIL PROJECT

Design of Graphics, Fabrication, Supply, Installation, Testing and Commissioning of Signage of 4 stations viz. Dapodi, Bopodi, Khadki & Range Hill of Reach 01 and 4 stations viz. Deccan Gymkhana, Sambhaji Park, PMC & Civil Court Elevated of Reach 02 of Pune Metro Rail Project

TENDER NO.

P1 Misc-28/2022

PART II: WORK REQUIREMENTS

SECTION – VII – C

IT- 5D BIM

Maharashtra Metro Rail Corporation Limited

(A Joint Venture of Government of India and Government of Maharashtra)

PUNE METRO RAIL PROJECT

Design of Graphics, Fabrication, Supply, Installation, Testing and Commissioning of Signage of 4 stations viz. Dapodi, Bopodi, Khadki & Range Hill of Reach 01 and 4 stations viz. Deccan Gymkhana, Sambhaji Park, PMC & Civil Court Elevated of Reach 02 of Pune Metro Rail Project.

TENDER NO.

P1 Misc-28/2022

PART- III

CONDITIONS OF CONTRACT AND CONTRACT FORMS

SECTION - VIII

GENERAL CONDITIONS (GC)

GENERAL CONDITIONS OF CONTRACT

The General Conditions governing this Contract shall be the Conditions of Contract for Plant and Design-Build Projects, First Edition 1999 prepared by the Federation Internationale des Ingenieurs-Conseils (FIDIC). It is also called the FIDIC Yellow Book.

The General Conditions of Contract (GCC) are supplemented with the Particular Conditions of Contract (PCC) by the wherein reference to the numbering of the Clauses in GCC is given, so that the GCC and the PCC together comprise the rights and obligations of the parties. In the case of any discrepancy between the conditions contained in the GCC and the PCC, the conditions contained in the PCC shall prevail over that of the GCC.

As the Contractor is deemed familiar with this General Conditions of Contract, no copy will be attached to the Tender / Contract Documents.

Maharashtra Metro Rail Corporation Limited

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PUNE METRO RAIL PROJECT

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TENDER NO.

P1 Misc-28/2022

PART-III

**CONDITIONS OF CONTRACT AND CONTRACT
FORMS**

SECTION-IX

PARTICULAR CONDITIONS (PC)

Section IX. Particular Conditions (PC)

The following Particular Conditions shall supplement the GC. Whenever there is a conflict, the provisions herein shall prevail over those in the GC.

Part A - Contract Data

SR No	Conditions	Sub-Clause	Data
1	Employer's name and address	1.1.2.2 & 1.3	Maharashtra Metro Rail Corporation Limited, Pune Metro Rail Project 101, The Orion, Opposite Don Bosco Youth Centre, Koregaon Park, Pune - 411001
2	Engineer's name and address	1.1.2.4 & 1.3	Employer will nominate
3	Bank's name	1.1.2.11	Not Applicable.
4	Borrower's name	1.1.2.12	Maharashtra Metro Rail Corporation Limited through Government of India and Government of Maharashtra.
5	Time for Completion	1.1.3.3	Refer to Table: Summary of Sections below
6	Defects Notification Period (Defect Liability Period)	1.1.3.7	24 months from the date of issue of Taking Over Certificate for the whole of the Works. During the Defects Liability Period the Contractor shall provide, free of cost, competent and skilled personnel as stated under <i>Part 1 - Section III - 3.6 Personnel</i> and maintain adequate stock of spares so as to promptly fulfil his obligations during the Defects Liability Period as laid down in GCC and Works Requirements
7	Sections	1.1.5.6	Refer to Table: Summary of Sections below
8	Country	1.1.6.2	India
9	Site	1.1.6.7	Pune, Maharashtra
10	Electronic transmission systems	1.3	Electronic transmission shall be in the form of scanned original documents. In case of Price Bid, only the format in the commercial section of the Bid is to be filled up online.

11	Governing Law	1.4	Acts and Laws of India
12	Ruling language	1.4	English
13	Language for communications	1.4	English
14	Contract Agreement	1.6	Signing of the Contract by the Employer is subject to provision of a compliant Performance Security by the Contractor
15	Care and Supply of Documents	1.8	Documents to be supplied by the Contractor or the Employer under the Contract shall also be provided in digital form.
17	Inspections and Audit by the Bank	1.15	The Bidder/Contractor grants the Employer, the EIB and auditors appointed by either of them, as well as any authority or European Union Institution or body having competence under European Union law, the right to inspect and copy the books and records of the bidder, contractor, supplier or consultant in connection with any Bank-financed contract.
18	Time for access to the Site	2.1	Refer to Table: Summary of Sections below
19	Engineer's Duties and Authority	3.1	<p>The Engineer shall obtain the specific approval of the Employer before taking the following actions:</p> <p><i>[The Employer may decide to limit the authority of the Engineer by selecting one or several of the options below:]</i></p> <ul style="list-style-type: none"> • issuing a Variation for substantial technical modifications, increase of the Accepted Contract Amount or extension of time; • proceeding to Determination under clause 3.5 of the GCC; • issuing Interim Payment Certificate under clause 14.6 of the GCC; and • issuance of a Taking over Certificate under clauses 10.1 and 10.2 of the GCC.
20	Delegation by the Engineer	3.2	Delegation by the Engineer is subject to the provisions of the Contract between the Employer and the Engineer
21	Contractor's General Obligations	4.1	<p>4.1 The Contractor shall provide the following documents as part of the Contract:</p> <ul style="list-style-type: none"> • shop drawings to be approved by the Engineer prior to starting the Works; • as-built drawings to be approved by the Engineer prior to taking over of the Works; and • operation and maintenance manuals.

22	Performance Security	4.2	<p>The performance security will be 3% (three percent) of the Accepted Contract Amount and in the same currency(ies) of the Accepted Contract Amount. This performance security will be in the form of a demand guarantee i.e. Bank Guarantee issued from a scheduled commercial bank of Indian or foreign origin having business office in India and in the same currency(ies) of the Accepted Contract Amount.</p> <p>In the event of variations during the execution of the contract, which result in payments to the Contractor over and above the contract price, the Performance</p> <p>Security shall be adjusted in accordance with clause 4.2 of GC.</p> <p>The performance security amount will be progressively decreased and finally released as under:</p> <ul style="list-style-type: none"> • 1. up to 30% reduced when the whole Works is commissioned • 2. a further 30% reduced on completion of 50% of DLP period i.e. 12 months from the date of issue of Taking Over Certificate for whole works • 3. the balance 40% shall be released as provided for in GC Clause 4.2
23	Contractor's Representative	4.3	Prior consent of the Employer is required for replacing the Contractor's Representative
24	Subcontractors	4.4	Prior consent of the Employer is required for other proposed Subcontractors.
25	Progress reports	4.21	Refer to Works Requirements - General Specifications
26	Normal working hours	6.5	The Contractor, if required, shall carry out work during night hours or in shifts. The Contractor shall not be entitled to any increase in the Accepted Contract Amount on account of night/shift working
27	Testing	7.4	The Engineer shall give the Contractor not less than one (1) working day notice of the Engineer's intention to attend the tests.
28	Commencement of Works	8.1	The Commencement Date shall be: Date given in LOA or Employer's Notice to Proceed
29	Extension of time	8.4	Granting any extension of time is subject to the Engineer's determination in accordance with sub-clause 3.5 - Determinations.
30	Delay damages for the	8.7 & 14.15(b)	(a) 0.05% of the original Contract Price per calendar day of delay of each Key Date.

	Works		(b) There is no maximum limit in levy of LD for delays in individual Key Dates. However, maximum limit for cumulative LD for complete Contract shall not exceed 10% of the final Contract Price.
31	Maximum amount of delay damages	8.7	10 % of the final Contract Price.
32	Measurement and Evaluation	12	Shall be done and certified by Engineer.
33	Right to Vary	13.1	Additional work, plant, material or services not related to the Permanent Works shall not be entitled to a Variation.
34	Variation Procedure	13.3	<p>Prior consent of the Employer is required on any proposed Variation issued for substantial technical modifications, additional cost or extension of time. Such Variation shall be consolidated in a signed Amendment to Contract.</p> <p>Payment for works in quantities or amount which exceed the initial quantity or amount for a Bill of the Bill of Quantities or for a Schedule of the lump sum price shall require a signed Amendment to Contract, unless using Contract provisions for Contract Contingencies, Provisional Sums or Daywork.</p> <p>Last sentence of sub-clause 13.3 is deleted and replaced by: Upon instruction of approving a Variation, the Engineer shall proceed in accordance with Sub-Clause 3.5 to agree or determine adjustments to the Contract Price and to the schedule of payments under Sub-Clause 14.4. These adjustments shall include reasonable profit and shall take account of the Contractor's submissions under Sub-Clause 13.2 if applicable.]</p>
35	Provisional Sums	13.5(b)(ii)	<i>Not applicable</i>
36	Adjustments for Changes in Cost	13.8	Refer PC Part B - Clause no. 45
37	Contract Price	14.1 (a)	No change
		14.1(b)	The following taxes, duties and fees exemptions apply to the Contract: Refer PC Part B - Clause No.46
		14.1(d)	<p>If requested by the Engineer, the breakdown of all unit prices shall also be submitted by the Contractor within 28 days from the Commencement Date.</p> <p>Refer PC Part B - Clause No. 46</p>

38	Total advance payment	14.2	Deleted
39	Repayment amortization rate of advance payment	14.2(b)	Deleted
40	Percentage of Retention	14.2	0% (Zero percentage)
41	Limit of Retention Money	14.2	The aggregate amount of the Performance Security and the Retention Money shall not exceed 3% (three percent) of the Accepted Contract Amount
42	Plant and Materials	14.5(b)(i)	Not applicable
		14.5(c)(i)	Not applicable
43	Minimum Amount of Interim Payment Certificates	14.6	No restriction
44	Payment	14.7	<p>The Employer shall pay to the Contractor the amount certified in each Interim Payment Certificate.</p> <p>Payment to the Contractor of the amounts due in each currency shall be made into the following bank accounts:</p> <p><i>[insert bank account details at the time of contract signing]</i></p>
45	Publishing source of commercial interest rates for financial charges in case of delayed payment	14.8	As provided for in PC Part B- Clause No.49
46	Currencies of Payment	14.15	The Contract Price shall be paid in the currency(ies) named in the Contract.
48	Insurance cover for Contractor's All Risk and other requirements as specified in the GC	18	100% of the Total Contract Price
49	Periods for submission of insurance: a. evidence of insurance. b. relevant policies	18.1	14 days from Commencement Date 28 days from Commencement Date

50	Minimum amount of third party insurance	18.3	INR 0.50 Million for any one incident, with no. of incidents unlimited
51	Amount of Professional Indemnity Insurance (PII)	18.4 (PC)	AOA (any one accident) limit equal to 6% of the Contract Value with AOY (any one year) limit of 2 incidents in a year. In the Professional Indemnity Insurance Policy the deductible amount shall not be more than 5% AOA limit. All Policy shall be obtained within Four weeks from 'date of commencement' and shall be valid for five years after date of issue of 'Performance Certificate' or 3 years after commencement of commercial train operations whichever is later. Wherever the Contractor submits policy for shorter period / annual renewable policy, the same shall be renewed before its expiry date. In such situation, the performance guarantee shall be retained till required validity period. The Contractor's submission of such shorter period / renewable policy shall be construed as their irrevocable consent for retention of the performance guarantee.
52	Termination, Payment and Release	19.6	Determination by the Engineer shall be done in accordance with sub-clause 3.5 Determination.
53	Date by which the Dispute Board shall be appointed	20.2	Not Applicable. Dispute resolution shall be by Arbitration Act 1996 & further amendments time to time.
54	The Dispute Board shall be comprised of	20.2	Constitution of Dispute Board is not applicable in this Contract. The Disputes may be resolved by ADR methods i.e. mutual settlement/negotiations etc. Dispute resolution shall be by Arbitration Act 1996 & further amendments time to time.
55	List of potential Dispute Board sole members	20.2	Not applicable. Dispute resolution shall be by Arbitration Act 1996 & further amendments time to time.
56	Appointment (if not agreed) to be made by	20.3	After failure of negotiation / conciliations of mutual settlements the issues may be referred for arbitration.
57	Rules of arbitration	20.6(a)	The Rules of Arbitration are in accordance with the Arbitration and Conciliation Act 1996 & further amendments time to time.
		20.6(b)	Place of Arbitration : Pune
58	Failure to Comply with Dispute Board's Decision	20.7	Constitution of Dispute Board is not applicable in this Contract. The Disputes may be resolved by ADR methods i.e. mutual settlement/negotiations etc.

59	Contractor's Claims	20.1	Determination by the Engineer shall be done in accordance with sub-clause 3.5 Determination.
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Table-1: Summary of Sections (KEY DATES)

Sr. no.	Key Date	Item Description	Time of Completion from LOA
1	KD-1	Submission of Station specific Signage Design Drawings and art work (graphics) schedules for stations	2 weeks
2	KD-2	Submitting all the material samples and Construction Schedule	3 weeks
3	KD-3	Approval on all signage samples and shop drawings	5 weeks
	Installation of 100% Signage and Graphics Completion		
4	KD-4	First Two Stations including street level Signages	8 weeks
5	KD-5	Next Two Stations including street level Signages	9 weeks
6	KD-6	Next Two Stations including street level Signages	10 weeks
7	KD-7	Next Two Stations including street level Signages	11 weeks
8	KD-8	Multi Modal Signages at all the Stations	16 weeks
9	KD-9	Commissioning of signages and handover at all stations	4 months

Notes regarding Changes in Key Dates

1. The Key Dates and Access Dates indicated above have been identified on the basis of discussions with various groups and agencies involved in the Project. Special attention is drawn to the following facts with respect to the possible changes in the Key Dates and Access Dates.
2. It is essential that the Contractor shall achieve the identified work by the specified Key Date mentioned against it, failing which Liquidated Damages shall become leviable as set out in the Contract.
3. The Access Dates are dependent on the other agencies e.g. civil contractor etc. involved in the project. The Contractor shall interface and maintain a close liaison with other agencies for timely availability of the access. In case the Contractor finds that there is slippage and the likely Access Dates may not be adhered to, the Contractor shall inform the Employer well in advance for the likely delays in access to site.
4. The Employer will, on his part, make all efforts to provide the Contractor with access to information as well as to various locations at stations in stages, in order to plan/execute his activities for time-bound completion of his obligations under the Contract, as per the Access Dates mentioned above. If, however, due to any reasons, the Employer is not in a position to provide access or shared access in these circumstances **and based on the information provided by Contractor vide point no. 3,** will inform the Contractor about the proposed revised Access Dates. The Contractor shall suitably make necessary changes in his Work Program and shall make all out efforts so that, irrespective of the revised Access Dates, the concerned Key Dates are adhered to.
5. Where Access Dates overlap, the Contractor shall ensure that there are sufficient resources to meet the Key Dates.

Notes regarding Key Dates

1. The achievement of a Key Date shall be subject to issue of “No Objection” from the Employer’s Representative upon notice of completion of each KD by Contractor.
2. Failure to meet any Key Date, Liquidated Damages (LD) will be imposed at a rate of 0.05% of the balance value of contract amount (to be executed) per week of delay reckoned from the stipulated date of completion of each KD.
3. All LD put together is subjected to a maximum of 10% of accepted contract amount.

4. Any imposition of LD on account of delay in any Key Date (KD) will be waived and LD amount if deducted will be returned (without interest) provided the Contractor is able to accomplish the “successive key date (KD)” along with the immediate preceding delayed Key Dates.
5. These penalties shall not relieve the Contractor from his obligation to complete the works or from any other obligations and liabilities under this contract.
6. Payment shall be made as per actual measured quantity of executed work, meeting the specifications & quality standards, acceptable to Engineer. The billing cycle shall be monthly or as agreed by Engineer.

Part B - Specific Provisions

1	Sub-Clause 4.1 (d)	<p>The following is added to the existing clause:</p> <p>The Contractor shall prepare, and keep up-to-date, a complete set of "as-built" records of the execution of the Works, showing the exact "as-built" locations, sizes and details of the Works as executed, with cross references to relevant specifications and data sheets. These records shall be kept on the Site and shall be used exclusively for the purposes of this Sub-Clause. Six copies shall be submitted to the Engineer prior to the commencement of the Tests on Completion.</p> <p>In addition, the Contractor shall prepare and submit to the Engineer "as-built drawings" of the Works, showing all Works as executed. The drawings shall be prepared as the Works proceed and shall be submitted to the Engineer for his inspection. The Contractor shall obtain the consent of the Engineer as to their size, the referencing system, and other pertinent details.</p> <p>Prior to the issue of any Taking Over Certificate, the Contractor shall submit to the Engineer one microfiche copy, one full-size original copy and six printed copies of the relevant "as-built drawings", and any further Construction and/or Manufacture Documents specified in the Works Requirements. The Works shall not be considered to be completed for the purposes of Taking Over under Clause 10 until such documents have been submitted to the Engineer.</p> <p>Prior to commencement of the Tests on Completion, the Contractor shall prepare, and submit to the Engineer, Operation & Maintenance Manuals in accordance with the Works Requirements and in sufficient detail for the Employer to operate, maintain, dismantle, reassemble, adjust and repair the Works. The Works shall not be considered to be completed for the purposes of Taking Over under Clause 10 until such Operation and Maintenance Manuals have been submitted to the Engineer and received his consent.</p> <p>The Operation and Maintenance Manuals and drawings submitted by the Contractor shall, if required, be updated by him during the Defects Notification Period and re-submitted for review and acceptance by the Engineer.</p>
2	GC Sub-Clause 4.2 Performance Security	<p>Replace the GC Sub-Clause 4.2 with the provisions as under:</p> <p>The Contractor shall obtain (at his cost) a Performance Security for proper performance, in the amount stated in the Contract Data and denominated in the currency(ies) of the Contract or in a freely convertible currency acceptable to the Employer. If an amount is not stated in the Contract Data, this Sub-Clause shall not apply.</p> <p>The Contractor shall deliver the Performance Security to the Employer within 28 days after receiving the Letter of Acceptance and shall send a copy to the Engineer. The Performance Security shall be issued by a scheduled Indian/Foreign bank in India acceptable to the Employer and</p>

		<p>shall be in the form annexed to the Particular Conditions, as stipulated by the Employer in the Contract Data, or in another form approved by the Employer.</p> <p>The Contractor shall ensure that the Performance Security is valid and enforceable until the Contractor has executed and completed the Works and remedied any defects. If the terms of the Performance Security specify its expiry date, and the Contractor has not become entitled to receive the Performance Certificate by the date 28 days prior to the expiry date, the Contractor shall extend the validity of the Performance Security until the Works have been completed and any defects have been remedied.</p> <p>The Employer shall not make a claim under the Performance Security, except for amounts to which the Employer is entitled under the Contract.</p> <p>The Employer shall indemnify & 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.</p> <p>The Employer shall return the Performance Security to the Contractor within 21 days after receiving a copy of the Performance Certificate.</p> <p>Without limitation to the provisions of the rest of this Sub-Clause, whenever the Engineer determines an addition or a reduction to the Contract Price as a result of a change in cost and/or legislation, or as a result of a Variation, amounting to more than 25 percent of the portion of the Contract Price payable in a specific currency, the Contractor shall at the Engineer's request promptly increase, or may decrease, as the case may be, the value of the Performance Security in that currency by an equal percentage.</p>
3	Sub-clause 4.2A (new subclause)	<p>Guarantees, Warranties and Undertakings</p> <p>Within 30 days of the date of Letter of Acceptance of the Bid, the Contractor shall submit to the Employer:</p> <p>(a) An Undertaking in the approved format from a parent company, the identity of which shall have been submitted in writing to the Employer prior to acceptance of the Bid and against which the Employer shall have raised no-objection.</p> <p>(b) A written Guarantee in the approved format from a parent company, the identity of which shall have been submitted in writing to the Employer prior to acceptance of the Bid and against which the Employer shall have raised no objection.</p> <p>(c) A warrantee in the approved format from the Contractor.</p> <p>In the event that the Contractor shall comprise two or more members, corporations acting in partnership, joint venture,</p>

		<p>consortium or otherwise each such member or corporation shall submit a parent company Undertaking and Guarantee.</p> <p>Notwithstanding any other provision of the Contract:</p> <p>(a) submission by the Contractor of the requisite Performance security, parent company Undertakings and written Guarantees shall be condition precedent to the Contractor's entitlement to any payment, under the Contract; and</p> <p>(b) failure by the Contractor to provide a Performance security or parent company Undertakings or parent company Guarantees shall entitle the Employer either to suspend the Works or to terminate the Contract forthwith by notice in writing to that effect, notwithstanding that the Contractor may have been to proceed with the Works, and the Contractor shall not be compensation whatsoever as a consequence of such suspension or termination</p> <p>The forms of Contractor warranty shall be in the format given in the Section X: Contract Forms.</p>
4	Sub-Clause4.4 Subcontractors	<p>The following is added to the existing clause:</p> <p>The Contractor shall not be required to provide to the Engineer the details of the pricing of their Sub-contracts.</p> <p>Sub-contracting, excluding design work shall be generally limited to 50% of the lump sum price. The terms and conditions of subcontracts and the payments that have to be made to the Subcontractors shall be the sole responsibility of the Contractor.</p> <p>For sub-contracts exceeding Rs.5 million, it will be obligatory for the Contractor to obtain a "Notice of No-Objection" from the Engineer, to the identity of the Sub-contractor and Vendor. The Contractor shall certify that the cumulative value of the subcontracts (including those upto Rs.5 million each) awarded is within the aforesaid 50% limit. Any proposals by the Bidders in their offer shall not be construed as an approval of the vendor.</p> <p>The terms and conditions of the sub-contract are the sole prerogative of the Contractor & are deemed to be included in the price(s) quoted by the Bidder. However, the Subcontractor / Vendor shall fully comply with the technical specifications included in the Works Requirements.</p> <p>It shall be obligatory for the Contractor to obtain Notice of No Objection from the Engineer for the selection of the Sub-contractor and vendors for all items of work, even if the name of the Subcontractor and vendor is named in the Contractor's Proposal and the works to be done including purchase of materials and equipment are in accordance with the Standards specified in the Contract. List of such major items for sub-contracting shall be drawn up by the Contractor in consultation with the Engineer. The terms and conditions of the sub-contract / vending agreement are the sole prerogatives of the Contractor and are deemed to be included in the Contract Price.</p>

		<p>The Contractor shall provide sufficient superintendence, whether on the site or elsewhere, to ensure that the work to be carried out by a Subcontractor complies with the requirements of the Contract.</p> <p>The proposed sub-contract terms and conditions shall impose on the sub-contractor such terms of the Contract as are applicable and appropriate to the part of the Works to be sub-contracted, to enable</p> <p>the Contractor to comply with his obligations under the Contract.</p> <p>Notwithstanding any consent to sub-contract given by the Engineer, if in his opinion it is considered necessary, the Engineer shall have full authority to order the removal of any sub-contractor from the Site or off-Site, place of manufacture/fabrication or storage.</p> <p>The Contractor shall ensure that their sub-contractors, material / equipment suppliers, consultants and other agencies deployed by them in connection with execution of the Contract do not make any claim or raise any dispute before Employer. For this, necessary provision is to be made in the agreement between Contractor and their Sub contractors / consultants / other agencies. Similarly, the agreement should also incorporate the provision of dispute resolution. An undertaking in the following format shall be submitted by Contractor in respect of each such agency:</p> <p>Name of work In connection with above work, M/s, Contractor has/is engaging M/s, as sub-contractor (or consultant or material / equipment supplier or service provider). For this, the terms and conditions of agreement include necessary provisions for resolution of dispute if any arising between Contractor and subcontractor. It is confirmed by the subcontractor that any claim/dispute arising out of the above work shall be resolved in terms of agreement and shall not be raised before Employer and also shall not make any claim against Employer before any forum/court.</p>
5	Sub-clause 4.8 Safety and Subclause 6.7, Health and Safety	<p>The following is added to the existing clause:</p> <p>Within 8 weeks of the date of Notice to Proceed, the Contractor shall submit a detailed and comprehensive contract-specific Site Safety Plan based on the Employer's Safety, Health and Environment Manual (SHE Manual). The Contractor is required to make himself aware of all the requirements of the Employer's Safety, Health and Environment Manual in this regard and comply with them. The Site Safety Plan shall include detailed policies, procedures and regulations which, when implemented, will ensure compliance with Sub-Clauses 4.8 and 6.7 of General Conditions of Contract.</p> <p>The Contractor shall, from time to time and as necessary or required by the Engineer, produce supplements to the Site Safety Plan such that it is at all times a detailed, comprehensive and contemporaneous statement by the</p>

		<p>Contractor of his site safety and industrial health obligations, responsibilities, policies and procedures (under the laws of India) or as stated in the Contract or elsewhere relating to work on Site.</p> <p>If at any time the Site Safety Plan is, in the opinion of the Engineer, insufficient or requires revision or modification to ensure the security of the Works and the safety of all workmen upon, and visitors to the Site, the Engineer may instruct the Contractor to revise the Site Safety Plan. The Contractor shall, within 14 days, submit the revised plan to the Engineer for review.</p> <p>Any omission, inconsistency or error in the Site Safety Plan or the Engineer concurrence or rejection of the Site Safety Plan and/or supplements thereto shall be without prejudice to the Contractor's obligations with respect to site safety and industrial health and shall not excuse any failure by the Contractor to adopt proper and recognized safety practices throughout the execution of the Works.</p> <p>The Contractor shall adhere to the Site Safety Plan and shall ensure, that all sub-contractors of all tiers have a copy of the Site Safety Plan and comply with its provisions.</p> <p>The Contractor shall provide all necessary access, assistance and facilities to enable the Engineer and the Employer to carry out surveillance to verify that the Site Safety Plan is being properly and fully implemented.</p> <p>The Contractor shall notify the Engineer immediately of any occurrence or incident that results in death or serious injury as defined in the Indian Penal Code. Such initial notification may be verbal and confirmed in writing thereafter and shall be followed by a comprehensive written report within 24 hours of the occurrence/incident. The Contractor shall duly complete standard forms as required by the Engineer and Statutory Authorities.</p> <p>The Contractor shall provide and maintain all necessary temporary fire protection and firefighting facilities on the Site during the construction of the Works in accordance with the statutory regulations and as required by the Engineer. The Contractor shall ensure that all gases, fuels and other dangerous Materials and goods are stored and handled in a safe manner and in accordance with the statutory regulations and as required by the Engineer.</p> <p>The obligations and requirements for safety and industrial health under this Contract are entirely without prejudice to, and do not derogate from, the Contractor's statutory obligations, with respect to safety and industrial health.</p> <p>The Contractor shall provide a training / workshop on Safety, Health and Environment (SHE) to all its workers / employees / subcontractors of atleast 2 weeks (96 hours) at the time of induction. Before posting any of his workers/staff/ employees /subcontractors, the Contractor shall give a certificate that</p>
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		the said person had undergone the requisite SHE is training. Non-compliance of the above will invoke penalties as per conditions of contract on SHE.
6	Sub-Clause 4.10 Site Data	<p>Replace the GC Sub-Clause 4.10 with the provisions as under:</p> <p>The Employer shall have made available to the Contractor with the Bidding documents such relevant data in Employer's possession on hydrological and sub-surface conditions at the Site, including environmental aspects. The Employer shall similarly make available to the Contractor all such data, which come into the Employer's possession after the Base Date. The accuracy or reliability of the data/studies/reports and of any other information supplied at any time by the Employer or Engineer is not warranted with respect to the viability of his design and execution of Works and the Contractor shall be responsible for interpreting all such data. The Contractor shall conduct further investigations considered necessary by him at his own cost and any error, discrepancies if found in Employer's data at any stage will not constitute ground for any claim for extra time and costs.</p> <p>The Contractor shall be deemed to have obtained all necessary information as to risks, contingencies and other circumstances which may influence or affect the Tender or Works.</p> <p>The Contractor shall also be deemed to have inspected and examined the Site, its surroundings, the above data and other available information with respect to the viability of his design and execution of Works and to have satisfied himself before submitting the Tender, as to all the relevant matters including without limitation:</p> <p>(a) the climatic conditions;</p> <p>(b) the extent and nature of the work, Plant, and Materials necessary for the execution and completion of the Works and the remedying of any defects;</p> <p>(c) the applicable laws, procedures and labour practices</p> <p>(d) The Contractor's requirement for access, accommodation, facilities, personnel, power, transport and other services.</p> <p>(e) the risk of injury or damage to property adjacent to the Site and to the occupiers of such property or any other risk.</p>
7	Sub-Clause 4.12, Unforeseeable Physical Conditions	<p>The following is added to the existing clause:</p> <p>This provision applies if unforeseeable physical condition continues for more than a period of 60 days in continuation. Contractor shall be entitled to claim as per clause 8.4 & 20.1 both it is further clarified that if this unforeseeable condition remains less than 60 days then the Contractor is entitled to claim time extension only under sub-clause 8.4.</p>
8	Sub-clause 4.15 - Access Route	<p>The following is added to the existing clause:</p> <p>All operations for the execution of the Works shall be carried out so as not to interfere unnecessarily with the convenience of the public or the access to public or private roads or</p>

		<p>footpaths or properties owned by the Employer or by any other person. The Contractor shall select routes, choose and use such vehicles so that movement of Contractor's Equipment, Plant and Materials from and to the Site is so limited that traffic is not delayed and damage to highways and bridges is prevented. If there is any delay or damage or injury, the cost of rectification or reconstruction of highways or bridges shall be borne by the Contractor. The Contractor shall indemnify the Employer in respect of all claims, demands, proceedings, damages, costs, charges and expenses whatsoever arising out of or in relation to any such matters.</p> <p>If during the execution of the Works the Contractor shall receive any claim arising out of the execution of the Works in respect of damage to highways or bridges, he shall immediately report the facts to the Engineer. The Contractor shall negotiate a settlement in respect of such claims and indemnify the Employer in respect of all claims, proceedings, damages, costs, charges and expenses in relation thereto.</p>
9	Sub-clause 4.18 - Protection of The Environment	<p>Add the following at the end of this sub-clause:</p> <p>Outline Environmental Plan shall be in accordance with the provisions of Employer's Safety, Health & Environment (SHE) Manual and shall include in summary form, the Contractor's proposed means of complying with his obligations in relation to:</p> <ul style="list-style-type: none"> • the Site Environment; and • System Environment as described in Works Requirements. <p>Within 60 days of the date of the Notice to Proceed, the Contractor shall submit a detailed and comprehensive Environmental Plan based on the Outline Environmental Plan. The Environmental Plan shall include detailed policies, procedures and applicable regulations.</p> <p>The Contractor shall provide all necessary access, assistance and facilities to enable the Engineer and the Employer to monitor and conduct tests at site to verify that the Environmental Plan is being properly and fully implemented.</p>
10	Sub-clause 4.19 Electricity, Water and Gas	<p>The following is added to the existing clause:</p> <p>The Contractor shall be allowed, free of charge, traction power.</p>
11	Sub-clause 4.20, Employer's Equipment	<p>The following is added to the existing clause:</p> <p>The Employer will not provide any tools, plant, equipment and machinery or materials under the Contract.</p>
12	Sub-clause 4.22 - Security of Site and Safety of Works	<p>The following is added to the existing clause:</p> <p>The Contractor shall throughout the execution of the Works including the carrying out of any testing, commissioning</p>

		<p>(including Integrated Testing and Commissioning), or remedying of any defect:</p> <ol style="list-style-type: none"> take full responsibility for the adequacy, stability, safety and security of the Works, Plant, Rolling Stock, Contractor's Equipment, Temporary Works, operations on Site and methods of manufacture, installation, construction and transportation; have full regard for the safety of all persons on or in the vicinity of the Site (including without limitation persons to whom access to the Site has been allowed by the Contractor), comply with all relevant safety regulations, including provision of safety gear, and insofar as the Contractor is in occupation or otherwise is using areas of the Site, keep the Site and the Works (so far as the same are not completed and occupied by the Employer) in an orderly state appropriate to the avoidance of injury to all persons and shall keep the Employer indemnified against all injuries to such persons. provide and maintain all lights, guards, fences and warning signs and watchmen when and where necessary or required by the Engineer or by laws or by any relevant authority for the protection of the Works and for the safety and convenience of the public and all persons on or in the vicinity of the Site; and where any work would otherwise be carried out in darkness, ensure that all parts of the Site where work is being carried out are so lighted as to ensure the safety of all persons on or in the vicinity of the Site and of such work. <p>Contractor is required to take note of all the necessary provisions in Employer's Safety, Health and Environment Manual (SHE Manual) and the Contractor's price shall be inclusive of all the necessary costs to meet the prescribed safety standards. In the case, the Contractor fails in the above; the Employer may provide the necessary arrangements and recover the costs from the Contractor.</p> <p>The Contractor shall submit a detailed and comprehensive contract-specific Site Safety Plan and System Safety Assurance Plan in accordance with the provisions in Employer's Safety, Health & Environment (SHE) Manual and Employer's Requirements.</p> <p>The Contractor shall, from time to time and as necessary or required by the Engineer, produce supplements to the Site Safety and System Safety Assurance Plans such that they are at all times detailed, comprehensive and contemporaneous statements by the Contractor of his site safety measures, policies and procedures under the laws of India) or as stated in the Contract or elsewhere.</p> <p>If at any time the Site Safety Plan and/or System Safety Assurance Plan is, in the Engineer's opinion, insufficient or requires revision or modification, the Engineer may instruct the Contractor to revise the appropriate Plan. The Contractor shall, within fourteen days, submit the revised plan to the Engineer for review.</p> <p>Any omission, inconsistency or error in the Safety Plans or the Engineer's consent or rejection of the Safety Plans and/or</p>
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		<p>supplements thereto shall be without prejudice to the Contractor's obligations with respect to safety measures and shall not excuse any failure by the Contractor to adopt proper and recognized safety practices throughout the execution of the Works.</p> <p>The Contractor shall provide all necessary access, assistance and facilities to enable the Engineer and the Employer to carry out surveillance to verify that the Safety Plans are being properly and fully implemented</p>
14	Clause 5A Design (new Clause & subclauses)	<p>Design:- The clauses under the head 'Design' are applicable only in 'Design & Construct' contracts and in case of 'Part Design & Construct' contracts, these are applicable only to part of the Contract in which the design is the responsibility of the Contractor.</p>
15	Sub-clause 5A.1, General Obligations	<p>The Contractor shall design and provide all necessary specifications for the Works in accordance with the site plans and Works Requirements. Any design detail, plan, drawing, specifications, notes, annotations, and information required shall be provided in such sufficient format, details, extent, size and scale and within such time as may be required to ensure effective execution of Works and/or as otherwise required by the Engineer.</p> <p>The Contractor holds himself, and his designers as having the experience and capability necessary for the design. The Contractor undertakes that the designers shall be available to attend discussions with the Engineer at all reasonable times during the Contract Period.</p> <p>The designer shall be the same entity as proposed by the Contractor at the time of pre-qualification (in the Bid), unless otherwise approved by the Employer. The Contractor shall furnish Designer's Warranty in the format approved by the Employer.</p> <p>The Design and Construction Standards shall be in conformity with the requirements of "Rules for Opening of a Railway or a Section of a Railway for Public Carriage of Passengers" and "Rules for Introduction of New Type of Rolling Stock" and to the satisfaction of the Commissioner of Railway Safety whose sanction is mandatory for commissioning of the System.</p> <p>The Works shall be executed in conformity with the Employer's Requirements, Specifications and Drawings of the Contract issued to the Contractor by the Engineer from time to time. If the Contractor does any work or part in a manner contrary to the Specifications or Drawings, he shall bear all the costs arising there from including dismantling and reconstruction strictly in accordance with the Specifications and Drawings and shall be responsible for all loss to the Employer.</p> <p>If any ambiguity arises as to the meaning and intent of any portion of the Employer's Requirements, Specifications and Drawings or as to execution or quality of any work or material or as to the measurement of the Works, the decision of the Engineer thereon shall be final and binding.</p>

16	Sub-clause 5A.2, Contractor's warranty of design	<p>a. The Contractor shall be fully responsible, for the suitability, adequacy, integrity, durability & practicality of the Contractor's proposal.</p> <p>b. The Contractor warrants that the Contractor's Proposals meet the Works Requirements and is fit for the purpose thereof. Where there is any inadequacy, insufficiency, impracticality or unsuitability in or of the Works Requirements or any part thereof, the Contractor's Proposal shall take into account, address or rectify such inadequacy, insufficiency, impracticality or unsuitability at Contractor's own cost.</p> <p>c. The Contractor warrants that the Works have been or will be designed, manufactured, installed and otherwise constructed and to the highest standards available using proven up-to-date good practice.</p> <p>e. The Contractor warrants that the Works will, when completed, comply with enactments and regulations relevant to the Works.</p> <p>f. The Contractor warrants that the design of the Works and the manufacture of plant have taken or will have taken full account of the effects of the intended manufacturing and installation methods, Temporary Works and Contractor's Equipment</p> <p>g. The Contractor shall also provide a guarantee from the Designer for the design for suitability, adequacy, practicality of design for Works Requirements.</p> <p>h. The Contractor shall indemnify the Employer against any damage, expense, liability, loss or claim, which the Employer might incur, sustain or be subject to arising from any breach of the Contractor's design responsibility and/or warranty set out in this Clause.</p> <p>i. The Contractor further specifies and is deemed to have checked and accepted full responsibility 'for the Contractor's Proposal and warrants absolutely that the same meets the Works Requirements:</p> <ul style="list-style-type: none"> • Notwithstanding that such design may be or have been prepared, developed or issued by the Employer, any of Contractor's consultants, his sub-contractors and/or his qualified personnel/persons or cause to be prepared, developed or issued by others. • Notwithstanding any warranties, guaranties and/or indemnities that may be or may have been submitted by any other person. • Notwithstanding that the same have been accepted by the Engineer <p>i. The Contractor shall be fully responsible for the Plants, Materials, goods, workmanship, preparing, developing and coordinating all design Works to enable that part of the Works to be constructed and/or to be fully operational in accordance with the Contract's requirements.</p> <p>j. Apart from the Contractor, the above warranty shall also be applicable for his designer. This warranty shall be a part of his sub contract with the designer and should be made available at the time of signing of the Agreement.</p> <p>k. No claim for additional payment or extension of time shall be entertained and/or the Contractor shall not be relieved</p>

		<p>from any obligation/liability under the Contract, for any delay, suspension, impediment to or adverse effect upon the progress of the Works due to any mistake, inaccuracy, discrepancy or omission in or between the Contractor's, the Definitive Design and the final design, or any failure by the Contractor to prepare any Design Data or submit the same to the Engineer in due time and the Contractor shall promptly make good any such defect at his own cost.</p>
17	<p>Sub-clause 5A.3,</p> <p>Construction and/or</p> <p>Manufacture Documents</p>	<p>The Manufacture Documents shall comprise the technical documents specified in the Works Requirements, documents required to satisfy all regulatory approvals, documents described below (Sub-clause 5A.7: As Built Document), and (Sub-clause 5A.8: Operations and Maintenance Manuals). The Contractor shall prepare all Manufacture Documents in sufficient detail and shall also prepare any other document necessary to instruct the Contractor's personnel. The Engineer shall have the right to inspect the preparation of all these documents wherever they are being prepared.</p> <p>Each of the Construction and/or Manufacture Documents shall, when considered ready for use, be submitted to the Engineer for pre-construction or pre-manufacture review. Unless otherwise stated in Employer's Requirements, each review by the Engineer shall not exceed 21 days, calculated from the date on which the Engineer receives the Manufacture Document.</p> <p>The Engineer may during the review period, give notice to the Contractor that a Manufacture Document fails (to the extent stated) to comply with the Works Requirements, it shall be rectified, resubmitted & reviewed (and if specified, approved) in accordance with this Sub-Clause, at the Contractor's cost.</p> <p>For each part of the Works, and except to the extent that the prior consent of the Engineer shall have been obtained:</p> <p>(a) In the case of a Construction and/or Manufacture Document which has (as specified) been submitted for the Engineer's approval</p> <p>(i) The Engineer shall give notice to the Contractor that the Construction and/or Manufacture Document is provided with no objection, with or without comments, or that it fails (to the extent stated) to comply with the Contract;</p> <p>(ii) Execution of such part of the Works shall not commence until the Engineer has provided with no objection the Construction and/or Manufacture Document; and</p> <p>(iii) The Engineer shall be deemed to have provided with no objection the Construction and/or Manufacture Document upon the expiry of the review periods for all the Construction and/or Manufacture Documents which are relevant to the design and execution of such parts, unless the Engineer has previously notified otherwise in accordance with sub-paragraph (i)</p> <p>(b) construction and/or manufacture of such part of the Works shall not commence prior to the expiry of the review of the Construction and/or Manufacture Documents which are relevant to its design and execution;</p>

		<p>(c) construction and/or manufacture shall be in accordance with such reviewed (and if specified, approved) Construction and/or Manufacture Documents; and</p> <p>(d) if the Contractor wishes to modify any design or document which has previously been submitted for such pre-construction and/or pre-manufacture review, the Contractor shall immediately notify the Engineer, & based on Engineer's approval shall subsequently submit revised documents to the Engineer in accordance with the above procedure.</p> <p>If the Engineer instructs that further Construction and/or Manufacture Documents are necessary for carrying out the Works, the Contractor shall promptly and at Contractor's cost prepare such documents,</p> <p>Errors omissions, ambiguities, inconsistencies, inadequacies and other defects if found at any stage in construction or any operations manufacture documents, then shall be rectified by the Contractor at his own cost and any approval or consent or review (under this sub-clause or otherwise) by the Employer/Engineer of the Manufacture and Construction Documents under this Sub-clause shall not relieve the Contractor from any obligations or responsibility under the Contract.</p> <p>Should it be found at any time after notification of consent that the relevant drawings or documents do not comply with the Contract or do not agree with drawings or documents in relation to which the Engineer has previously notified his consent, the Contractor shall, at his own expense, make such alterations or additions as, in the opinion of the Engineer, are necessary to remedy such noncompliance or non-agreement and shall submit all such varied or amended drawings or documents for the consent of the Engineer.</p>
18	<p>Sub-clause 5A.3.1,</p> <p>Submission of documents (other than Design Data)</p>	<p>The Contractor shall submit drawings and documents, as required by the Contract, to the Engineer in accordance with any submittal schedule agreed with the Engineer. This submittal shall be made sufficiently before the Works are to be carried out to give the Engineer and the Employer reasonable time to examine the drawings or other documents, to prepare comments and for any changes to be accommodated by the Contractor.</p> <p>Where the consent of the Engineer is required, the Engineer shall notify the Contractor in writing of his decision either within such period as may expressly be stipulated in the Contract or otherwise within a reasonable time.</p> <p>If the Engineer has reasonable cause for being dissatisfied with the proposals set out in the Contractor's drawings or documents, the Engineer shall, within a period of 28 days from the date of submittal, require the Contractor in writing to make such amendments thereto as the Engineer may consider necessary. The Contractor shall make and be bound by such amendments at no additional expense to the Employer and shall resubmit the amended drawings or documents for Engineer's consent.</p>

		<p>Within 14 days of notification of the Engineer's consent the Contractor shall provide the Engineer with the type and number of sets of the relevant drawings or documents as stipulated in the Employer's Requirement.</p> <p>Should it be found at any time after notification of consent that the relevant drawings or documents do not comply with the Contract or do not agree with drawings or documents in relation to which the Engineer has previously notified his consent, the Contractor shall, at his own expense, make such alterations or additions as, in the opinion of the Engineer, are necessary to remedy such noncompliance or non-agreement and shall submit all such varied or amended drawings or documents for the consent of the Engineer. No examination by the Engineer of the drawings or documents submitted by the Contractor, nor any consent of the Engineer in</p> <p>relation to the same, with or without amendment, shall absolve the Contractor from any of his obligations under the Contract or any liability for or arising from such drawings or documents.</p> <p>The Operation and Maintenance Manuals and drawings submitted by the Contractor shall, if required, be updated by him during the Defects Liability Period and re-submitted for review and acceptance by the Employer's Representative.</p>
19	<p>Sub-clause 5A.3.2, Submission of Design Data</p>	<p>In the case of submissions subsequent to the Definitive Design, the Design Data shall be in accordance with Employer's Requirements and the Definitive Design.</p> <p>The Contractor shall submit to the Engineer all Design Data, together with the relevant Design Certificates certified by the Contractor, on or before the respective dates for submission shown on the Design Submission Programme or, as the case may be, the Works Programme. In the event that a re-submission of Design Data is required, such re-submission shall be made as soon as practicable after the receipt of the relevant statement of objections. All submissions of Design Data shall include the copies as stipulated in the Employer's Requirements.</p> <p>Following receipt of a submission of Design Data the Engineer shall, within 28 days, return one copy of the Design Data to the Contractor, together with either a Notice of No-Objection, or a statement of objections which shall identify the aspects of the Design Data which do not conform to the above requirements. If the Engineer returns any Design Data with a Notice of No Objection, the Contractor shall proceed with the Works in accordance with the Contract.</p> <p>If the Engineer provides that revisions to a submission of Design Data/ are appropriate but that such revisions are of minor design significance, the Engineer may issue a Notice of No Objection subject to an appended schedule of comments identifying the relevant revisions. The Contractor shall revise such Design Data in accordance with such comments but shall not be obliged to resubmit such Design Data solely on account of such revisions.</p> <p>If the Engineer returns any Design Data with a statement of objections the Contractor shall revise the Design Data to take account of the stated objections and re-submit such Design Data to the Engineer, together with new Design Certificates signed by the Designer and the Contractor.</p>

		<p>The issue of a Notice of No Objection in relation to any submission of Design Data shall be entirely without prejudice to the review of subsequent submissions of Design Data or to any subsequent request for a Contractor's Variation, and shall not bind or fetter the Engineer in any manner whatsoever when deciding whether or not to raise objections in relation to any subsequent submission of Design Data or when dealing with a subsequent request for a Contractor's Variation.</p> <p>Neither an objection raised to the Design Data nor revisions of minor design significance under this Clause will, under any circumstances, constitute an Employer's Variation.</p>
20	Sub-clause 5A.4, Delayed Drawings or Instructions	<ul style="list-style-type: none"> The Contractor shall give notice to the Engineer whenever the Works are likely to be delayed or disrupted if any necessary drawing or instruction is not issued to the Contractor within a particular time, which shall be reasonable. The notice shall include details of the necessary drawing or instruction, details of why and by when it should be issued, and the nature and amount of the delay or disruption likely to be suffered if it is late. If the Contractor suffers delay and/or incurs Cost as a result of a failure of the Engineer to issue the notified drawing or instruction within a time which is reasonable and is specified in the notice with supporting details, the Contractor shall give a further notice to the Engineer and shall be entitled subject to Clause 20 to: <ul style="list-style-type: none"> an extension of time for any such delay, if completion is or will be delayed, under Clause 8.4. payment of any such Cost-plus profit, which shall be included in the Contract Price. After receiving this further notice, the Engineer shall proceed to agree or determine these matters. However, if and to the extent that the Engineer's failure was caused by any error or delay by the Contractor, including an error in, or delay in the submission of, any of the Contractor's Documents, the Contractor shall not be entitled to such extension of time, Cost or profit.
21	Sub-clause 5A.5, Technical Standards and Regulations	<p>The design, the Construction and/or Manufacture Documents, the execution and the completed Works (including remedying of defects therein) shall comply with the specifications, technical standards, building construction, safety and environmental regulations and other standards specified in the Works Requirements applicable to the Works or defined by the applicable laws and regulations.</p>
22	Sub-clause 5A.6, Samples	<p>The Contractor shall submit at his own cost the following samples and relevant information to the Engineer for pre-construction and/or pre-manufacture review in accordance with the procedure for Construction and/or Manufacture Documents described in Sub- Clause above "Delayed Drawings or Instructions":</p> <ul style="list-style-type: none"> manufacturer's standard samples of Materials samples (if any) specified in the Employer's Requirements

		Each sample shall be labelled as to origin and intended use in the Works.
23	Sub-clause 5A.7, As-built drawings and Documents	<p>The Contractor shall prepare, and keep up-to-date, a complete set of "as-built" records of the execution of the Works, showing the exact "as-built" locations, sizes and details of the Works as executed, with cross references to relevant specifications and data sheets. These records shall be kept on the Site and shall be used exclusively for the purposes of this Sub-Clause. Six copies shall be submitted to the Engineer prior to the commencement of the Tests on Completion.</p> <p>In addition, the Contractor shall prepare and submit to the Engineer "as-built drawings" of the Works, showing all Works as executed. The drawings shall be prepared as the Works proceed and shall be submitted to the Engineer for his inspection. The Contractor shall obtain the consent of the Engineer as to their size, the referencing system, and other pertinent details.</p> <p>Prior to the issue of any Taking Over Certificate, the Contractor shall submit to the Engineer one microfiche copy, one full-size original copy and six printed copies of the relevant "as-built drawings", and any further Construction and/or Manufacture Documents specified in the Works Requirements. The Works shall not be considered to be completed for the purposes of Taking Over under Clause 10 until such documents have been submitted to the Engineer.</p>
24	Sub-clause 5A.8, Operation And Maintenance Manuals	<p>Prior to commencement of the Tests on Completion, the Contractor shall prepare, and submit to the Engineer, Operation and Maintenance Manuals in accordance with the Works Requirements and in sufficient detail for the Employer to operate, maintain, dismantle, reassemble, adjust and repair the Works. The Works shall not be considered to be completed for the purposes of Taking Over under Clause 10 until such Operation and Maintenance Manuals have been submitted to the Engineer and received his consent.</p> <p>The Operation and Maintenance Manuals and drawings submitted by the Contractor shall be updated by him during the Defects Liability Period and the Contractor shall re-submit the updated manuals at the end of the DLP for review and acceptance by the Engineer.</p>
25	Sub-clause 5A.9, Intellectual Property Rights and Royalties	<p>The Contractor shall indemnify the Employer and the Engineer from and against all claims and proceedings on account of infringement (or alleged infringement) of any patent rights, registered designs, copyright, design, trademark, trade name, know-how or other intellectual property rights in respect of the Works, Contractor's Equipment, machines, work method, or Plant, or Materials, or anything whatsoever required for the Works and from and against all claims, demands, proceedings, damages, costs, charges and expenses whatsoever in respect thereof or in relation thereto. The Contractor shall pay all traffic surcharges and other royalties, licence fees, rent and other payments or compensation, if any, for getting stone, sand, gravel, clay or other materials, machine, process, systems, work methods, or Contractor's Equipment required for the Works. The Contractor shall, in the event of infringement of Intellectual Property Rights, rectify, modify or replace at his own cost the Works, Plant or materials or</p>

	<p>anything whatsoever required for the Works so that infringement no more exist or in the alternative shall procure necessary rights/license so that there is no infringement of Intellectual Property Rights.</p> <p>The Contractor shall be promptly notified of any claim under this Sub-Clause made against the Employer. The Contractor shall, at his cost, conduct negotiations for the settlement of such claim, and any litigation or arbitration that may arise from it. The Employer or the Engineer shall not make any admission, which might be prejudicial to the Contractor, unless the Contractor has failed to take over the conduct of the negotiations, litigation or arbitration within a reasonable time after having been so requested. In the event of Contractor failing to act at Engineer's notice, the Employer shall be at full liberty to deduct any such amount of pending claim from any amount due to the Contractor under this Contract or any other Contract.</p> <p>Insofar as the patent, copyright or other intellectual property rights in any Plant, Design Data, plans, calculations, drawings, documents, Materials, know-how and information relating to the Works shall be vested in the Contractor, the Contractor shall grant to the Employer, his successors and assignees a royalty-free, nonexclusive and irrevocable licence (carrying the right to grant sublicenses) to use and reproduce any of the works, designs or inventions incorporated and referred to in such Plant, documents or Materials and any such know-how and information for all purposes relating to the Works (including without limitation the design, manufacture, installation, reconstruction, Testing, commissioning, completion, reinstatement, extension, repair and operation of the Works).</p> <p>If any patent, registered design or software is developed by the Contractor specifically for the Works, the title thereto shall vest in the Employer and the Contractor shall grant to the Employer a nonexclusive irrevocable and royalty-free licence (carrying the right to grant sub-license) to use, repair, copy, modify, enhance, adapt and translate in any form such Software for his own use.</p> <p>If the Contractor uses proprietary software for the purpose of storing or utilising records the Contractor shall obtain at his own expense the grant of a licence or sub-licence to use such software in favour of the Employer and shall pay such licence fee or other payment as the grantor of such licence may require provided that the use of such software under the licence may be restricted to use relating to the design, construction, reconstruction, manufacture, completion, reinstatement, extension, repair and operation of the Works or any part thereof. The Contractor's permission referred to above shall be given, inter alia, to enable the Employer to disclose (under conditions of confidentiality satisfactory to the Contractor) programmes and documentation for a third party to undertake the performance of services for the Employer in respect of such programmes and documentation.</p> <p>If any software is developed under the Contract or used by the Contractor for the purposes of storing or utilising records over which the Contractor or a third party holds title or other rights, the Contractor shall permit or obtain for the Employer (as the case may require) the right to use and apply that Software free</p>
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		<p>of additional charge (together with any modifications, improvements and developments thereof) for the purpose of the design, manufacture, installation, reconstruction, testing, commissioning, completion, reinstatement, extension, repair, modification or operation of the Works, or any part thereof, or for the purpose of any Dispute.</p> <p>The Employer reserves the right to use other Software on or in connection with the Works.</p>
26	Sub-Clause 6.2 Rates of Wages and Conditions of Labour	<p>Replace the GC Sub-Clause 6.2 with the provisions as under:</p> <p>Full compliance of statutory requirements apart, the Contractor shall pay rates of wages and observe conditions of labour not less favourable than those established for the trade or the industry where the work is carried out.</p> <p>The Contractor shall, if required by the Employer, deliver to the Engineer or to his office, a return in detail, in such form and at such intervals as the Employer may prescribe, showing the number of labour employed in different categories by the Contractor on the Site.</p> <p>The Contractor shall make himself aware of all labour regulations and their impact on the cost and build up the same in the Contract Price. During the Contract Period no extra amount in this regard shall be payable to the Contractor, for whatsoever reason including any revision of rates payable to the labour due to revision of rates payable in Minimum Wages Act.</p> <p>Labour provided by the Contractor, either directly or through subcontractors, for the exclusive use of the Employer or the Engineer, shall, for the purpose of this Sub-Clause, be deemed to be employed by the Contractor.</p> <p>In the event of default being made in the payment of any money in respect of wages of any person employed by the Contractor or any of its sub-contractors of any tier in and for carrying out of this Contract and if a claim therefore is filed in the office of the Labour Authorities and proof thereof is furnished to the satisfaction of the Labour Authorities, the Employer may, failing payment of the said money by the Contractor, make payment of such claim on behalf of the Contractor to the said Labour Authorities and any sums so paid shall be recoverable by the Employer from the Contractor.</p>
27	Sub-Clause 6.4 Labour Laws	<p>The following is added to the existing clause:</p> <p>(a) In dealing with labour and employees, the Contractor and his Sub-Contractors (including piece rate and petty Contractors) shall comply fully with all laws and statutory regulations pertaining to engagement, payment and upkeep of the labour in India.</p> <p>(b) The Contractor shall have a Labour Welfare Organisation which shall be responsible for labour welfare and compliance with prevalent labour laws, statutes and guidelines. In this context, the Contractor is also required to familiarize himself with Maharashtra Metro Rail</p>

		<p>Corporation Limited's Labour Welfare Fund Rules as specified in PC or elsewhere in the Contract and comply with the same.</p> <p>(c) The Contractor shall prepare and submit compliance reports of adherence to labour laws as and when desired by the Engineer.</p> <p>(d) The Contractor will ensure to open bank accounts for each worker employed by him and his sub-contractors and all the payments to workers will be released through bank accounts.</p> <p>(e) The Contractor shall, if required by the Employer, deliver to the Engineer or to his office; a return in detail, in such form and at such intervals as the Employer may prescribe, showing the number of labour employed in different categories by the Contractor or his subcontractors on the Site.</p>
28	Sub-Clause 6.5 Working Hours	<p>Replace the GC Sub-Clause 6.5 with the provisions as under:</p> <p>The Contractor, if required, shall carry out work during night hours or in shifts, unless specifically provided otherwise in the Contract. No increase in rates or extra payments shall be admissible for night work. The Contractor shall provide adequate lighting and safety arrangements.</p>
29	Clause 7, Workmanship and Quality Control	<p>The following is added to the existing clause:</p> <p>Within 28 days of the issue of the Notice to Proceed, the Contractor shall submit to the Engineer, for his consent, his proposed Site Quality Plan based on the Outline Quality Plan and the Employer's Requirements. The quality manual should address the quality system as required by ISO 9001 or equivalent standard. Any supplement to the Site Quality Plan shall be submitted at least 14 days before commencement of the relevant work.</p> <p>Upon the Engineer notifying his consent to the Site Quality Plan, or any supplement thereto, the Contractor shall, adhere to the principles and procedures contained in such document, except where the Engineer gives his consent to any amended or varied version thereof. The Contractor shall cause any sub-contractors to adhere to this Plan.</p> <p>The Contractor shall appoint a suitably qualified and experienced person, not otherwise engaged in the performance of the Contract, to act as manager of the quality assurance system and shall provide such other personnel and resources as required to ensure effective operation of the quality assurance system. The said manager shall carry out audits of the application of the quality assurance system, and ensure effective quality control and delivery of quality assurance.</p> <p>The Contractor shall provide all necessary access, assistance and facilities to enable the Engineer to carry out surveillance visits both on and off the Site to verify that the quality assurance system is being properly and fully implemented. No extra payment shall be made in this regard and the cost of</p>

		the Work under this element shall be deemed to be included in the Contract Price.
30	Sub-Clause 7.1, Manner of Execution	<p>Add following at the end of GC Sub-Clause 7.1:</p> <p>The Contractor shall design and provide all necessary specifications for the Works in accordance with the site plans and Work's Requirements. Any design detail, plan, drawing, specifications, notes, annotations, and information required shall be provided in such sufficient format, details, extent, size and scale and within such time as may be required to ensure effective execution of Works and/or as otherwise required by the Engineer.</p> <p>The Contractor holds himself, and his designers as having the experience and capability necessary for the design. The Contractor undertakes that the designers shall be available to attend discussions with the Engineer at all reasonable times during the Contract Period.</p> <p>The designer shall be the same entity as proposed by the Contractor at the time of pre-qualification (in Bid), unless otherwise approved by the Employer. The Contractor shall furnish Designer's Warranty in the format enclosed in Section X Contract Forms.</p> <p>The Contractor further warrants that:</p> <ol style="list-style-type: none"> The Contractor shall be fully responsible, for the suitability, adequacy, integrity, durability and practicality of the Contractor's proposal. The Contractor warrants that the Contractor's Proposals meet the Work's Requirements and is fit for the purpose thereof. Where there is any inadequacy, insufficiency, impracticality or unsuitability in or of the Work's Requirements or any part thereof, the Contractor's Proposal shall take into account, address or rectify such inadequacy, insufficiency, impracticality or unsuitability at Contractor's own cost. The Contractor warrants that the Works have been or will be designed, manufactured, installed and otherwise constructed and to the highest standards available using proven up-to-date good practice The Contractor warrants that the Works will, when completed, comply with enactments and regulations relevant to the Works The Contractor warrants that the design of the Works and the manufacture of plant have taken or will have taken full account of the effects of the intended manufacturing and installation methods, Temporary Works and Contractor's Equipment The Contractor shall also provide a guarantee from the Designer for the design for suitability, adequacy, practicality of design for Work's Requirements The Contractor shall indemnify the Employer against any damage, expense, liability, loss or claim, which the Employer might incur, sustain or be subject to arising from

		<p>any breach of the Contractor's design responsibility and/or warranty set out in this Clause.</p> <p>h. The Contractor further specifies and is deemed to have checked and accepted full responsibility 'for the Contractor' s Proposal and warrants absolutely that the same meets the Work's Requirements:</p> <p>i. Notwithstanding that such design may be or have been prepared, developed or issued by the Employer, any of Contractor's consultants, his sub-contractors and/or his qualified personnel/ persons or cause to be prepared, developed or issued by others.</p> <p>ii. Notwithstanding any warranties, guaranties and/or indemnities that may be or may have been submitted by any other person.</p> <p>iii. Notwithstanding that the same have been accepted by the Engineer.</p> <p>The Contractor shall be fully responsible for the Plants, Materials, goods, workmanship, preparing, developing and coordinating all design Works to enable that part of the Works to be constructed and/or to be fully operational in accordance with the Contract's requirements.</p> <p>Apart from the Contractor, the above warranty shall also be applicable for his designer. This warranty shall be a part of his sub contract with the designer and should be made available at the time of signing of the Agreement.</p> <p>No claim for additional payment or extension of time shall be entertained and/or the Contractor shall not be relieved from any obligation/liability under the Contract, for any delay, suspension, impediment to or adverse effect upon the progress of the Work due to any mistake, inaccuracy, discrepancy or omission in or between the Contractor's, the Definitive Design and the final design, or any failure by the Contractor to prepare any Design Data or submit the same to the Engineer in due time and the Contractor shall promptly make good any such defect at his own cost.</p>
31	Sub-Clause 7.6 Remedial Works	<p>Add the following at the end of this sub-clause:</p> <p>The Contractor shall not be released from any liability or obligation under the Contract by reason of any such inspection or testing or witnessing of testing, or by the submission of reports of inspection or testing to the Engineer.</p>
32	Sub-Clause 7.7 Ownership of Plant and Materials	<p>Replace the GC Sub-Clause 7.7 with provisions as under:</p> <p>The plant, goods and material not finally taken over as per GC Clause 10 but payment against which have been made in part or full against Indemnity Bond / Safety Custody Bank Guarantee will remain under the Contractor's custody. The Contractor shall be responsible for its safety and will bear all the risks till taken over by the Employer.</p>
33	Sub-Clause 7.9 (additional subclause)	Undertaking for manufacture and supply of spares

		The Contractor shall submit an undertaking for manufacture & supply of spares (including those of its Sub-Contractors / Vendors) for the equipment supplied in the Contract for at least 10 years from the date of completion of the Contract.
34	Sub-Clause 8.1, Commencement of Works	<p>Replace the GC Sub-Clause 8.1 with the provisions as under:</p> <p>Except as otherwise provided in the Particular Conditions of Contract, the Commencement Date shall be the date indicated in the Letter of Acceptance.</p> <p>The Contractor shall commence the execution of the Works as soon as is reasonably practicable after the Commencement Date and shall then proceed with the Works with due expedition and without delay.</p>
35	Sub-clause 8.3, Programme	<p>The following is added to the existing clause:</p> <p>The Contractor shall prepare and submit his detailed Programme of Work so as to achieve key dates of various activities. The Contractor shall complete the work in a phased manner fixing priorities to the different stages of the work as per the requirement of project from time to time.</p> <p>Consent by the Engineer to a Works Programme shall not relieve the Contractor of any of his duties or responsibilities under the Contract, nor in the event that a Works Programme indicates that a Key Date has not or will not be met, constitute any form of acknowledgement that the Contractor is or may be entitled to an extension of time in relation to such Key Date or a Mile Stone.</p> <p>Design Submission Program</p> <p>The Contractor shall submit to the Engineer, the Design Submission Programme and updated versions thereof in the form and content and at the times prescribed in the Contract, including the dates on which major decisions should be made.</p> <p>In the second and subsequent submissions of the Design Submission Programme, the Contractor shall not, without the prior written consent of the Engineer:</p> <p>(a) revise the description or content of any design package identified in the initial version of Design Submission Programme;</p> <p>(b) reduce the periods provided for review by the Engineer of any submission of Design Data as set out in the initial version of the Design Submission Programme;</p> <p>(c) revise the sequence of submissions of Design Data shown in the initial version of the Design Submission Programme. Any amendment of the Design Submission Programme in breach of the above requirements shall have no effect whatsoever under the Contract.</p> <p>Manufacture, Installation and Construction Methods</p>

		<p>The Contractor shall submit complete documents and information pertaining to the methods of manufacture, installation and construction which the Contractor proposes to adopt or use, (and if applicable such calculations of stresses, strains and deflections and the like that will or may arise in the Works or to the other works comprising the Project or any parts thereof during installation from the use of such methods). The Engineer will then check to see whether, if such methods are adhered to, the Works can be executed in accordance with the Contract and without detriment to the Works (when completed) and to other works comprising the Project and, in a manner, which minimises disruption to road and pedestrian traffic.</p> <p>The Engineer shall inform the Contractor in writing within 21 days after receipt of the above information;</p> <p>(a) that the Contractor's proposed methods of manufacture, installation and construction have the consent of the Engineer; Or</p> <p>(b) in what respects, in the opinion of the Engineer the Contractor's proposed methods of manufacture, installation and construction:</p> <p>a. fail to comply with the Employer's Requirements and/or the Definitive Design and/or the Final Design;</p> <p>b. would be detrimental to the Works and/or to the other works comprising the Project;</p> <p>c. do not comply with the other requirements of the Contract; or</p> <p>(c) as to the further documents or information which are required to enable the Engineer to properly assess the proposed methods of manufacture, installation and construction.</p> <p>In the event that the Engineer does not give his consent, the Contractor shall take such steps or make such changes in the said methods or supply such further documents or information as may be necessary to meet the Engineer's requirements and to obtain his consent. The Contractor shall not change the methods of manufacture, installation and construction which have received the Engineer's consent without further review and consent in writing of the Engineer.</p> <p>Notwithstanding the foregoing provisions of this Clause, or that certain of the Contractor's proposed methods of manufacture, installation and construction may be the subject of the consent of the Engineer, the Contractor shall not be relieved of any liability or obligation under the Contract.</p>
36	Sub-Clause 8.4, Extension of Time for Completion	<p>Replace the GC Sub-Clause 8.4 with the provisions as under:</p> <p>The Contractor shall be entitled subject to Sub-Clause 20.1 [Contractor's Claims] to an extension of the Time for</p>

		<p>Completion if and to the extent that completion for the purposes of Sub-Clause 10.1 [Taking Over of the Works and Sections] is or will be delayed by any of the following causes:</p> <ul style="list-style-type: none"> (a) a Variation (unless an adjustment to the Time for Completion has been agreed under Sub-Clause 13.3 [Variation Procedure]) or other substantial change in the Contract, (b) a cause of delay giving an entitlement to extension of time under a Sub-Clause of these Conditions, or (c) exceptionally adverse climatic conditions, (d) any delay, impediment or prevention caused by or attributable to the Employer, the Employer's Personnel, or the Employer's other contractors. <p>If the Contractor considers himself to be entitled to an extension of the Time for Completion, the Contractor shall give notice to the Engineer in accordance with Sub-Clause 20.1 [Contractor's Claims]. When determining each extension of time under Sub-Clause 20.1, the Engineer shall review previous determinations and may increase, but shall not decrease, the total extension of time.</p>
37	Sub-clause 8.7, Delay Damages	<p>The following is added to the existing clause:</p> <p>The 'total Contract Value' used in the GCC sub clause 8.5 for the purpose of levy of liquidated damages on failure to achieve Key Dates shall mean the 'Awarded cost of the work'.</p>
38	Sub-Clause 8.9 Consequences of Suspension	<p>The following is added to the existing clause:</p> <p>The Contractor shall not be entitled to extra cost (if any), incurred by him, during the period of suspension of Work, if such suspension is</p> <ul style="list-style-type: none"> a. provided for in the Contract, or b. necessary for proper execution of Works or by reasons of weather condition or by some default on the part of the Contractor, or c. necessary for the safety of Works or any part thereof or d. necessary for the safety of adjoining public or other property or safety of the public or workmen or those who have to be at the site or e. to ensure safety and to avoid disruption of traffic and utilities, as also to permit fast repairs and restoration of any damaged utilities, or f. on account of work carried out by the Contractor not in accordance with the directions of the Engineer; or g. on account of any other reason which is not attributable to the Employer
39	Sub-Clause 9.4, Failure to Pass Tests on Completion	<p>Replace the GC Sub-Clause 9.4 with the provisions as under:</p> <p>If the Works, or a Section, fail to pass the Tests on Completion repeated under Sub-Clause 9.3 [Retesting], the Engineer shall be entitled to:</p>

		<p>(a) order further repetition of Tests on Completion under Sub-Clause 9.3; or</p> <p>(b) if the failure deprives the Employer of substantially the whole benefit of the Works or Section, reject the Works or Section (as the case may be), in which event the Employer shall have the same remedies as are provided in subparagraph (c) of Sub-Clause 11.4 [Failure to Remedy Defects].</p>
40	<p>Sub-Clause 9.5 (additional subclause)</p> <p>Integrated Testing and Commissioning</p>	<p>Integrated Testing</p> <p>Tests on Completion shall also include Integrated Testing where applicable as per the contract conditions. The Contractor shall, following satisfactory completion of tests on his works, equipment, sub-systems or system, perform, at the direction of the Engineer, programme of tests to verify and confirm the compatibility and complete performance of his works, equipment, sub-systems or system with the works, equipment, sub-systems or system provided by others.</p> <p>Compilation of Test Results</p> <p>The results of the Integrated Testing and Commissioning shall be compiled and evaluated by the Engineer and the Contractor.</p> <p>Re-testing</p> <p>If the Works, or a part thereof, or a Section, fail to pass the Integrated Testing and Commissioning, the Engineer shall require such failed Tests, to be repeated under the same terms and conditions. If such failure and retesting result from a default of the Contractor and cause the Employer to incur additional costs, the same shall be recoverable from the Contractor by the Employer and may be deducted by the Employer from any monies due, or to become due, to the Contractor.</p> <p>Failure to pass Test</p> <p>If the Works, or a part thereof, or a Section, fail to pass Integrated Testing and Commissioning and the Contractor in consequence proposes to make any adjustment or modification to the Works or a part thereof, or a section, the Engineer may, with the approval of the Employer, instruct the Contractor to carry out such adjustment or modification, at his own cost and to satisfy the requirements of Integrated Testing and Commissioning within such time as the Employer / Engineer may deem to be reasonable.</p> <p>Statutory Requirements</p> <p>The Contractor along with others shall carry out all statutory tests and trials, under the supervision of the Engineer, necessary for obtaining sanction of the competent authority for opening the system for public carriage of passengers.</p> <p>The Contractor shall, if required by the Employer, deliver to the Engineer or to his office, a return in detail, in such form and at such intervals as the Employer may prescribe, showing the number of labour employed in different categories by the Contractor on the Site.</p>

		<p>The Design and Manufacture Standards to be adopted by the Contractor shall be in conformity with the requirements of tender specifications as well as "Rules for Opening of a Railway or a Section of a Railway for Public Carriage of Passengers" and "Rules for Introduction of New Type of Rolling Stock". Contractor under the supervision of the Engineer, shall carry out all statutory tests and trials and shall prepare and submit all documents as required including the documents required for obtaining all approvals and sanction of the Commissioner of Metro Railway Safety (CMRS) and any other Statutory Authority, that may be required for introduction of Rolling Stock for Public Carriage of Passengers.</p>
41	Clause 11 Defect Liability	<p>The following is added to the existing clause:</p> <p>During the Defects Liability Period the Contractor shall provide, competent and skilled personnel as stated under <i>1 - Section III - 3.6 Personnel</i> and maintain adequate stock of spares so as to promptly fulfil his obligations during the Defects Liability Period as laid down in GCC and Works Requirements at free of cost. A penalty of Rs.10000/- per day in DLP period will be imposed if Track failure (only that part which is as per scope of work of contract Misc-28/2022) is not repaired/replaced within 24 Hrs of its failure.</p> <p>Maintenance during Defects Liability Period</p> <p>Contractor shall establish an office for the purpose with communication facility so as to facilitate communication for reporting failures and liaison with maintenance staff manning the stations round the clock. The supervisor in-charge should be provided with mobile communication facility to ensure his presence at the site immediately after reporting. Contractor shall ensure restoration /rectification/replacement, within reasonable time, to the satisfaction of Engineer. The Engineer in case of the delay as deems fit shall be empowered to carry out the maintenance at the risk and cost of the Contractor.</p> <p>Routine Maintenance</p> <p>Submit Monthly status report to the Engineer -in - Charge.</p> <p>Repairs</p> <p>All equipment that requires repairing shall be immediately serviced and repaired.</p> <p>Complaints</p> <p>The Contractor shall receive calls for any and all problems experienced in the operation of the systems, attend to these within 120 minutes of receiving the complaints and shall take steps to immediately correct any deficiencies that may exist.</p> <p>Maintenance Log Book</p>

		<p>The Contractor shall maintain a Maintenance Log Book at each Station, the format for which shall be approved by Engineer - in - charge. In the Maintenance Log book, the details about date of Routine Maintenance, Routine Maintenance activities performed, Details of Call - out visit / Break - down maintenance, etc. shall be maintained. Copy of relevant pages of the Log book to be submitted to the Engineer - in - charge with the Monthly status report.</p> <p>Failure Analysis Report</p> <p>The Contractor shall submit a report for the Failure Analysis in the format approved by the "Engineer" giving the details of the type of fault, cause of fault, analysis of faulty component, etc correlated with the details of last preventive maintenance activity performed.</p> <p>Operation and Maintenance</p> <p>The Contractor shall provide Expert team for Maintenance and operation till the end of DLP. The deployment of these Experts and team shall be continuous. These Experts and team shall work under the administrative control of the Employer. These Experts and team shall also ensure that the Client's maintenance staff acquire necessary skills and follow correct procedures and practices in the maintenance, overhaul and repair of various components for the system as well as for the maintenance of the related software (if any) after the DLP. The qualification and experience of the Experts to be deployed by the Contractor shall be as prescribed in the</p> <p>Works Requirements. Prior approval of the Employer shall be necessary before the Experts are deployed for maintenance and operation. The Contractor shall replace promptly, Contractor's experts who are not considered suitable by the Engineer.</p>
42	Sub-Clause 11.4 Failure to Remedy Defects	<p>Replace the GC Sub-Clause 11.4 with the provisions as under:</p> <p>If the Contractor fails to remedy any defect or damage within such time as the Employer / Engineer may deem to be reasonable, the Employer or the Engineer may fix a date on or by which to remedy the defect or damage and give the Contractor reasonable notice of such date. If the Contractor fails to remedy the defect or damage by such date and the necessity for such work is due to a cause stated in Sub-Clause 11.2(a), (b) or (c), the Employer may (at his sole discretion):</p> <p>(a) carry out the work himself or by others, in a reasonable manner and at the Contractor's risk and cost, but the Contractor shall have no responsibility for such work: the costs incurred by the Employer in remedying the defector damage shall be recoverable from the Contractor by the Employer;</p> <p>(b) require the Engineer to determine and certify a reasonable reduction in the Contract Price ;or</p> <p>(c) if the defect or damage is such that the Employer has been deprived of substantially the whole of the benefit of the Works or parts of the Works, terminate the Contract in respect of such parts of the Works as cannot be put to the</p>

		intended use ,the Employer shall then be entitled to recover all sums paid for such parts of the Works together with the cost of dismantling the same ,clearing the Site and returning Plant, Rolling Stock and Materials to the Contractor ,and Sub- Clause 13 shall not apply.
43	Sub-clause 12.3.1 (New sub-clause)	<p><u>Variation in the Bill of Quantities</u></p> <p>i) The quantities of items shown in the Bill of Quantities are approximate, & liable to vary during the actual execution of the work. Some items/group of items may have to be altered, added or omitted. The Contractor shall be bound to carry out and complete the stipulated work as instructed by the Engineer, irrespective of the magnitude of variations including additions, alterations or omissions in the Bill of Quantities, individual items or group of items of Schedule-BLT1 and Schedule-CR1 specified in the Bill of Quantities.</p> <p>ii) Each of these Schedules BLT1 and CR-1 shall constitute a Group of items.</p> <p>iii) Such variations shall be paid as follows:</p> <p>a) At the accepted rates of the Contract for Positive variation in quantities to the extent of 25%. Unless otherwise specifically provided for in the Bill of Quantities or elsewhere in the Contract, the variation of 25% shall be applicable to a group of items mentioned therein and not to individual items. In case of variation in quantities on minus side, contract rates will be payable for executed quantities.</p> <p>b) Variation in the quantity of items individually costing upto 1% of the total contract value, shall be payable at the rates stated in the Contract notwithstanding the magnitude of variation upto 2% of the original Contract Value for each item.</p> <p>c) In case the variation in individual items or the group of items as stipulated above, is more than 25% on plus side, the rate for the varied quantity beyond 25% shall be negotiated between the Engineer and the Contractor and mutually agreed rates arrived at before actual execution of the extra quantity.</p> <p>d) In case Engineer introduces an item for which the Contract does not contain any rates or prices applicable to the varied Works, the rate of such items shall be derived, wherever possible, from rate for similar items available in the Bill of Quantities of the accepted Tender. In case this is not possible, the rate may be decided on the following basis:</p> <p>i. Cost of Materials at current market price, as actually utilised in the final finished Permanent Works, including a reasonable percentage for wastage and transportation.</p> <p>ii. Cost of enabling works if any (unless provided for separately) worked out on the above basis but with less stringent quality. Specifications minus salvage value of serviceable material released after completion of work and cost of material released as scrap.</p> <p>iii. Cost of labour actually used at the site of work at rates under Payment of Minimum Wages Act for the area of work for each category of worker, further enhanced by a percentage of 10% of the aforesaid rates to account for labour not directly utilised at Site and other ancillary and incidental expenses on labour.</p> <p>iv. Hire charges for Plant & Machinery, scaffolding, shuttering, forms, etc., required to be used at the site of the work. The tools used by the various trades shall not be counted as Plant & Machinery for this purpose.</p> <p>v. An amount of 20% of items (i), (ii), (iii) and (iv) above to allow for Contractor's overheads, profits and corporate taxes. This percentage shall also apply to estimated cost of Materials supplied free to the Contractor.</p> <p>vi. In all cases where extra items of work are involved, for which there are no rates in the accepted Bill of Quantities the Contractor shall give a notice to the Engineer, of at least 7 days before the need for their execution arises.</p>

		<p>In the event of disagreement in respect of items (c) and (d) above, the Engineer shall fix such rates of price as are, in his opinion appropriate and shall notify the Contractor accordingly, with a copy to the Employer. Until such time as rates or prices are agreed or fixed, the Engineer shall determine provisional rates or prices to enable on account payments to the Contractor. Alternatively, in the event of disagreement, the Contractor shall have no claim to execute extra quantities/new items and the Engineer shall be free to get such additional quantities beyond 25% new items executed through any other agency. However, if the Engineer or the Employer so directs the Contractor shall be bound to carry out any such additional quantities beyond the limits stated above original quantities and or new items and the disagreement or the difference regarding rates to be paid for the same shall be settled in the manner laid down under the conditions for the settlement of dispute.</p>
44	<p>Sub-clause 13.2.1 (New sub-clause)</p>	<p>Employer's Variation & Variation Procedure</p> <p>"Employer's Variation" means a change in the Works Requirements which makes necessary alteration or modification of the Design, quality or scope of Works as described by or referred to in the Works Requirements. Changes to any sequence, method or timing of manufacture, testing and Commissioning including Integrated Testing and Commissioning and changes to any part of the Site or access thereto will not constitute Employer's Variation.</p> <p>An Employer's Variation shall be requested and implemented in accordance with and subject to the following provisions:</p> <p>(a) within 14 days (or such other period as the Engineer may allow) of the Engineer informing the Contractor in writing of the intention to request an Employer's Variation, the Contractor shall notify the Engineer in writing whether in his opinion the Employer's Variation would, if ordered:</p> <p>(i) give rise to any entitlement to an extension of time; or (ii) affect the achievement of any Milestone; or</p> <p>(ii) give rise to any entitlement to additional payment; or</p> <p>(iii) affect the warranties of the Contractor set out in Conditions of Contract and shall submit his proposals as to the terms upon which he would agree to implement the Employer's Variation.</p> <p>(b) The Contractor shall furnish sufficient information in terms of rates/prices of the equipment/components manufactured by the contractor or sourced from the Vendors/Sub-contractors such as: estimated man-hours, man-hours rates for manufactured items, design costs, basic rate of materials, sub-assemblies, taxes, duties, overheads & profiles and inflation rate, so as to establish the reasonableness of the variation price. In assessing work covered by any sub-contract, the Engineer shall have, where he deems necessary, access to the original sub-contract conditions, rates, prices and details of the variation claimed and may direct the Contractor to provide a copy of the same, to assist in evaluating any Variations.</p> <p>(c) any agreement between the Engineer and the Contractor as to the terms upon which an Employer's Variation may be implemented shall have no contractual or other legal effect, until it is in writing and is signed by the Contractor</p>

		<p>and the Engineer. The Engineer before signing such agreement shall take prior approval of the Employer. The terms of this agreement will be binding upon the Contractor and the Employer. This agreement shall determine the amount which should be added to or deducted from the relevant Cost Centre Amount and/or the revisions (if any) which should be made to the Milestone Payment Schedules as a result of the Variation.</p> <p>In the event of the Engineer and the Contractor failing to reach agreement on the revisions to be made to the Cost Centre Amounts, the Engineer shall, with the approval of the Employer, determine the amount which should be added or deducted from the relevant cost centre amount which shall be binding on the contractor. In case the Contractor supplies part/ incomplete information or refuses to supply the required information, Engineer shall determine the cost of Variation based on the information available to him from any sources which in his judgment can be used to determine the case. The Contractor shall proceed with the Work irrespective of whether an agreement between the Engineer and Contractor as to the terms and price of the variation have been reached or not but may submit his Claim if necessary, in accordance with Sub-clause 20 of GCC.</p> <p>(d) if the Engineer withdraws the request for an Employer's Variation, the Contractor shall have no claim of any kind whatsoever arising out of or in connection with any of the proposals made or any failure to reach agreement. In case the Employer's Variation involves omission of part of the Works, the agreement shall address the issue of reduction in the Contract Price.</p> <p>Note: The Contract Forms attached to PC may be modified as considered necessary at the time of finalization of the Contract.</p>
45	Sub-clause 13.7 Adjustments for Changes in Legislation	<p>The following is added to the existing clause:</p> <p>The Contract Price shall be adjusted to take into account any new taxes or any statutory variation in Custom Duty, GST etc. on finished product/item during the contractual completion period shall be to the Employer's account for which the Contractor shall furnish documentary evidence in support of their claims. However, any increase in the cost due to new taxes or change in the existing taxes & GST/Custom duty act etc. introduced during the extended contractual completion period due to the Contractor's fault shall be to the Contractor's account.</p>
46	Sub-Clause 13.8, Adjustments for Changes in Cost	<p>Replace the GC Sub-Clause 13.8 with the provisions as under:</p> <p>The rates as per the accepted Bill of Quantities / Pricing Document shall be applicable till the completion of the Works and will be varied only to the extent of permissible price variation under this clause. However, this adjustment shall be to the extent that full compensation for any rise or fall in costs to the Contractor is not covered by the Price Variation formula, the rates in the accepted Bill of Quantities / Pricing Document shall be deemed to include amounts to cover the contingency of such rise or fall in costs.</p>

<p>The price variation will be payable only on the Indian currency component (no adjustment for foreign currency component) of the Contract Price for Bill of Quantity bill no BLT -1 and CR -1 only of Price Bid as per the following price variation formula.</p> <p>Payment as per the Contract shall be subject to adjustment in accordance with the following Price Variation formula, and other terms given herein, to provide for variation in the market rates of inputs like labour, materials and fuel / energy during the currency of the Contract:</p> $V = V_L + V_S + V_C + V_F + V_M$ <p>Where</p>	
V	Total adjustment on account of all components/factors
V _L	<p>Adjustment on account of labour component</p> $= p * R * \frac{l - l_o}{l_o}$
V _S	<p>Adjustment on account of steel component</p> $= q * R * \frac{W_S - W_{so}}{W_{so}}$
V _C	<p>Adjustment on account of cement component</p> $= r * R * \frac{W_C - W_{co}}{W_{co}}$
V _F	<p>Adjustment on account of fuel / lubricant component</p> $= s * R * \frac{W_f - W_{fo}}{W_{fo}}$
V _M	<p>Adjustment on account of other materials, machinery and machine tools component</p> $= t * R * \frac{W_m - W_{mo}}{W_{mo}}$
p	Cost coefficient of labour to the total cost = 0.20
q	Cost coefficient of Steel to the total cost = 0.25

		r	Cost coefficient of Cement to the total cost = 0.17
		s	Cost coefficient of Fuel & Lubricants to the total cost = 0.05
		t	Cost coefficient of other Materials, machineries, tools and plants = 0.18
		Note: $p + q + r + s + t = 0.85$, balance 0.15 shall be the fixed component	
		R	Gross value of the work done by the Contractor for the period of work under consideration, after excluding the reform the cost of any materials supplied free or at fixed rate to the Contractor.
		I_o	Consumer Price Index for Industrial workers, published in the Labour Bureau, Ministry of Labour and Employment, Government of India, as applicable to Pune area for the month preceding the month in which the last date prescribed for receipt of tender, falls.
		I	Average of monthly Consumer Price Index for Industrial workers published in the Labour Bureau, Ministry of Labour and Employment, Government of India, as applicable to Pune area for the month under consideration.
		W_{so}	Wholesale Price Index for Steel published by RBI Bulletin (with base 2011-12 = 100 for mild steel - long products) for the month preceding the month in which the last date prescribed for receipt of tender, falls
		W_s	Wholesale Price Index for Steel published by published by RBI Bulletin (with base 2011-12 = 100 for mild steel - long products) for the month under consideration
		W_{co}	Wholesale Price Index for Cement, Lime, Plaster (with base 2011-12 = 100) issued by RBI Bulletin for the month preceding the month in which the last date prescribed for receipt of tender, falls.
		W_c	Wholesale Price Index for Cement, Lime, Plaster (with base 2011-12 = 100) issued by RBI Bulletin for the month under consideration.
		W_{fo}	Wholesale Price Index (Averages) for Fuel & Power (with base 2011-12 = 100), as published by RBI Bulletin for the month preceding the month in which the last date prescribed for receipt of tender, falls.
		W_f	Wholesale Price Index (Averages) for Fuel & Power (with base 2011-12 = 100), as published by RBI Bulletin for the month under consideration.
		W_{mo}	Wholesale Price Index (Averages) for Machinery and Machine Tools (with base 2011-12 = 100) as

			published by RBI Bulletin for the month preceding the month in which the last date prescribed for receipt of tender, falls.
		W _m	Wholesale Price Index (Averages) for Machinery and Machine Tools (with base 2011-12 = 100) as published by RBI Bulletin for the month under consideration.
		<p>Period of Work under consideration will mean as under:</p> <ul style="list-style-type: none"> • In the case of first "On-account Bill" the period from the months in which the Bid was opened to the month of measurement of first bill. • In the case of second and subsequent "On-account" and Final bills, the Period from the month of measurement for previous bill to the month of measurement of that bill. <p>Note: Responsibility of arranging the RBI Bulletins/CPWD notifications as desired by the Employer or the Engineer shall rest with the Contractor.</p> <p>Procedure in case of delay in Availability of final RBI indices:</p> <p>Where the final Price Indices are not available in the Reserve Bank of India Bulletins, while making payment towards on-account bills, payment towards Price Variation will be made on provisional basis based on the indices available, to be adjusted in subsequent bills as and when the final indices figures become available.</p> <p>Price Variation for Varied Items:</p> <p>Normally, no price variation clause shall be applicable to any extra item/new rates not originally included in the accepted Bill of Quantities / Pricing Document and for which the rates are fixed separately under Clause 13 of GCC. It shall, however be open to the Engineer to accept price variation clause in such cases where the rates are not based on actuals and work is likely to continue for more than one year.</p> <p>Adjustment on account of Price Variation:</p> <p>Adjustment on account of Price Variations may be positive (in which case extra amount shall be paid to the Contractor), or negative (in which case the amount of Price Variation shall be recovered from the Contractor). Adjustment on account of Price Variation shall be calculated separately, for each period, between two successive dates of measurements for bills and paid along with each bill or separately as claimed by the Contractor.</p> <p>After verifying the bill, the Engineer shall certify the adjustment amount and advise the same to the Employer along with the 'On Account' bill. Should any extra amount be due to Contractor, the Employer shall pay the same as far as possible within 28 days of certification by Engineer. Any amount due</p>	

		<p>from Contractor on account of negative adjustment shall be recovered from his pending or other bills at the earliest.</p> <p>Price Variation during extended period of completion:</p> <p>The price adjustment as worked out above i.e. either increase or decrease will be applicable up to the stipulated date of completion of the work including the extended period of completion where such extension has been granted under Sub-Clause 8.4 & 8.5 of GC or it is specifically mentioned that extension is with price variation also. However, where extension has been granted under Sub-Clause 8.7 of GC, price adjustment will be due as follows:</p> <p>In case the indices increase above the indices applicable to a bill made on the last date of original completion period or the extended period under Sub-Clauses 8.4 & 8.5 of GC, the price adjustment for the period of extension under Sub-Clause 8.7 of GC will be limited to the amount payable as per the indices applicable to a bill made on the last date of the original completion period or the extended period under Sub-Clauses 8.4 & 8.5 of GC as the case may be.</p> <p>In case the indices fall below the indices applicable to a bill made on the last date of the original or extended period of completion, then the lower indices will be adopted for Price Adjustment for the period of extension under Clause 8.4 & 8.5 of GC unless the extension has been granted due to Contractor's fault.</p>
47	<p>Sub-Clause 14.1,</p> <p>The Contract Price</p>	<p>Replace the GC Sub-Clause 14.1 with the provisions as under:</p> <ul style="list-style-type: none"> (a) the Contract Price shall be the item rate Accepted Contract Amount and be subject to adjustments in accordance with the Contract; (b) the Contractor shall pay all taxes, levies, duties, cess as per GST/Custom Tariff Act etc, royalty, rates and fees required to be paid by him under the Contract, and the Contract Price shall not be adjusted for any of these costs except as stated in Sub-Clause 13.7 [Adjustments for Changes in Legislation]; (c) No change (d) Not applicable (e) The Contract Price, subject to any adjustment thereto in accordance with the Contract shall be all inclusive of GST, Custom duties, royalties etc. <p>The Bidder/Contractor is required to note the following regarding Contract prices:</p> <ul style="list-style-type: none"> • The Contractor shall submit the proof of registrations under various fiscal and labour laws like GST, Profession Tax, Import Export Code, Employee State Insurance, Provident Fund, Maharashtra Labour Welfare Fund and shall submit an undertaking that he will get registered with the competent authority/ies for complying with various laws that are applicable.

		<ul style="list-style-type: none">• Deleted• The Contractor shall be solely responsible to find out and ascertain whether their supplies for Maharashtra Metro Rail Corporation Limited will qualify and be eligible for the concession duty benefit under Chapter 98.01 of custom Tariff Act for project Imports & shall manage the Custom Duty applicability and inclusion in their quoted price accordingly. After award of the Contract, Employer at the written request of a contractor shall facilitate the contractor for obtaining sponsoring / recommendation letter from the GOM for getting themselves registered for availing Project Import benefits. 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.• Should the Employer, during execution of the contract, obtain a waiver of GST/Custom Duty if applicable, in full or part thereof, the Contractor will be advised on the process to be followed to obtain exemption /refund of such taxes, duties etc., from the concerned Authorities. In case of failure by the Contractor to obtain and remit the refund within reasonable time (to be decided by the Employer & 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. The decision of the Employer shall be final and binding. If the Contractor fails to take the required action to obtain refund or exemption, the Employer may take action in accordance with condition of Contract.• The Contractor shall maintain details of GST /Custom Duty etc. paid to the concerned authority and submit:• Certificate of the Chartered Accountant in regard to turnover of the Contractor relating to Maharashtra Metro Rail Corporation Limited.• GST return of the Contractor for the relevant period / periods along with detailed statement & copy of Challans in regard to deposit of tax.• The Contractor also will have to submit 'No Dues Certificate' for the year / period as and when required by Maharashtra Metro Rail Corporation Limited.• The full and final payment to Contractor will be made only after documents as required above are furnished by him and checked by Maharashtra Metro Rail Corporation Limited.• All payments will be subject to GST-TDS provisions, if applicable in force from time to time.• Deleted• Any duty drawback, export / import incentive, concession / exemption available to the Contractor to be passed on to Maharashtra Metro Rail Corporation Limited.• Labour Welfare Fund, ESI, PF and other labour related payments:• Primary responsibility for payment statutory dues or other dues within stipulated time shall be primary responsibility of the Contractor.• Maharashtra Metro Rail Corporation Limited at no point of time shall be responsible for the same.
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		<ul style="list-style-type: none"> Contractors shall certify on annual basis that there are no unpaid dues relating to persons working in Maharashtra Metro Rail Corporation Limited project. Maharashtra Metro Rail Corporation Limited has a right to recover any unpaid dues from the Contractor in the event of default at his part. Income tax All payments shall be subject to TDS provisions in force from time to time. The Bidders are expected to submit certificates from competent authorities for lesser / non-deduction of TDS. Deleted General Clause In case if Maharashtra Metro Rail Corporation Limited project is approved for exemptions from any tax, duty, cess, levy at a date later than the date of award of Bid the benefit so accruing to the Bidder shall be passed on to Maharashtra Metro Rail Corporation Limited. Appropriate changes will be made to the Contract Price in such cases. The Contractor shall provide Maharashtra Metro Rail Corporation Limited an authority to deduct such amounts from any sum payable to the Contractor by Maharashtra Metro Rail Corporation Limited. In case of change in taxation regime, the Contractor shall comply with the statutory requirements and provide Maharashtra Metro Rail Corporation Limited with such documents / certificates / declaration as may be stipulated by Maharashtra Metro Rail Corporation Limited from time to time. All bill raised should specifically state the amount of taxes charged separately in detail. The bills should mention all the required statutory details including the registration numbers with various statutory authorities, declarations, formats as required under various statutory laws / regulations. Maharashtra Metro Rail Corporation Limited shall at no point of time will be responsible for payment of taxes, duties, cess, levy, rates, royalty other than which are mentioned in the Bidding Documents and recovered by the Contractor in their bills submitted periodically. No recoveries will be entertained by Maharashtra Metro Rail Corporation Limited for demands raised by the Contractor at later stage. <p>The Contractor has to maintain meticulous record of all the taxes and duties paid under GST, Custom Duty etc. and to submit the same when required by the Employer.</p>
48	Sub-Clause 14.2, Advance Payment	<p>Replace the GC Sub-Clause 14.2 with the provisions as under:</p> <p>The Employer shall make an advance payment, as an interest-free loan for mobilization and cash flow support, when the Contractor submits a guarantee in accordance with this Sub-Clause. The total advance payment, the number and timing of instalments (if more than one), and the applicable currencies and proportions, shall be as stated in the Contract Data.</p>

		<p>The Engineer shall deliver to the Employer and to the Contractor an Interim Payment Certificate for the advance payment after receiving a Statement (under Sub-Clause 14.3 [Application for Interim Payment Certificates]) and after the Employer receives (i) the Performance Security in accordance with Sub-Clause 4.2 [Performance Security] and (ii) a guarantee in amounts and currencies equal to the advance payment. This guarantee shall be issued by a Scheduled Commercial Bank based in India acceptable to the Employer and shall be in the form annexed to the Particular Conditions or in another form approved by the Employer.</p> <p>The Contractor shall ensure that the guarantee is valid and enforceable until the advance payment has been repaid, but its amount shall be progressively reduced by the amount repaid by the Contractor as indicated in the Payment Certificates. If the terms of the guarantee specify its expiry date, and the advance payment has not been repaid by the date 28 days prior to the expiry date, the Contractor shall extend the validity of the guarantee until the advance payment has been repaid.</p> <p>Unless stated otherwise in the Contract Data, the advance payment shall be repaid through percentage deductions from the interim payments determined by the Engineer in accordance with Sub-Clause 14.6 [Issue of Interim Payment Certificates], as follows:</p> <ul style="list-style-type: none"> (a) deductions shall commence in the next interim Payment Certificate following that in which the total of all certified interim payments (excluding the advance payment and deductions and repayments of retention) exceeds 30 percent (30%) of the Accepted Contract Amount; and (b) deductions shall be made at the amortization rate stated in the Contract Data of the amount of each Interim Payment Certificate (excluding the advance payment and deductions for its repayments as well as deductions for retention money) in the currencies and proportions of the advance payment until such time as the advance payment has been repaid; provided that the advance payment shall be completely repaid prior to the time when 90 percent (90%) of the Accepted Contract Amount less Provisional Sums has been certified for payment. <p>If the advance payment has not been repaid prior to the issue of the Taking-Over Certificate for the Works or prior to termination under Clause 15 [Termination by Employer], Clause 16 [Suspension and Termination by Contractor] or Clause 19 [Force Majeure] (as the case may be), the whole of the balance then outstanding shall immediately become due and in case of termination under Clause 15 [Termination by Employer], except for Sub-Clause 15.5 [Employer's Entitlement to Termination for Convenience], payable by the Contractor to the Employer.</p>
49	Sub-clause 14.2.1	<p>Interest in case of delay in repayment of Advances</p> <p>Should there be delay in the progress and completion of work, as a result of which it is not possible to recover the advance and interest thereon, before the date of completion stipulated in the Contract, then the interest to be charged from the Contractor on the remaining portion of the advance beyond the original completion date specified in the Contract, shall be the State Bank</p>

		<p>of India Base Rate plus 3% per annum or 12% per annum, whichever is higher up to the date of actual recovery affected by the MAHA-METRO.</p> <p>If the contract is terminated due to default of the Contractor, the 'Mobilisation Advance' would be deemed as interest bearing advance at an interest rate equal to the State Bank of India Base Rate, prevailing on the date of issue of Notice of Invitation of Bids plus 3% per annum or 12% per annum, whichever is higher, to be compounded quarterly.</p> <p>The interest will be calculated from the first day of the month in which an advance is paid to the Contractor and it will be calculated up to the last day of the month in which the recovery is made. Interest for the month would be calculated on the month principal outstanding on the first day on the month.</p>
50	Sub-Clause 14.7, Payment	<p>Add following at the end of the Sub-Clause GC 14.7:</p> <p>The Employer may, at its sole discretion, authorise the Engineer to perform the functions of Employer specified in the GC Clause 14.7.</p> <p>The Employer may advise arrangements for payment through the lending Bank. The procedure to be followed for such payment through the Bank shall be advised to the Contractor by the Engineer.</p> <p>Add Further</p> <p>If and to the extent that the Pricing Document expressly specifies in relation to a Cost Centre that the Contractor is entitled to payment in a currency other than Indian Rupees, or the Engineer makes a determination of Cost in a currency other than Indian Rupees, all such payments shall be made in the relevant foreign currency.</p> <p>In calculating the amount payable to the Contractor for the Rupee portion, for each item, sums of less than Fifty Paise shall be omitted and sums of Fifty Paise and more, up to one Rupee, shall be reckoned as one Rupee. The net payments in foreign currencies, if applicable, shall also be rounded off to 'zero' decimal places.</p> <p>All the payments to the contractor/supplier for all currency shall be made by online mode/e-cheque. But no payment will be issued for an amount of less than Rs. 1000/-. This shall not apply to the final payment.</p> <p>Payment procedure shall be as under:</p> <p>a) The Contractor shall submit the monthly bill for payment to the Engineer.</p> <p>b) Immediately after the submission of bill 80 % amount of the bill shall be released within 7 working days.</p> <p>c) The remaining 20% of the bill shall be released after detail scrutiny and subsequent comments / Recommendations by</p>

		<p>Engineer within 28 days from the date of submission of bill by contractor.</p> <p>d) If any adverse comments regarding the workmanship or the quality of the work done in the previous bill is made by the Engineer then appropriate and suitable amount shall be recovered from successive bills.</p> <p>Add further</p> <p>Notwithstanding anything stated herein the Employer's Representative retains the right to withhold payment on any item due for payment when the services is to be performed is not performed or is not carried to satisfaction of Employers satisfaction.</p>
51	Sub-Clause 14.8-Delayed Payment	<p>Replace the GC Sub-Clause 14.8 with the provisions as under:</p> <p>If the Contractor does not receive payment/certificate for acceptance of payment in accordance with GC and PC Clause 14.7 above, the Contractor shall be entitled to receive interest on the amount unpaid during the period of delay. This period of delay shall be deemed to commence from the first working day after 56 calendar days from the date of issue of the Interim Payment Certificate.</p> <p>The interest shall be calculated at an interest rate equal to State Bank of India prime lending rate.</p> <p>The Contractor shall submit their claim for the interest for the above period of delay along with detailed reasons for the said delays to the Engineer within 14 days of the expiry of the 56 days period. The claimed interest shall be payable to the Contractor only if it is determined by the Engineer that the delays are solely attributable to the Employer.</p>
52	Sub-Clause 14.9	<p>Replace the GC Sub-Clause 14.9 with the provisions as under:</p> <p>When the Taking-Over Certificate has been issued for the Works, the first half of the Retention Money shall be certified by the Engineer for payment to the Contractor. If a Taking-Over Certificate is issued for a Section or part of the Works, a proportion of the Retention Money shall be certified and paid. This proportion shall be half (50%) of the proportion calculated by dividing the estimated contract value of the Section or part, by the estimated final Contract Price.</p> <p>Promptly after the latest of the expiry dates of the Defects Notification Periods, the outstanding balance of the Retention Money shall be certified by the Engineer for payment to the Contractor. If a Taking-Over Certificate was issued for a Section, a proportion of the second half of the Retention Money shall be certified and paid promptly after the expiry date of the Defects Notification Period for the Section. This</p>

		<p>proportion shall be half (50%) of the proportion calculated by dividing the estimated contract value of the Section by the estimated final Contract Price.</p> <p>However, if any work remains to be executed under Clause 11 [Defects Liability], the Engineer shall be entitled to withhold certification of the estimated cost of this work until it has been executed.</p> <p>When calculating these proportions, no account shall be taken of any adjustments under Sub-Clause 13.7 [Adjustments for Changes in Legislation] and Sub-Clause 13.8 [Adjustments for Changes in Cost].</p> <p>Unless otherwise stated in the Particular Conditions, when the Taking-Over Certificate has been issued for the Works and the first half of the Retention Money has been certified for payment by the Engineer, the Contractor shall be entitled to substitute a guarantee, in the form annexed to the Particular Conditions or in another form approved by the Employer and issued by a scheduled Indian/Foreign bank in India acceptable to the Employer, for the second half of the Retention Money. The Contractor shall ensure that the guarantee is in the amounts and currencies of the second half of the Retention Money and is valid and enforceable until the Contractor has executed and completed the Works and remedied any defects, as specified for the Performance Security in Sub- Clause 4.2. On receipt by the Employer of the required guarantee, the Engineer shall certify, and the Employer shall pay the second half of the Retention Money. The release of the second half of the Retention Money against a guarantee shall then be in lieu of the release under the second paragraph of this Sub-Clause. The Employer shall return the guarantee to the Contractor within 21 days after receiving a copy of the Performance Certificate.</p> <p>If the Performance Security required under Sub-Clause 4.2 is in the form of a demand guarantee, and the amount guaranteed under it when the Taking-Over Certificate is issued is more than half of the Retention Money, then the Retention Money guarantee will not be required. If the amount guaranteed under the Performance Security when the Taking-Over Certificate is issued is less than half of the Retention Money, the Retention Money guarantee will only be required for the difference between half of the Retention Money and the amount guaranteed under the Performance Security.</p>
53	Sub-Clause 14.15 Currencies of Payment	In item no. (e) of Sub-Clause 14.15 the “Central Bank of the country” would mean the Reserve Bank of India and the Base Date would be the date 28 days before the latest date of submission of Bid.
54	Sub-Clause 15.2	<p>Add the following at the end of this sub-clause:</p> <p>On termination of contract due to Contractor’s default the performance security shall be forfeited by encashing the bank guarantee and the balance work shall be got done independently without risk and cost of the failed Contractor. The failed Contractor shall be debarred from participating in the tender for executing the balance work. If the failed contractor is a JV/CONSORTIUM or a partnership firm, then every member/partner of such JV/CONSORTIUM or partnership firm shall be debarred from participating in the</p>

		<p>tender for the balance work either in his/her individual capacity or as a partner of any other JV/CONSORTIUM/partnership firm.</p> <p>In case the contractor fails to adhere to the agreed programme of work by margin of 10% of the stipulated period or 21 days, whichever is earlier, or fails to complete the Works or parts of the Works within the stipulated or extended period of completion, or is unlikely to complete the whole Work or part thereof within time because of poor record of progress, the Employer at its sole discretion may terminate only part of the contract also by taking out some part of the total scope of work and may complete or arrange for any other entity through the process of open/limited/single tender or by calling quotations, to do so at the risk and cost of the Contractor.</p>
55	Sub-Clause 16.1, Contractor's Entitlement to Suspend Work	<p>Replace the GC Sub-Clause 16.1 with the provisions as under:</p> <p>If the Engineer fails to certify in accordance with Sub-Clause 14.6 [Issue of Interim Payment Certificates] or the Employer fails to comply with Sub-Clause 14.7 [Payment], the Contractor may, after giving not less than 21 days' notice to the Employer, suspend work (or reduce the rate of work) unless and until the Contractor has received the Payment Certificate, reasonable evidence or payment, as the case may be and as described in the notice.</p> <p>The Contractor's action shall not prejudice his entitlements to financing charges under Sub-Clause 14.8 [Delayed Payment] and to termination under Sub-Clause 16.2 [Termination by Contractor].</p> <p>If the Contractor subsequently receives such Payment Certificate, evidence or payment (as described in the relevant Sub-Clause and in the above notice) before giving a notice of termination, the Contractor shall resume normal working as soon as is reasonably practicable.</p> <p>If the Contractor suffers delay and/or incurs Cost as a result of suspending work (or reducing the rate of work) in accordance with this Sub-Clause, the Contractor shall give notice to the Engineer and shall be entitled subject to Sub-Clause 20.1 [Contractor's Claims] to:</p> <ul style="list-style-type: none"> (a) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [Extension of Time for Completion], and (b) payment of any such Cost-plus profit, which shall be included in the Contract Price. <p>After receiving this notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine these matters.</p>
56	Sub-Clause 16.2, Termination by Contractor	<p>Replace the GC Sub-Clause 16.2 with the provisions as under:</p> <p>The Contractor shall be entitled to terminate the Contract if:</p>

		<p>(a) the Engineer fails, within 56 days after receiving a Statement and supporting documents, to issue the relevant Payment Certificate,</p> <p>(b) the Contractor does not receive the amount due under an Interim Payment Certificate within 42 days after the expiry of the time stated in Sub-Clause 14.7 [Payment] within which payment is to be made (except for deductions in accordance with Sub-Clause 2.5 [Employer's Claims]),</p> <p>(c) the Employer substantially fails to perform his obligations under the Contract in such manner as to materially and adversely affect the economic balance of the Contract and/or the ability of the Contractor to perform the Contract,</p> <p>(d) the Employer fails to comply with Sub-Clause 1.6 [Contract Agreement] or Sub-Clause 1.7 [Assignment],</p> <p>(e) a prolonged suspension affects the whole of the Works as described in Sub-Clause 8.11 [Prolonged Suspension], or</p> <p>(f) the Employer becomes bankrupt or insolvent, goes into liquidation, has a receiving or administration order made against him, compounds with his creditors, or carries on business under a receiver, trustee or manager for the benefit of his creditors, or if any act is done or event occurs which (under applicable Laws) has a similar effect to any of these acts or events.</p> <p>(g) the Contractor does not receive the Engineer's instruction recording the agreement of both Parties on the fulfilment of the conditions for the Commencement of Works under Sub- Clause 8.1 [Commencement of Works].</p> <p>In any of these events or circumstances, the Contractor may, upon giving 14 days' notice to the Employer, terminate the Contract. However, in the case of sub-paragraph (e) or (f), the Contractor may by notice terminate the Contract immediately.</p> <p>In the event the Bank suspends the loan or credit from which part or whole of the payments to the Contractor are being made, if the Contractor has not received the sums due to him upon expiration of the 14 days referred to in Sub-Clause 14.7 [Payment] for payments under Interim Payment Certificates, the Contractor may, without prejudice to the Contractor's entitlement to financing charges under Sub-Clause 14.8 [Delayed Payment], take one of the following actions, namely (i) suspend work or reduce the rate of work under Sub-Clause 16.1 above, or (ii) terminate the Contract by giving notice to the Employer, with a copy to the Engineer, such termination to take effect 14 days after the giving of the notice.</p> <p>The Contractor's election to terminate the Contract shall not prejudice any other rights of the Contractor, under the Contract or otherwise.</p>
57	Sub-clause 17.1 - Indemnities	<p>Replace the GC Sub-Clause 17.1 with the provisions as under:</p> <p>"The Contractor shall indemnify and hold harmless the Employer (Maharashtra Metro Rail Corporation Limited), the Engineer, the Designated Contractors, representatives and</p>

		<p>employees from and against all actions, suits, proceedings, claims, damages, losses, expenses and demands of every nature and description, by reasons of any act or omissions of the Contractor, his representative or his employees in the execution of the Works, including professional services provided by the Contractor or in the guarding the same.</p> <p>These indemnification obligations shall include but not be limited to claims, damages, losses, damage proceedings, charges and expenses which are attributable to:</p> <ul style="list-style-type: none"> • sickness, or disease, or death of, or injury to any person; and • loss of, or damage to, or destruction of any property (other than the Works) including consequential loss of use; and • loss, damage or costs arising from the carriage of Plant, Rolling Stock and Materials and/or ownership or chartering of marine vessels by the Contractor, or any sub-contractor of any tier. <p>The Contractor shall also indemnify and save harmless the Employer from & against all claims & proceedings on account of infringements of patents rights, design, trademark name etc as detailed out in the GC.</p> <p>All sums payable by way of compensation under these conditions shall be considered reasonable compensation payable to the Employer, without reference to the actual loss or damage sustained, and whether or not any damage shall have been sustained.</p> <p>The decision of the Engineer as to compensation claimed shall be final and binding.”</p>
58	<p>Sub-Clause 18.1</p> <p>General Requirement for Insurances</p>	<p>Add the following at the end of this sub-clause:</p> <p>The Contractor shall obtain all insurances required in the Contract from Insurance companies operating in India. Insurances to cover risks within India as well as Marine and Transit Insurances shall invariably be effected with an Indian Insurance Company.</p>
59	<p>Sub-Clause 18.2 Insurance for Works and Contractor's Equipment</p>	<p>Add the following at the end of this sub-clause:</p> <p>The Contractor shall take Comprehensive All Risk (CAR) insurance policies duly covering Marine/Transit, Erection cum Storage insurance of cars for value equivalent to the contract value with deductibles not exceeding one (01) percent value. Insurance policy shall be valid till three months after expiry of DLP. The policy shall include insurance for the complete contract value.</p>
60	<p>New Sub-clause 18.5,</p> <p>Professional Indemnity Insurance</p>	<p>The Contractor shall effect and maintain professional, indemnity insurance, in the name of Maharashtra Metro Rail Corporation Limited, for the amount in Indian Rupees stipulated in Part A: Contract Data in respect of any design of the Works to be carried out by, or on behalf of the Contractor.</p>

		<p>This insurance, which shall ensure the Contractor's liability by reason of professional negligence and errors in the design of the works, shall be valid from the date of commencement of Works, until 5 years after the date of issue of Performance Certificate or 3 years after commencement of commercial train operations whichever is later. Alternatively, the Contractor shall redeem the insurance before the expiry of the Yearly Insurance in such a way that the entire validity period is covered.</p> <p>The Engineer will not issue Final Payment Certificate until the Contractor has produced evidence that coverage of the professional indemnity insurance has been provided for the aforesaid period.</p>
61	Sub-Clause 19.4, Consequences of Force Majeure	<p>Replace the GC Sub-Clause 19.4 with the provisions as under:</p> <p>If the Contractor is prevented from performing his substantial obligations under the Contract by Force Majeure of which notice has been given under Sub-Clause 19.2 [Notice of Force Majeure], and suffers delay and/or incurs Cost by reason of such Force Majeure, the Contractor shall be entitled subject to Sub-Clause 20.1 [Contractor's Claims] to:</p> <p>(c) an extension of time for any such delay, if completion is or will be delayed, under Sub-Clause 8.4 [Extension of Time for Completion], and</p> <p>(d) if the event or circumstance is of the kind described in subparagraphs (i) to (iii) of Sub-Clause 19.1 [Definition of Force Majeure] and, in sub-paragraphs (ii) and (iii), occurs in the Country, payment of any such Cost, including the costs of rectifying or replacing the Works and/or Goods damaged or destroyed by Force Majeure, to the extent they are not indemnified through the insurance policy referred to in Sub-Clause 18.2 [Insurance for Works and Contractor's Equipment].</p> <p>After receiving this notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine these matters.</p>
62	Sub-clause 19.6: Optional Termination, Payment and Release	<p>Replace "84 days" and "140 days" mentioned in the sub-clause with "184 days" and "340 days" respectively.</p>
63	Sub-clause 19.8 (New Subclause)	<p>Any loss or damage caused to Goods/Trains in manufacturer's works in India or abroad due to natural calamities like flooding, typhoons and heavy storms etc. including rioting, fire etc. shall be covered by an insurance policy by the Contractor and he shall not be entitled for any payment against the loss or damage from the Employer. The Employer may however consider an extension to the Contract on this account if it is established that all reasonable precautions were taken by the Contractor.</p>
Replacement to Clause 20 of Section VIII - GCC: CLAIMS, DISPUTES & ARBITRATION		

64	Sub-Clause 20.1 Procedure of claim	<p>The following is added to the existing clause:</p> <p>If the Contractor intends to claim any additional payment under any clause of these Conditions or otherwise, the contractor shall give notice to the Engineer as soon as possible and in any event within 28 days of the start of the event giving rise to the claim.</p> <p>The Contractor shall keep such contemporary records to substantiate any claim, either on the Site or at any other location acceptable to the Engineer. Without admitting the Employer's liability, the Engineer shall, on receipt of such notice, inspect such records and may instruct the Contractor to keep further contemporary records. The Contractor shall permit the Engineer to inspect all such records, and shall (if instructed) submit copies to the Engineer.</p> <p>Within 28 days of such notice, or such other time as may be agreed by the Engineer, the Contractor shall send to the Engineer an account, giving detailed particulars of the amount and basis of the claim. Where the event giving rise to the claim has a continuing effect, such amount shall be considered as interim. The Contractor shall then, at such intervals as the Engineer may reasonably require, send further interim accounts giving the accumulated amount of the claim and any further particulars. Where interim accounts are sent to the Engineer, the Contractor shall send a final account within 28 days of the end of the effects resulting from the event.</p> <p>If the Contractor fails to comply with this Sub-Clause, he shall not be entitled to claim any additional payment.</p>
65	Sub-Clause 20.2 Payment for Claims	<p>The following is added to the existing clause:</p> <p>The Contractor shall be entitled to have included in any Interim Payment Certificate such amount for any claim as the Engineer considers due, after taking approval from the Employer. If the particulars supplied are insufficient to substantiate the whole of the claim, the Contractor shall be entitled to payment for such part of the claim as has been substantiated.</p>
66	Sub-Clause 20.3 No legal action till Dispute Settlement Procedure is exhausted	<p>The following is added to the existing clause:</p> <p>Any and all Disputes shall be settled in accordance with the provisions of Clause 20. No action at law concerning or arising out of any Dispute shall be commenced unless and until all applicable Dispute resolution procedures set out in Clause 20 shall have been finally exhausted in relation to that Dispute or any Dispute out of which that Dispute shall have arisen with which it may be or may have been connected.</p>
67	Sub-Clause 20.4 Notice of Dispute	<p>The following is added to the existing clause:</p> <p>For the purpose of Sub-Clause 20.5, a Dispute shall be deemed to arise when one party serves on the other party a notice in writing (hereinafter called a ("Notice of Dispute") stating the nature of the Dispute provided that no such notice shall be served later than 28 days after the date of issue of Performance Certificate by the Engineer.</p>
68	Sub-Clause 20.5 Two stages for Dispute Resolution	<p>The following is added to the existing clause:</p> <p>Disputes shall be settled through two stages:</p>

		<p>a. Conciliation procedures as established by "The Arbitration and Conciliation Act-1996" (as amended from time to time) and in accordance with this Clause. In the event this procedure fails to resolve the Dispute then;</p> <p>b. Arbitration procedures undertaken as provided by "The Arbitration and Conciliation Act -1996" (as amended from time to time) and in accordance with this Clause.</p>
69	Additional Sub-Clause 20.5 Conciliation	<p>The following is added to the existing clause:</p> <p>Within 60 days of receipt of Notice of Dispute, either party shall refer the matter in dispute to conciliation.</p> <p>Conciliation proceedings shall be initiated within 30 days of one party inviting the other in writing to Conciliation. Conciliation shall commence when the other party accepts in writing this invitation. If the invitation is not accepted then Conciliation shall not take place. If the party initiating conciliation does not receive a reply within 30 days from the date on which he sends the invitation he may elect to treat this as a rejection of the invitation to conciliate and inform the other party accordingly.</p> <p>The Conciliation shall be undertaken by one Conciliator selected from a panel of Conciliators maintained by the Employer. The Conciliator shall assist the parties to reach an amicable settlement in an independent and impartial manner.</p>
70	Additional Sub-Clause 20.5 :Conciliation Procedure	<p>The following is added to the existing clause:</p> <p>The Employer shall maintain a panel of Conciliators, who shall be from serving or retired engineers of Government Departments, or of Public Sector Undertakings. Out of this panel, a list of three Conciliators shall be sent to the Contractor who shall choose one of them to act as Conciliator and conduct conciliation proceedings/ in accordance with "The Arbitration and Conciliation Act, 1996", of India.</p> <p>There will be no objection if conciliator so nominated is a serving employee of MAHA-METRO who would be Deputy level officer and above.</p> <p>The Employer and the Contractor shall in good faith co-operate with the Conciliator and, in particular, shall endeavor to comply with requests by the Conciliator to submit written materials, provide evidence and attend meetings. Each party may, on his own initiative or at the invitation of the Conciliator, submit to the Conciliator suggestions for the settlement of the dispute.</p> <p>When it appears to the Conciliator that there exist elements of a settle which may be acceptable to the parties, he shall formulate the terms possible settlement and submit them to the parties for their observations, receiving the observations of the parties, the Conciliator may reformulate the terms of a possible settlement in the light of such observations.</p> <p>If the parties reach agreement on a settlement of the dispute, they may draw up and sign a written settlement agreement. If requested by the parties, the Conciliator may draw up, or assist the parties in drawing up, the settlement agreement.</p> <p>When the parties sign the settlement agreement, it shall be final and binding on the parties and persons claiming under them respectively. The Conciliator shall authenticate the settlement</p>

		agreement and furnish a copy thereof to each of the parties. As far as possible, the conciliation proceedings should be completed within 60 days of the receipt of notice by the Conciliator.
71	Additional Sub-Clause 20.5 Termination of Conciliation Proceedings	<p>The following is added to the existing clause: The parties shall not initiate, during the conciliation proceedings, any arbitral or judicial proceedings in respect of a dispute that is the subject matter of the conciliation proceedings.</p> <p>The conciliation proceedings shall be terminated:</p> <ol style="list-style-type: none"> by the signing of the settlement agreement by the parties on the date of agreement; or by written declaration of the conciliator, after consultation with the parties, to the effect further efforts at conciliation are no longer justified, on the date of declaration; or by a written declaration of the parties to the conciliator to the effect that the conciliation proceedings are terminated, on the date of declaration; or by a written declaration of a party to the other party and the conciliator, if appointed, to the effect that the conciliation proceedings are terminated, on the date of declaration. <p>Upon termination of the conciliation proceedings, the conciliator shall fix the costs of the conciliation and give written notice thereof to the parties. The costs shall be borne equally by the parties unless settlement agreement provides for a different apportionment. All other expenses incurred by a party shall be borne by that party.</p>
72	Sub-Clause 20.6 Arbitration	<p>The following is added to the existing clause: If the efforts to resolve all or any of the disputes through conciliation fails, then such dispute or differences, whatsoever arising between the parties, arising out of touching or relating to construction/ manufacture, measuring operation or effect of the Contract or the breach thereof shall be referred to Arbitration in accordance with the following provisions:</p> <ol style="list-style-type: none"> Matters to be arbitrated upon shall be referred to a sole Arbitrator if the total value of the claim is up to Rs.5 million and to a panel of three Arbitrators if total value of claims is more than Rs.5 million. The Employer shall provide a panel of three arbitrators which may also include MAHA-METRO officers for the claims up to Rs.5 million and a panel of five Arbitrators which may also include MAHA-METRO officers for claims of more than Rs.5 million. The Contractor shall have to choose the sole Arbitrator from the panel of three and/or one Arbitrator from the panel of five in case three Arbitrators are to be appointed. The Employer shall also choose one Arbitrator from this panel of five and the two so chosen will choose the third arbitrator from the panel only. The Arbitrator(s) shall be appointed within a period of 30 days from the date of receipt of written notice/ demand of appointment of Arbitrator from either party. Neither party shall be limited in the proceedings before such arbitrator(s) to the evidence nor did arguments put before the Engineer for the purpose of obtaining his decision. No decision given by the Engineer in accordance with the foregoing provisions shall disqualify him from being called as a witness and

		<p>giving evidence before the arbitrator(s) on any matter, whatsoever, relevant to dispute or difference referred to arbitrator/s. The arbitration proceedings shall be held in Pune only. The language of proceedings that of documents and communication shall be English.</p> <p>b. The Employer at the time of offering the panel of Arbitrator(s) to be appointed as Arbitrator shall also supply the information with regard to the qualifications of the said Arbitrator nominated in the panel along with their professional experience, phone nos. and addresses to the contractor.</p> <p>The award of the sole Arbitrator or the award by majority of three Arbitrators as the case may be shall be binding on all parties. The award shall be made claim wise and will be a speaking award.</p>
73	Sub-Clause 20.6: Interest on Arbitration Award	<p>The following is added to the existing clause:</p> <p>Where the arbitral award is for the payment of money, no interest shall be payable on whole or any part of the money for any period, till the date on which the award is made.</p>
74	Sub-Clause 20.6: Arbitration from Time to Time	<p>The following is added to the existing clause:</p> <p>The cost of arbitration shall be borne by the respective parties. The cost shall, inter alia, include the fees of the Arbitrator(s) as per rates fixed by the Employer</p>
75	Sub-Clause 20.6: Jurisdiction of courts	<p>The following is added to the existing clause:</p> <p>Where recourse to a Court is to be made in respect of any matter, the jurisdiction of court shall be: District and Sessions Court, Pune/ High Court of Judicature at Bombay - Nagpur Bench, Nagpur/ Supreme Court of India, New Delhi.</p>
76	Additional Sub-Clause Suspension of Work on Account of Arbitration	<p>The following is added to the existing clause:</p> <p>The reference to Conciliation / Arbitration shall proceed notwithstanding that the works shall not then be or be alleged to be complete, provided always that the obligations of the Employer, Engineer and the Contractor shall not be altered by reasons of arbitration being conducted during the progress of the Works. Neither party shall be entitled to suspend the work or part of the work to which the dispute relates on account of arbitration and payments to the Contractor shall continue to be made in terms of the Contract.</p>
77	Additional Sub-Clause :Notice of Contractor	<p>a. All notices to the Contractor, shall be served by post or telex or telefax or by hand to the Contractor or his authorized representatives. In case of notices delivered by post, they will be deemed to have been delivered after 7 days of dispatch.</p> <p>b. The Contractor shall, on award of the Contract, furnish to the Engineer, the name, designation, address and telephone, telex and telefax numbers and e-mail address of his representative referred above.</p>
78	Additional Sub-Clause : Notice to Employer & Engineer	<p>All notices to the Employer or Engineer shall be served by post or telex or telefax, or by delivering by hand to the address nominated for the purpose.</p>
79	Additional Sub-Clause Sub-	<p>Parties to the contract may change the nominated address by employer with a notice to all concerned.</p>

	Clause 20.9: Change of address	
80	Additional Clause: Work by persons other than the Contractor	<p>Work by persons other than the Contractor</p> <p>If the Contractor shall fail to carry out any work required under the Contract or refuse to comply with any instruction or order given by the Engineer in accordance with the Contract within a reasonable time, the Engineer may give the Contractor 14 days' notice in writing to carry out such work or comply with such instruction. If the Contractor fails to comply with such notice, the Employer shall be entitled to carry out such work or instruction by his own workmen or by other contractors. Without prejudice to any other right or remedy, all additional expenditure properly incurred by the Employer in having such work or instruction carried out shall be recoverable by the Employer from the Contractor.</p> <p>If by reason of any accident or failure or other event occurring to, in, or in connection with the Works any remedial or other work shall, in the opinion of the Engineer, be urgently necessary and the Contractor is unable or unwilling at once to do such remedial or other work, the Engineer may authorize the carrying out of such remedial or other work by a person other than the Contractor. If the remedial or other work so authorized by the Engineer is work, which, in the Engineer's opinion, the Contractor was liable to do under the Contract, all expenses properly incurred in carrying out the same shall be recoverable by the Employer from the Contractor. Provided that the Engineer shall, as soon after the occurrence of any such emergency as may be reasonably practicable, notify the Contractor thereof in writing.</p>
81	Additional clause: Confidentiality of Information	<p>Confidentiality of Information</p> <p>The Contractor shall not use or divulge, except for the purpose of the Contract or with the written permission of the Employer, any information relating to the Works or the Project provided in the Contract or otherwise provided by the Employer, or the Engineer. The Contractor shall ensure that his sub-contractors of any tier shall be bound by a like confidentiality undertaking.</p> <p>The Employer, Engineer and any third party to whom an assignment has been made in accordance with Sub-clause 1.7 of General Conditions of Contract may use any information provided by the Contractor in accordance with the Contract. The Employer shall use reasonable endeavours to ensure that the Engineer and any third party- referred to in aforesaid Sub-Clause 1.7 shall not, divulge such information except for any purpose connected with the Contract.</p>
82	Additional Clause: Maintaining the Site	<p>In general, the cleanliness, lighting, safety, security, drinking water, first aid etc. will be the responsibility of the civil contractor as specified in the interface document.</p> <p>The Contractor shall be responsible for maintaining the site. The daily sweeping and cleaning of the area under his possession/work shall be his responsibility.</p>

		In case of repeated aberrations notices by the Engineer, a minimum penalty of Rs.5000/- shall be imposed for each instance.
83	Additional Clause: EIA & SIA	The Employer will engage suitable agencies for performing Environmental Impact Assessment and Social Impact Assessment due to the Project. These agencies will suggest appropriate monitoring mechanism as well as mitigation measures for implementation by Maharashtra Metro Rail Corporation Limited. The Contractor will be required to implement these measures as part of its obligation under SHE Manual / other relevant conditions. In case, implementing these measures are beyond the scope of work as detailed in Bidding Documents, the same shall be taken up as a Variation.
84	Additional Clause: Spares	<p>The Contractor shall supply spare parts as per the Employers requirement.</p> <p>(a) The Contractor shall submit a schedule of spare parts duly indicating, for each item of spares, its description, part number, drawing number, lead time, shelf life and number of units required for the system during the first ten years, principal as well as secondary sources of supply, and also the unit price with escalation/de-escalation clause.</p> <p>(b) The Employer may, during a period of ten years from the date of taking-over of the whole of the Works, purchase as many parts as required by him, at the rates indicated in the pricing document and accepted by the Employer.</p> <p>(c) If during the period of ten years, the Contractor intends to discontinue the manufacture of spare or replacement parts for the any equipment / Machine the Contractor shall immediately give notice to the Employer of such intention. The Employer shall be given the opportunity of ordering at reasonable prices such quantities of such spare or replacement parts as the Employer requires in relation to the anticipated life of the equipment.</p> <p>In the event of Contractor failing to supply the spare parts in accordance with this Clause, he shall in respect of each item of spare, furnish free of cost to the Employer, the drawings, specifications, patterns and other information to enable the Employer to make or have made such spare parts. The Employer shall be entitled to retain the aforesaid drawings etc., for such time only as is necessary for the exercise by the Employer of his rights under this clause and the drawings, if the Contractor so requires, shall be returned by the Employer to the Contractor in good order and condition (fair wear and tear excepted).</p> <p>Under such circumstances, the Contractor shall also grant to the Employer, without payment of any royalty or charge, full right and liberty to make or have made spare or replacement parts as aforesaid and for such purposes only to use, make and have made copies of all drawings, patterns, specifications and other information supplied by the Contractor to the Employer pursuant to the Contract.</p> <p>The Contractor will so far as it is reasonably able to bind his sub-contractors to conform with the requirements of this Clause and shall, prior to entry into any sub-contracts, provide</p>

		<p>the Employer with full details of any sub-contractor who will not so conform in which event the Employer may direct the Contractor to seek an alternative sub-contractor.</p> <p>If the Contractor fails to provide spare or replacement parts as described in this Sub-clause and these are available from the Contractor's sub-contractor, the Employer shall have the right to obtain such spare and replacement parts from the subcontractor or any other supplier and any additional cost incurred by the Employer shall be recoverable from the Contractor.</p> <p>(d) The Employer may require the Contractor to enter into a Maintenance Contract with the Employer for the System / Machine provided under the Contract under terms and conditions to be mutually agreed.</p>
85	Additional Clause: Deployment of the Personnel by the Employer	<p>The Contractor shall deploy personnel sponsored by the Employer during the Contract Period in areas stipulated in the Works Requirements.</p> <p>The travel expenses, salary and allowances, boarding and lodging expenses of these sponsored personnel shall be borne by the Employer, but the Contractor shall provide other facilities required for the purpose of performing their duties. The sponsored personnel shall be under the technical and administrative control of the Contractor.</p>
86	Additional Clause: Indemnity Bond	<p>The contractor shall submit a Indemnity Bond in the format given in Section X. Contract Forms against payments made for Plant and Equipment delivered to Pune.</p>
87	Additional Clause: Safe Custody Bank Guarantee	<p>(Applicable for items specifically mentioned in the contract).</p> <p>The Contractor shall submit a Safe Custody Bank Guarantee in the format given in Section X. Contract Forms against payments made for Plant and Equipment dispatched from manufacturer's works . The amount of safe custody Bank Guarantee shall be equal to 95% percent of the amount due as per relevant clause wherever applicable. The value of the Safe Custody Bank Guarantee would be adjusted for the equipment's already commissioned</p>
88	Additional Clause: Interface Requirements	<p>The Contractor shall be responsible to interface with the other contractors as per the interface table provided in the contract. Employer will supervise/facilitate the coordination between the Contractor and other designated contractors. However, the Contractor will allow for liaison with, and modifications to his design to cater for the work of such other contractors. The list of interface items is indicative only and the ultimate responsibility of commissioning lies with the Contractor.</p>

89	Additional Clause: Part Termination	The Contractor shall be responsible for site progress for meeting the deadlines set by the Engineer for meeting the key dates/ROD. In the event of failure of the Contractor in the opinion of the Engineer for performance of any part activity, Employer reserves the right to notify the Contractor and if Contractor does not improve in the next 15 days, Employer may decide to off-load the part of the work and get this work done through other contractors. The additional cost of the work, if any, incurred by the Employer shall be recovered from the Contractor's payment
90	Additional Clause: Bought out Items	<p>For the bought-out items (items purchased from vendor) being incorporated in the system, Contractor shall ensure the following:</p> <ul style="list-style-type: none">) During Design stage, a confirmation from the vendor is to be submitted that the utilisation and associated system to the component / sub-component, being supplied by vendor are in line with their recommendations / design.i) During Installation, testing and commissioning of the equipment at site vendor's engineer shall supervise and certify that these activities have been carried out as per the manufacturer's recommendations.(iii) Operation and Maintenance requirements prescribed by the vendor for the component / sub-component must be included in O&M documents / Maintenance Manuals prepared by the contractor.(iv) (Details of maintenance set-up of vendor and a confirmation from vendor for ensuring availability of Maintenance support is submitted to Employer.
91	Additional Clause: Limit of Aggregate Damages on Employer	Notwithstanding anything to the contrary contained in the General Conditions of Contract, the Parties expressly agree that the aggregate "payment of any Cost-plus profit" ("Damages") payable under Clauses 1.9, 2.1, 4.7, 7.4, 10.2, 10.3 and 16.1 shall not exceed 10% (ten per cent) of the Contract Price. For the avoidance of doubt, the Damages payable by the Employer under the aforesaid Clauses shall not be additive if they arise concurrently from more than one cause but relate to the same part of the Project.

Maharashtra Metro Rail Corporation Limited

(A Joint Venture of Government of India and Government of Maharashtra)

PUNE METRO RAIL PROJECT

Design of Graphics, Fabrication, Supply, Installation, Testing and Commissioning of Signage of 4 stations viz. Dapodi, Bopodi, Khadki & Range Hill of Reach 01 and 4 stations viz. Deccan Gymkhana, Sambhaji Park, PMC & Civil Court Elevated of Reach 02 of Pune Metro Rail Project.

TENDER NO.

P1 Misc-28/2022

PART-III

CONDITIONS OF CONTRACT AND CONTRACT

FORMS

SECTION-X

CONTRACT FORMS

Section X. Contract Forms

Table of Forms

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Indemnity Bond

Notification of Award

Letter of Acceptance

[letterhead paper of the Purchaser]
[date]

To: *[name and address of the Supplier]*

Subject: **Notification of Award Contract No.**

This is to notify you that your Bid dated _____ ***[insert date]*** for execution of the

_____ ***[insert name of the contract and identification number, as given in the SCC]***. for the Accepted Contract Amount of

[insert amount in numbers and words and name of currency], as corrected and modified in accordance with the Instructions to Bidders is hereby accepted by our institution.

You are requested to furnish the Performance Security within 14 days in accordance with the Conditions of Contract, using for that purpose one of the Performance Security Forms included in Section X, Contract Forms, of the Bidding Document.

Authorized Signature:

Name and Title of Signatory:

Name of institution:

Attachment: Contract Agreement

Contract Agreement

(Contract No:)

THIS AGREEMENT made on the ____ day of _____, _____, between Maharashtra Metro Rail Corporation Limited, a company incorporated under company act 2013, vide CIN U60100MH2015SGC262054 having its registered office at "Metro House, 28/2, Anand Nagar, C K Naidu Road, Civil Lines, Nagpur - 440001 and Project Office addressed as Pune Metro Rail Project, The Orion Building, 1st Floor, 101, Opp. Don Bosco Youth Centre, Koregaon Park, Pune-411001, hereinafter referred "the Employer" (which expression shall unless it be repugnant to the context or meaning thereof be deemed to including his heirs, successors and legal representative) of the one part,
and

_____ having its registered office at _____, India hereinafter referred "the Contractor" (which expression shall unless it be repugnant to the context or meaning thereof be deemed to including his heirs, successors and legal representative), of the other part:

WHEREAS the Employer desires that the Works known as "_____" should be executed by the Contractor as the Employer has accepted the Bid of the Contractor for the execution and completion of these Works and the remedying of any defects therein, for a sum including all taxes and duties, input credit (if any) royalties, levies, custom tariff, cess, Goods and Service Tax (GST) etc. as specified in Bid/Tender documents hereinafter referred as "the Contract Price" of INR _____.

The Employer and the Contractor agree as follows:

In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Contract documents referred to.

The following documents shall be deemed to form and be read and construed as part of this Agreement. This Agreement shall prevail over all other Contract documents.

Performance Bank Guarantee No. _____ and valid up to _____ for INR _____ submitted by _____.

The Letter of Acceptance bearing No. _____ dated _____ along with all its annexures.

The Financial package opened on _____.

The Letter of Bid and Appendix to Bid.

Corrigendum _____ issued by Maha-Metro.

The entire bid documents issued by Maha-Metro by letter and e-mail.

The entire bid documents _____ along with Tender clarifications, confirmations, and other compliances, duly accepted and submitted by Contractor on-----.

The completed Schedules and any other document forming part of the contract.

Invoicing and Bank Details of Contractor (Annexure Enclosed).

In consideration of the payments to be made by the Employer to the Contractor as specified in this Agreement, the Contractor hereby covenants with the Employer to execute the Works and to remedy defects therein in conformity in all respects with the provisions of the Contract.

The Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

IN WITNESS whereof the parties hereto have caused this Agreement to be executed in accordance with the laws of India on the day, month and year specified above.

Employer: Maharashtra Metro Rail Corporation Limited

Signature

Name of Signatory:

Designation:

Contractor:

Signature

Name of Signatory:

Designation:

In the presence of:

Witness:

Sign

Name

Address

In the presence of:

Witness:

Sign

Name

Address

**Performance Security
(Demand Guarantee)**

Beneficiary: _____ Date: _____

PERFORMANCE GUARANTEE No.: _____

Guarantor: _____

We have been informed that _____ (hereinafter called "the Applicant") has entered into Contract No. _____ dated _____ with the Beneficiary, for the execution of _____ (hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, a performance guarantee is required.

At the request of the Applicant, we as Guarantor, waiving all objections and defences under the aforementioned contract, hereby irrevocably and independently undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of _____ (____),¹ 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 first 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 has failed to duly perform the aforementioned contract, without the Beneficiary needing to prove or to show grounds for your demand or the sum specified therein.

This guarantee shall expire, no later than the Day of, 2...², and any demand for payment under it must be received by us at this office indicated above on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758, except that the supporting statement under Article 15(a) is hereby excluded.

[signature(s)]

¹ The Guarantor shall insert an amount representing the percentage of the Accepted Contract Amount specified in the Letter of Acceptance, less provisional sums, if any, and denominated either in the currency(cies) of the Contract or a freely convertible currency acceptable to the Beneficiary.

² Insert the date twenty-eight days after the expected completion date. The Employer should note that in the event of an extension of this date for completion of the Contract, the Employer would need to request an extension of this guarantee from the Guarantor. Such request must be in writing and must be made prior to the expiration date established in the guarantee. In preparing this guarantee, the Employer might consider adding the following text to the form, at the end of the penultimate paragraph: "The Guarantor agrees to a one-time extension of this guarantee for a period not to exceed [six months][one year], in response to the Beneficiary's written

request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee.”

Note: All italicized text (including footnotes) is for use in preparing this form and shall be deleted from the final product.

**Advance Payment Security
Demand Guarantee**

To

Maharashtra Metro Rail Corporation Ltd.

PUNE METRO RAIL PROJECT

101, The Orion, Opposite Don Bosco Youth Centre,
Koregaon Park, Pune 411001.

Bank Guarantee No. _____, dt. _____ for
Rs. _____ (Rupees _____ only).

w.e.f. : _____

valid upto : _____

claim upto : _____

1. In Consideration of M/s Maharashtra Metro Rail Corporation Ltd., (hereinafter called "the Employer", which expression shall, unless repugnant to the context or subject thereof include his successor and assigns) having awarded M/s. _____ having its Registered Office at _____

_____ (hereinafter referred to as "the Contractor", which expression shall unless repugnant to the context of meaning thereof include its successors, administrators, executors and assigns), a contract by issue of Employers Letter of Acceptance No. _____ dated _____ and the same having been mutually accepted by the Contractor, resulting in a Contract bearing No. _____ for Rs. _____ (Rupees _____ only) for Contract _____ : (Name of work)

_____ (hereinafter called "the Contract") and the Employer has agreed to make an advance payment to the Contractor for performance of the said Contract amounting to Rs. _____ (Rupees _____ only) of Mobilisation Advance.

2. We, _____ constituted under the _____ Act, 1955 having it's Corporate Centre and Central Office at _____

and one of it's Local Head Office at _____ and Branch Office at _____

_____ (hereinafter referred to as "the Bank", which

expression shall unless repugnant to the context of meaning thereof, include its successors, administrators, executors and assigns) do hereby guarantee and undertake to pay the Employer, immediately on demand any or all monies payable by the Contractor to the extent of Rs. _____ (Rupees _____ only) as aforesaid at any time upto _____ without any demur, reservation, context, recourse or protest and or without any reference to the Contractor.

3. Any such demand made by the Employer on the Bank shall be conclusive and binding notwithstanding any difference between the Employer and the Contractor or any dispute pending before any Court, Tribunal, Arbitrator and shall continue to be enforceable till the Employer discharges this guarantee. However, not later than expiry date of guarantee.
4. The Employer shall have the fullest liberty without affecting in any way the liability of the Bank under this Guarantee, from time to time to vary the advance or to extend the time for performance of the Contract by the Contractor. The Employer shall have the fullest liberty without affecting his guarantee, to postpone from time to time the exercise of any powers vested in them or of any right which they might have against the Contractor and to exercise the same at any time in any manner and either to enforce or to forebear to enforce any covenants, contained or implied, in the Contract between the Employer and Contractor or any other course or demand or security available to the Employer. The Bank shall not be redeemed to its obligation under these presents by any exercise by the Employer of its liberty with reference to the matters aforesaid of any of them or by reason of any other act or forbearance or other acts of omission or commission on the part of the Employer or any other indulgence shown by the Employer or by any other matter or thing whatsoever which under law would but for this provision have the effect of relieving the bank.
5. The Bank also agrees that the Employer at his option shall be entitled to enforce this Guarantee against this bank as a principal debtor, in the first instance without proceeding against the Contractor and notwithstanding any security or other guarantee that the Employer may have in relation to the Contractor's liabilities.

Notwithstanding anything contrary contained in any law for the time being in force or banking practice this guarantee shall not be assignable or transferable by the beneficiary. Notice or invocation by any person such as assignee, transferee or agent of beneficiary shall not be entertained by the bank any invocation of guarantee can be made only by the beneficiary directly.

Notwithstanding anything contained herein:

- a) Bank liability under this Bank Guarantee shall not exceed Rs. _____ (Rupees _____ only)
- b) This Bank Guarantee shall be valid upto _____.

- c) We are liable to pay the guarantee amount or part thereof under this Bank Guarantee only & only if you serve upon us a written claim or demand on or before _____.
- d) Thereafter all your rights under this guarantee shall be forfeited and we shall be released from all our liabilities hereunder irrespective of whether the guarantee in original is returned to us or not.

Dated _____.

Retention Money Security
Demand Guarantee
DELETED

Form of Designer's Warranty

(Refer. Sub - **Clause 15** of the PC)

THIS AGREEMENT is made the day of

BETWEEN:

- (1) [] [whose registered office is at]/[of] [] ("the Designer"); and
- (2) The Maharashtra Metro Rail Corporation Limited (together with its successors and assigns, "the Employer") of _____ [address].

WHEREAS:

- (a) By a contract _____ dated [] ("the Contract") made between (1) Maharashtra Metro Rail Corporation Limited ("the Employer") and (2) [] ("the Contractor"), the Contractor has agreed to design, execute, complete, test and commission (including Integrated Testing and Commissioning) and remedy any defect in the Works upon the terms and conditions contained in the Contract.
- (b) The Designer has had an opportunity of reading and noting the provisions of the Contract (other than details of the Contractor's prices and rates).
- (c) Pursuant to the Contract, the Contractor wishes to enter into an agreement with the Designer and Designer agrees to the wishes of the Contractor (the Consultancy agreement) to carry out the Contractor's obligations under the Contract in relation to the design and functions ascribed to the Designer in the Contract.
- (d) The Contract stipulates that the Contractor shall ensure that the Designer executes a warranty agreement in favour of the Employer.

NOW IT IS HEREBY AGREED as follows:

1. In consideration of the Employer not objecting to the Contractor and the Designer entering into the Consultancy Agreement, the Designer warrants and undertakes to the Employer that he has exercised and will continue to exercise all the skill and care to be expected of a professionally qualified and competent designer experienced in work of similar nature and scope as the Works in carrying out the design of the Works and in performing the other duties and functions ascribed to him in the Contract.
2. The Designer agrees that, in the event of the termination of the Contract by the Employer, the Designer will, if so required by notice in writing given by the Employer, except subject to Clause 4 the instructions of the Employer or his appointee to the exclusion of the Contractor in respect of the carrying out and completion of the Works upon the terms and conditions of the Consultancy Agreement.

3. The Designer further agrees that he will not, without first giving the Employer not less than 21 days' previous notice in writing, exercise any rights it may have to terminate the Consultancy Agreement or to treat the same as having been repudiated by the Contractor or to discontinue the performance of any duties to be performed by the Designer pursuant thereto. The Designer's right to terminate the Consultancy Agreement or to treat the same as having been repudiated or to discontinue the performance thereof shall cease if, within such period of notice and subject to Clause 4, the Employer shall give notice in writing to the Designer requiring the Designer to accept the instructions of the Employer or his appointee to the exclusion of the Contractor in respect of the carrying out and completion of the Contract Works upon the terms and conditions of the Consultancy Agreement.
4. Any notice given by the Employer under Clause 2 or 3 shall state that the Employer or his appointee accepts liability for payment of the fees payable to the Designer under the Consultancy Agreement and for performance of the Contractor's obligations under the Consultancy Agreement, including payment of any fees outstanding at the date of such notice.
5. The Employer shall be entitled to assign the benefit of this Warranty at any time without the consent of the Designer being required.
6. All documents arising out of or in connection with this Warranty shall be served:
 - (1) upon the Employer at [] marked for the attention of [];
 - (2) upon the Designer at [].
7. The Employer and the Designer may change their respective nominated addresses for service of documents to another address in India but only by prior written notice to each other. All demands and notices must be in writing.
8. This Warranty shall be governed by and construed according to the laws for the time being in force in India.
9. Except to the extent (if any) expressly permitted by the Consultancy Agreement, the Designer shall not sub-contract any of the Designer's obligations under the Consultancy Agreement without the prior written consent of the Employer's Representative.
10. Without prejudice to its obligations under this Warranty, the Designer shall maintain with well established underwriters of repute and on terms and conditions reasonably acceptable to the Employer, professional indemnity insurance (as per sub-clause 18.1 of the General Conditions) in respect of the Designer and its sub-consultants for Indian Rupees (*in words..... Rupees*) in relation to his design of the Works for any one occurrence or series of occurrences arising out of any one event from the date of notification of acceptance until 5 years after the issue of Performance Certificate for the whole of works. The Designer shall immediately inform the Employer if for any reason professional indemnity insurance is not maintained in accordance with this Warranty or becomes void or unenforceable.
11. Insofar as the patent, copyright or other intellectual property rights in any Design Data (as defined in the Contract), plans, calculations, drawings, documents, materials, computer software, know-how and information relating to the Works shall be vested in the Designer, the Designer grants to the Employer his successors and assigns a royalty-free, non-exclusive and irrevocable licence (carrying the right to grant sub-licences) to use and reproduce any of the works designs or inventions incorporated and referred to in such documents or materials and any such know-how and information for all purposes

relating to the Works (including without limitation the design, construction, reconstruction, completion, reinstatement, extension, repair and operation of the Works). To the extent beneficial ownership of any such patent, copyright or other intellectual property right is vested in anyone other than the Designer or the Contractor, the Designer shall use his best endeavours to procure that the beneficial owner thereof shall grant a like licence to the Employer. Any such licence granted shall not be determined if the Designer shall for any reason cease to be employed in connection with the Works.

12. (1) Any dispute or difference of any kind whatsoever between the Employer and the Designer arising under out of or in connection with this Warranty shall be referred to arbitration in accordance with Clause 20 of GC "Claims, Disputes and Arbitration" as defined in the Contract shall be deemed to include any such dispute or difference between the Employer and the Designer.
- (2) In the event that the Employer is of the opinion that the issues in such a dispute or difference will or may touch upon or concern a dispute or difference arising under out of or in connection with the Contract ("the Contract Dispute") then provided that an arbitrator has not already been appointed, the Employer may by notice in writing to the Designer require and the Designer shall be deemed to have consented to the referral of such dispute or difference to the arbitrator to whom the Contract Dispute has been or will be referred.
- (3) Save as expressly otherwise provided, the arbitrator shall have full power to open up, review and revise any decision, opinion, instruction, notice, order, direction, withholding of approval or consent, statement of objection, determination, certificate, assessment or valuation by the Employer's Representative or the Contractor, relating to the dispute or difference.

IN WITNESS whereof this Warranty has been executed as a deed on the date first before written.

THE COMMON SEAL of)

[Designer])

was affixed hereto in)

the presence of:-)

Parent Company Undertaking

THIS UNDERTAKING is issued on the _____ day of _____ BY _____
[whose registered office is at] / [of] _____ ("the Parent Company").

in favour of

Maharashtra Metro Rail Corporation Limited together with its successors and assigns, (the Employer"):

.....
.....
.....

WHEREAS

- (A) By a Contract for _____ in respect of Maharashtra Metro Rail Corporation Limited Contract No ____/____ ("the Contract") made between
- (1) Maharashtra Metro Rail Corporation Limited (the "Employer") and
- (2) _____ (the "Contractor") the Contractor has agreed to design, execute, complete and remedy any defects in the works ("the Works") upon the terms and conditions contained in the Contract.
- (B) Pursuant to the terms of the Contract, the Contractor has agreed to procure the provision of an undertaking in the terms hereof.
- (C) The Parent Company is the beneficial owner of ____ % [see Note 1] of the issued share capital of [the Contractor] [see Note 2].
- (D) At the request of the Contractor, the Parent Company has agreed to provide this undertaking.

NOW IT IS HEREBY UNDERTAKEN AND AGREED as follows:

1. In consideration of the Employer entering into the Contract with the Contractor, the Parent

Company hereby undertakes to the Employer that, without the written consent of the Employer, it will not [and will ensure that none of the companies referred to in Recital (C) will] [see Note 5]:

- a. Sell, transfer, assign or otherwise dispose of or deal with ownership of the whole or any part of EITHER [the share-holding or other interest in the [Contractor] [see Note 3] OR [the share holdings or other interests] [see Note 4] referred to in Recital (C) in any way which will affect the beneficial ownership and control in [the Contractor] [see Note 3] of the Parent Company [and the other companies referred to in Recital (C)] [see Note 5]; and
- b. take any action which may result in the Contractor being unable to comply with its obligations or perform in any way its duties under the Contract [or take any action which may result in [the Member forming part of the Contractor] [see Note 3] being unable to comply with its obligations or perform in any way its duties under the [Consortium or other relevant] agreement] [see Note 6]

until such time as the Works shall have been completed, all the Contractor's obligations under the Contract shall have been performed and the Defects Liability Period (as defined in the Contract) for the whole and every part of the Works shall have elapsed and further that it will ensure [that the Member forming part of the Contractor will take all steps necessary to ensure [see Note 6] compliance by the Contractor with the provisions of the Contract.

2. The obligations of the Parent Company under this Undertaking shall remain in full force and effect and shall not be affected or discharged in any way and the Parent Company hereby waives notice of:
 - a. any suspension of the Works, variation or amendment to the Contract (including without limitation extension of time for performance) or any concession or waiver by the Employer in respect of the Contractor's obligations [and/or the obligations of [_____] [see Note 7]
 - b. any provision of the Contract being or becoming illegal, invalid, void, voidable or unenforceable;
 - c. the termination of the Contract or of the employment of the Contractor and/or [] [see Note 7] under the Contract for any reason;
 - d. any forbearance or waiver of any right of action or remedy the Employer may have against the Contractor [and/or [_____]] [see Note 7] or negligence by the Employer in enforcing any such right of action or remedy;
 - e. any bond, undertaking, security or other guarantee held or obtained by the Employer for any of the obligations of the Contractor [and/or [_____]] [see Note 7] under the Contract or any release or waiver thereof.
1. This Undertaking shall extend to any variation of or amendment to the Contract and to any agreement supplemental thereto agreed between the Employer and the Contractor [and/or [_____]] [see Note 7] and for the avoidance of doubt the Parent Company

hereby authorises the Employer and the Contractor [and/or [_____]] [see Note 7] to make any such amendment, variation or supplemental agreement.

4. All documents arising out of or in connection with this Undertaking shall be served:
 - a. upon the Employer, at _____ marked for the attention of _____;
 - b. upon the Parent Company, at _____
5. The Employer and the Parent Company may change their respective nominated addresses for service of documents to another address but only by prior written notice to each other. All demands and notices must be in writing.
6. This Undertaking shall be governed by and construed according to the laws for the time being in force in India and the Parent Company agrees to submit to the exclusive jurisdiction of the courts at **Pune**, Maharashtra, India.

IN WITNESS where of this Undertaking has been executed as a deed on the date first before written.

Name:

Designation:

Date of Board resolution authorizing executant to execute this undertaking

Place:

Notes:

(For preparation of but not for inclusion in the engrossment of this Undertaking)

1. If the Parent Company is not the immediate parent company, the chain of ownership must be recited, identifying each company in the chain and the shareholdings or other interests in each subsidiary.
2. If the Contractor is a Consortium, that fact and the Consortium or other relevant agreement must be recited. In such case, insert the name of the Members of the Consortium in respect of which the parent company undertaking is being given. In such a case, the parent company of each of the Members is required to give the undertaking.
3. If Note 2 applies, refer to the Member relating to that Parent Company (which is giving this undertaking) and not the Contractor.
4. If Note 1 applies, use this alternative.
5. If Note 1 applies, add this provision.
6. If Note 2 applies, add this provision.
7. If Note 2 applies, add this provision and insert the name of the Member.

8. The notarized copy of the board resolution of the Parent Company must also accompany this Undertaking. In case the Parent Company is a foreign entity, then such board resolution should be notarized by a notary in its home country followed by the casualisation by the Indian Embassy there, or apostatised as per Hague Convention, as the case may be.

Parent Company Guarantee

THIS GUARANTEE is made the _____ day of _____ BY _____ whose registered office is at _____ [and _____ whose registered office is at _____] ("the Guarantor").

To Maharashtra Metro Rail Corporation Limited together with its successors and assigns, "the Employer") of:

.....

.....

.....

WHEREAS

(A) By a Contract for _____ of Pune Metro Rail Project Contract No:P1-T05BR/2019 ("the Contract") made between

(1) Maharashtra Metro Rail Corporation Limited (the "Employer")

and

(2) _____ (the "Contractor") the Contractor has agreed to design, execute, complete and remedy any defects in the works ("the Works") upon the terms and on editions contained in the Contract.

(B) Pursuant to the terms of the Contract, the Contractor has agreed to procure the provision of a guarantee in the terms hereof. [see Note 1]

(C) At the request of the Contractor, the Guarantor has agreed to guarantee performance of the

Contract by the [Contractor] [see Note 2] as set out herein.

IT IS HEREBY AGREED AS FOLLOWS:

1. In consideration of the Employer entering into the Contract with the Contractor, the Guarantor irrevocably and unconditionally guarantees to the Employer as a primary obligation and not as a surety due performance by the [Contractor] [see Note 2] of all of its obligations and liabilities under and in accordance with the Contract save that nothing herein shall be construed as imposing greater obligations or liabilities on the Guarantor than are imposed on the [Contractor] [see Note 2] in the Contract.
2. The obligations of the Guarantor under this Guarantee shall remain in full force and effect and shall not be affected or discharged in any way by and the Guarantor hereby waives notice of:
 - a. any suspension of the Works, variation to or amendment of the Contract (including without limitation extension of time for performance) or any concession or waiver by the Employer

- in respect of the Contractor's obligations [and/or the obligations of _____] [see Note 3] under the Contract;
- b. any provision of the Contract being or becoming illegal, invalid, void, voidable or unenforceable;
 - c. the termination of the Contract or of the engagement of the Contractor [and / or _____] [see Note 3] under the Contract for any reason;
 - d. any forbearance or waiver of any right of action or remedy the Employer may have against the Contractor [and / or _____] [see Note 3] or negligence by the Employer in enforcing any such right of action or remedy;
 - e. any bond, undertaking, security or other guarantee held or obtained by the Employer for any of the obligations of the Contractor [and / or _____] [see Note 3] under the Contract or any release or waiver thereof.
3. This Guarantee shall extend to any variation of or amendment to the Contract and to any agreement supplemental thereto agreed between the Employer and the Contractor [and/or _____] [see Note 3] and for the avoidance of doubt the Guarantor hereby authorises the Employer and the Contractor [and/or _____] [see Note 3] to make any such amendment, variation or supplemental agreement.
4. This Guarantee is a continuing guarantee and accordingly shall cover all of the obligations and liabilities of the [Contractor] [see Note 2] under the Contract and remain in full force and effect until all the said obligations and liabilities of the Contractor shall have been carried out, completed and discharged in accordance with the Contract. This Guarantee is in addition to any other security which the Employer may at any time hold and may be enforced without first having recourse to any such security or taking any steps or proceedings against the Contractor.
5. Until expiry of the Defects Liability Period (as defined in the Contract) for the whole and every part of the Works, the Guarantor shall not on any ground whatsoever make any claim or threaten to make any claim whether by proceedings or otherwise against the Contractor [and/or _____] [see Note 3] for the recovery of any sum paid by the Guarantor pursuant to this Guarantee. Any such claim shall be subordinate to any claims (contingent or otherwise) which the Employer may have against the Contractor [and/or _____] [see Note 3] arising out of or in connection with the Contract until such time as such claims shall be satisfied by the Contractor [and/or _____] [see Note 3] or the Guarantor as the case may be. To that intent the Guarantor shall not claim or have the benefit of any security which the Employer holds or may hold for any monies or liabilities due or incurred by the Contractor [and/or _____] [see Note 3] to the Employer and, in case the Guarantor receives any sum from the Contractor [and/or _____] [see Note 3] in respect of any payment by the Guarantor hereunder, the Guarantor shall hold such sum in trust for the Employer for so long as any sum is payable (contingently or otherwise) under this Guarantee.
6. The Employer shall be entitled to assign the benefit of this Guarantee at any time without the consent of the Guarantor or the [Contractor] [see Note 2] being required.
7. All documents arising out of or in connection with this Guarantee shall be served:
- a. upon the Employer, at _____ marked for the attention of _____;

- b. upon the Guarantor, at _____ India [see Note 5]
8. The Employer and the Guarantor may change their respective nominated addresses for service of documents to another address but only by prior written notice to each other. All demands and notices must be in writing.
 9. This Guarantee shall be governed by and construed according to the laws for the time being in force in India and the Guarantor agrees to submit to the exclusive jurisdiction of the courts at **Pune**, Maharashtra, India.

IN WITNESS whereof this Guarantee has been executed as a deed on the date first before written

.....

Name:

Designation:

Date of Board resolution authorizing executant to execute this undertaking

Place:

Notes:

(For preparation of but not inclusion in the engrossment of this Guarantee)

1. If the Contractor is a Consortium, that fact and the Consortium or other relevant agreement and the relationship of the Guarantor to the concerned Members forming part of the Contractor must be recited.
2. If Note 1 applies, replace the word "Contractor" with name of the concerned Member of the Consortium being guaranteed.
3. If Note 1 applies, add additional wording and insert the name the concerned Member of the Consortium being guaranteed.
4. The notarized copy of the board resolution of the Guarantor must also accompany this Guarantee. In case the Guarantor is a foreign entity, then such board resolution should be notarized by a notary in its home country followed by the casualisation by the Indian Embassy here, or apostatised as per Hague Convention, as the case may be.
5. The address for service shall be in India.

Contractor's Warranty

THIS WARRANTY is made the _____ day of _____

BY _____ of _____ [and [see Note 1]] ([jointly] "the Contractor")

To Maharashtra Metro Rail Corporation Limited together with its successors and assigns, "the Employer") of:

.....

.....

.....

WHEREAS

(A) By a Contract for _____ of Pune Metro Rail Project

Contract No: _____ ("the Contract") made between

(1) Maharashtra Metro Rail Corporation Limited (the "Employer")

and

(2) _____ (the "Contractor"), the Contractor has agreed to design, execute, complete, test and commission (including Integrated Testing and Commissioning) and remedy any defects in the works ("the Works") upon the terms and conditions contained in the Contract.

(B) [See Note 3].

(C) At the request of the Employer and pursuant to the terms of the Contract the Contractor has agreed to provide this Warranty.

NOW IT IS AGREED AS FOLLOWS:

1. The Contractor hereby warrants and undertakes that:

- a. the Contractor will design, execute, complete, test and commission (including Integrated Testing and Commissioning) and remedy any defect in the Works in accordance with the terms of the Contract; and
- b. the Contractor owes a duty of care to the Employer in relation to the performance of its duties under the Contract; and
- c. the Contractor will rectify or replace free of cost to the Employer any defect or failure of equipment provided in the Works for a period of 24 months from the date of taking over of section of the Works; and
- d. the Contractor agrees that should any modification be required to any part of the construction work as a consequence of failure analysis, the aforesaid period of 24 months shall re-commence from the date when the modified part is commissioned into service if the date of modification is later than the date of taking over of last trainset, and such modification shall be carried out free of cost to the Employer in all sections; and
- e. the Contractor shall maintain the manufacture & supply of spares (including those of its Sub-Contractors / vendors) for the equipment supplied in the Contract-work for at least 5 years from the date of Completion of the Contract; and
- f. the Contractor has exercised and will continue to exercise in the design of the Works all the skill and care to be expected of a professionally qualified and competent designer experienced in work of similar nature and scope as the Works; and
- g. the Works will, when completed, comply in all respects with the Employer's Requirements, the Contractor's Technical Proposals, the final Design Document and the intended use of the Works; and
- h. the Works has been or will be designed and manufactured to the highest standards available using internationally proven up-to-date good practice; and
- i. the Works will, when completed, comply with enactments and regulations relevant to the Works; and
- j. no Materials generally known to be deleterious or not in accordance with good engineering practice have been or will be specified or selected or incorporated in the Works by the Contractor.

2. The liability of [the companies comprising [see Note 3]] the Contractor under this Warranty [shall be joint and several and [see Note 3]] shall not be released, diminished or in any way affected by any independent inquiry or investigation into the Works or any matter related to the Contract whether carried out by or on behalf of the Employer or any liability or right of action which may arise out of such inquiry or investigation.

3. Insofar as the copyright or other intellectual property rights in any plans, calculations, drawings, documents, materials, plant, know-how and other information relating to the Works shall be vested in [the Contractor] [see Note 5], the [Contractor] [see Note 5] grants to the Employer its successors and assigns a royalty free, non-exclusive and irrevocable licence (carrying the right to grant sub-licences) to use and reproduce any of the works designs, inventions or other information incorporated and referred to in such documents or materials and any such know-how and information for all purposes relating to the Works of the PUNE METRO RAIL PROJECT including without limitation the design, manufacture, installation, completion, testing and commissioning (including Integrated Testing and Commissioning) reinstatement, extension and the remedy of any defect in the Works. To the extent that beneficial ownership of any such copyright or other intellectual property rights is vested in anyone other than the [Contractor] [see Note 5],, the [Contractor] [see Note 5], shall use best endeavours to procure that the beneficial owner thereof shall grant a like licence to the Employer. For the avoidance of doubt, any such licence granted shall not be determined if the [Contractor] [see Note 5], shall for any reason cease to be employed in connection with the Works.

4. The provisions of this Warranty shall be without prejudice to and shall not be deemed or construed so as to limit or exclude any rights or remedies which the Employer may have against the Contractor, whether in tort or otherwise.

5. Nothing contained in this Warranty shall vary or affect the Contractor's rights and obligations under the Contract.

6. The address for service of all documents arising out of or in connection with this Warranty shall be:

a. Upon the Employer at:

.....

.....

.....

b. Upon the Contractor at _____ India. [Note 4]

7. The Employer and the Contractor may change their respective nominated addresses to another address in India but only by prior written notice to each other. All notices must be in writing.

8. This Warranty shall be governed by and construed according to the laws for the time being in force in India.

9.

(1) Any dispute or difference of any kind whatsoever between the Employer and the Contractor arising under out of or in connection with this Warranty shall be referred to arbitration in accordance with the provisions relating to 'Conciliation and Arbitration' as set out in the General Conditions of Contract. "Dispute" as defined in the Contract shall be deemed to include any such dispute or difference between the Employer and Contractor.

(2) In the event that the Employer is of the opinion that the issues in such a dispute or difference will or may touch upon or concern a dispute or difference arising under out of or in connection with the Contract ("the Contract Dispute") then provided that an arbitrator has not already been appointed pursuant to Clause 9(1), the Employer may by notice in writing to the Contractor require and the Contractor shall be deemed to have consented to the referral of such dispute or difference to the arbitrator to whom the Contract Dispute has been or will be referred.

(3) Save as expressly otherwise provided, the arbitrator shall have full power to open up, review and revise any decision, opinion, instruction, notice, order, direction, withholding of approval or consent, determination, certificate, statement of objections relating to the dispute.

(4) Subject to the foregoing provisions of this clause 9, the Employer and the Contractor agree to submit to the exclusive jurisdiction of the Courts of India at Pune.

IN WITNESS whereof this Warranty has been executed as a deed on the date written at the head hereof.

.....

Name:

Designation:

Date of Board resolution authorizing executant to execute this undertaking

Place:

Notes:

(for preparation of and not inclusion in the engrossment of this Warranty)

1. If the Contractor is a Consortium, each Member of such Consortium shall be a party and liability under this warranty will be joint and several, with consequential grammatical changes.

2. If Note 1 applies, that fact and the Consortium or other relevant agreement must be recited.

3. Delete if Note 1 does not apply.

4. The address for service shall be in India.

5. If Note 1 applies, then insert the name of each Member.

Sub-Contractor's / Vendor's Warranty

(As applicable)

THIS WARRANTY is made the _____ day of _____

BY _____ [whose registered office is at] / [of] _____ ("the Sub-contractor")
and

TO Maharashtra Metro Rail Corporation Limited together with its successors and assigns,
"the Employer") of:

.....
.....
.....

WHEREAS

(A) By a Contract for _____ of Pune Metro Rail Project

Contract No: _____ ("the Contract") made between

(1) Maharashtra Metro Rail Corporation Limited (the “Employer”)

and

(2) _____ (the “Contractor”), the Contractor has agreed to _____ and remedy any defects in the works (“the Works”) upon the terms and conditions contained in the Contract.

(B) The Sub-contractor / vendor has had an opportunity of reading and noting the provisions of the Contract (other than details of the Contractor's prices and rates).

(C) Pursuant to the Contract, the Contractor wishes to enter into an agreement (“the Sub-contract”) with the Sub-contractor / Vendor to carry out and complete a part of the Works as more particularly described in the Sub-contract (“the Sub-contract Works”).

(D) The Contract stipulates that the Contractor shall obtain the consent of the Engineer before entering into the Sub-contract, and that the Contractor shall procure that the Sub-contractor executes a warranty in favour of the Employer.

NOW IT IS HEREBY AGREED as follows:

1. In consideration of the Engineer consenting to the Contractor and the Sub-contractor / Vendor entering into the Sub-contract, the Sub-contractor warrants and undertakes to the Employer that:
 - a. he will execute and complete the sub-contracted Works / supply, and will carry out each and all of the obligations, duties and undertakings of the Sub-contractor / Vendor under the Sub-contract when and if such obligations, duties and undertakings shall become due and performable, in accordance with the terms of the Sub-contract (as the same may from time to time be varied or amended with the consent of the Employer); and
 - b. he will supply to the Contractor and in specific cases wherever required to the Engineer with all information as may be required from time to time in relation to progress of the Sub-contract Works.
2. The Sub-contractor / Vendor undertakes to indemnify the Employer against each and every liability which the Employer may have to any person whatsoever and against any claims, demands, proceedings, loss, damages, costs and expenses sustained,

incurred or payable by the Employer provided that the Sub-contractor / Vendor shall have no greater liability to the Employer by virtue of this Warranty than the liability of the Contractor to the Employer under the Contract insofar as and to the extent that the same has arisen by reason of the execution of the Sub-Contract or any breach by the Sub-contractor / Vendor of his obligations under the Sub-contract.

3. No allowance/extension of time by the Employer hereunder or by the Contractor under the Sub-contract nor any forbearance or forgiveness in or in respect of any matter or thing concerning this Warranty or the Sub-contract on the part of the Employer or the Contractor, nor anything that the Employer or the Contractor may do or omit or neglect to do, shall in any way release the Sub-contractor / Vendor from any liability under this Warranty.
4. The Sub-contractor / Vendor agrees that he will not without first giving the Employer not less than 21 day's prior notice in writing exercise any right he may have to terminate the Sub-contract or treat the same as having been repudiated by the Contractor or withhold performance of its obligations under the Sub-contract.
5.
 - (1) In the event that the Contract or the employment of the Contractor under the Contract is terminated for any reason whatsoever and if so requested by the Employer in writing within 21 days of such termination, the Sub-contractor / Vendor shall carry out and complete his obligations under this Warranty and shall enter into a novation agreement with the Employer and the Contractor in which the Sub-contractor will undertake inter alia to perform the Sub-contract and be bound by its terms and conditions as if the Employer had originally been named as a contracting party in place of the Contractor. The said novation agreement will be in such form as the Employer may reasonably require.
 - (2) In the event that the Employer does not require the Sub-contractor / Vendor to enter into a novation agreement as required by Sub-clause 5 (1), the Sub-contractor shall have no claim whatsoever against the Employer for any damage, loss or expense howsoever arising out of or in connection with this Warranty.
6. Insofar as the copyright or other intellectual property rights, in any plans, calculations, drawings, documents, materials, know-how and information relating to the Sub-contract Works shall be vested in the Sub-contractor / Vendor, the Sub-contractor / Vendor grants to the Employer, his successors and assignees a royalty free, non-exclusive and irrevocable licence (carrying the right to grant sub-licences) to use and reproduce any of the works designs, inventions or other information incorporated and referred to in such documents or materials and any such know-how and information for all purposes relating to the Works of the Pune Metro Rail Project, without limitation the design of enabling facilities, construction, installation, reconstruction, completion, reinstatement, extension, remedy of any defect of the Works. To the extent beneficial ownership of any such copyright or other intellectual

property right is vested in anyone other than the Sub-contractor / Vendor, the Sub-contractor shall use best endeavours to procure that the beneficial owner thereof shall grant a like licence to the Employer. For the avoidance of doubt, any such licence granted shall not be determined if the Sub-contractor / Vendor shall for any reason cease to be employed in connection with the Sub-contract Works.

7. In the event of any ambiguity or conflict between the terms of the Sub-contract and this Warranty, the terms of this Warranty shall prevail.
8. The provisions of this Warranty shall be without prejudice to and shall not be deemed or construed so as to limit or exclude any rights or remedies which the Employer may have against the Sub-contractor / Vendor whether in tort or otherwise.
9. Nothing contained in this Warranty shall vary or affect the Sub-contractor's / Vendor's rights and obligations under the Sub-contract.
10. The Employer shall be entitled to assign the benefit of this Warranty at any time without the consent of the Sub-contractor / Vendor being required.
11. All documents arising out of or in connection with this Warranty shall be served:
 - a. Upon the Employer at:

.....

.....
 - b. Upon the Sub-Contractor / Vendor at _____ India.
12. The Employer and the Sub-contractor / Vendor may change their respective nominated addresses for service of documents to another address in India but only by prior written notice to each other. All demands and notices must be in writing.
13. This Warranty shall be governed by and construed according to the laws for the time being in force in India.
14.
 - (1) Any dispute or difference of any kind whatsoever between the Employer and the Sub-contractor / Vendor arising out of or in connection with this Warranty shall be

referred to arbitration in accordance with the arbitration provisions as described in the Contract.

- (2) In the event that the Employer is of the opinion that the issues in such a dispute or difference will or may touch upon or concern a dispute or difference arising under out of or in connection with the Contract ("the Contract Dispute") then provided that an arbitrator has not already been appointed pursuant to Clause 14 (1), the Employer may by notice in writing to the Sub-contractor / Vendor require and the Sub-contractor / Vendor shall be deemed to have consented to the referral of such dispute or difference to the arbitrator to whom the Contract Dispute has been or will be referred.
- (3) Save as expressly otherwise provided, the arbitrator shall have full power to open up, review and revise any decision, opinion, instruction, notice, order, direction, withholding of approval or consent, determination, certificate, statement of objection, assessment or valuation by the Engineer or the Contractor relating to the dispute or difference.
- (4) Subject to the foregoing provisions of this clause 14, the Sub-Contractor agrees to submit to the exclusive jurisdiction of the Courts at Pune, Maharashtra.

IN WITNESS whereof this Warranty has been executed as a deed on the date first before written

.....

Name:

Designation:

Date of Board resolution authorizing executant to execute this undertaking

Place:

Note: The notarized copy of the board resolution of the Sub-Contractor/vendor must also accompany this Warranty. In case the Sub-Contractor/vendor is a foreign entity, then such board resolution should be notarized by a notary in its home country followed by the consularisation by the Indian Embassy there, or apostilised as per Hague Convention, as the case may be.

Indemnity Bond

THIS INDENTURE made onbetween(hereinafter called the Contractor) which expression shall where the context do admits or implies be deemed to include its executors, administrators and assigns of the one part and the Maharashtra Metro Rail Corporation Limited (hereinafter called MAHAMETRO) of the other part.

WHEREAS by the agreement (LOA No dated.....) (hereinafter called the said agreement) the contractor has agreed to “-----” and whereas the contractor has applied to the MAHAMETRO that they may be allowed advance on the security of materials absolutely belonging to them and brought by them to the site of the works covered under the project of the said agreement for use in the construction of such of the work as they have under taken to execute at rates fixed for the finished work (inclusive of the cost of materials and labour and other charges).

AND WHEREAS the MAHAMETRO has agreed to make stage payment to the contractor the total sum of Rs.----- (Rupees -----only) for stage payment Bill. The quantities and other particulars of which are detailed in this bill for the said works signed by the Contractor on “-----” and MAHAMETRO has reserved to itself option of making any further advances till date on the security of other materials brought by the contractor to site of the said work.

NOW THIS INDENTURE WITNESS that in pursuance of the said agreement and its consideration of the sum of Rs. ----- (Rupees -----only) on or before the execution of these present amount paid to the contractor by the MAHAMETRO (the receipt where of the contractor) both hereby acknowledge and of such further Stage payment, if any, as may be made to him so aforesaid to the contractor do the covenant and agreed with the MAHAMETRO and declare as follows:

1. That the said sum of Rs. ----- (Rupees ----- only) so Stage Payment by the MAHAMETRO to the contractors as aforesaid and all or any further sum or sum's advanced as aforesaid shall be employed by the contractor in or towards the execution of the said works and for no other purpose whatsoever.

2. That the Stage Payment detailed in the said running account bill which have been offered to and accepted by the MAHAMETRO as security are absolutely the contractor's own property and free from encumbrances of any kind and the contractor's shall not make any application for or receive any further payments on the security of work executed which are not absolutely his own property and free from encumbrances of any kind the Contractor indemnifies the MAHAMETRO against all claims on any materials in respect of which any Stage Payment has been made to him as aforesaid.

3. That the Stage Payment detailed in the said running account bill and all other stage payments on the security of which further payments or Stage Payment any hereafter be made as aforesaid (hereinafter called the said materials) shall be used by the contractor solely in the

execution of the said works in accordance with the directions of the Engineer / MAHAMETRO and in the terms of the said agreement.

4. That the contractor shall be fully liable for the materials/components and shall make at his own cost all necessary and adequate arrangement for the proper watch, safe custody and protection against all risks including, but not limited to acts of the God of the said materials/components.

5. That the contractor shall be liable to provide on approved insurance in favour of Maharashtra Metro Rail Corporation Limited for all such materials/components used for the purpose of entire Metro project. However, the takingover of the works will be governed by terms and conditions of GC clause 10 (Employer Taking Over) of the Contract. The said materials shall remain at the site of said works in the contractor's custody and on his own responsibility and shall at the time be open to inspection by the Engineer/ Maharashtra Metro Rail Corporation Limited. That the Contractor shall be responsible for all such losses incurred towards such damage and/ or loss of goods in storage and custody and shall indemnify MAHA-Metro towards the same.

This insurance will be valid for a period until this material is approved and fixed in the building or advance has been fully recovered from contractor and the validity of all such insurance documents shall be ensured by MAHA-Metro.

That the title to Material shall pass to Maha-Metro upon payment and shall become and remain sole property of Maha-Metro.

6. That the said materials/components in the Contractor's custody shall not on any account be removed and/or shifted except with the written permission of the Engineer/ Maharashtra Metro Rail Corporation Limited, obtained after cumulative inspection by Contractor, Engineer and Maha-Metro.

The said material shall be shifted to Maha Metro Store (In Depot or elsewhere as per Maha-Metro's discretion) constructed by the Contractor on the land allotted by Maha Metro only upon the instruction of Maha-Metro.

7. That issue of any Stage Payment excess of what is finally required to be used at site would be the contractor's property without any liability on Maharashtra Metro Rail Corporation Limited., who would recover the cost of this from the contractor.

8. That the contractor hereby charges all the said materials components with the repayment to the MAHAMETRO of the said sum of Rs. ----- (Rupees ---- -----only) and any further sum or sums advanced as aforesaid and all cost charges. Damages and expenses payable under these presents provided always and it is hereby agreed and declared that not with power contained therein, if any, whenever the convenient for payment, and repayment herein before contained shall become enforceable and the money owned shall not be paid in accordance therewith, the MAHAMETRO., may at any time thereafter adopt all or any of the following courses as he may deem best.

a. That if the contractor shall at any time not be able to complete any part of the Component / equipment as per provision in contract Agreement it shall be considered as the work being left incomplete by the contractor and action as per the conditions of the contract shall be taken.

b. Deduct all or any of the money owing out of the performance security or any sum due to the contractor under the said agreement.

That in the event of any conflict between the provisions of these presents and the said agreement the provisions of these presents shall prevail.

This widening shall be co-extensive to the agreement dated between Maharashtra Metro Rail Corporation Limited, _____. (Client) and (Contractor).

IN WITNESS where of the said contractor and by the order under the direction of MAHAMETRO has here set their respective hands the day and years first above written.

Signed, Sealed & Delivered by the said Contractor:

IN THE PRESENCE OF: WITNESS:

1. NAME: Signature:

SIGNED BY (ADDRESS)

BY THE ORDER AND DIRECTION OF THE MAHAMETRO IN THE PRESENCE OF:

SIGNATURE: WITNESS

(NAME AND ADDRESS)

Guarantee for Safe Custody

(To be stamped in accordance with Stamp Act, of the country of issuing bank)

To:

MAHARASHTRA METRO RAIL CORPORATION LIMITED,

WHEREAS - the Consortium/ Joint venture consisting of:

(Name of Lead Member of the Group and address)

(Name of Member of the Group and address)

(Name of Member of the Group and address) ^[1]_{SEP}

(hereinafter called “the Contractor”), with M/s----- as the lead member has undertaken, in pursuance of Contract No. [] datedfor [Note 4] (hereinafter called “the Contract”), ^[1]_{SEP}AND WHEREAS according to the said Contract the Employer is obliged to pay to the Contractor the sum of [] ([]) (“the Payment on delivery”) as set out in the priced Bill of Quantities.

(A) Pursuant to the said activities, [Note 4] are to be manufactured offshore or in India for subsequent delivery to the Contractor’s premises in Pune, India and held in safe custody by the Contractor.

(B) Pursuant to the terms of the Contract, the Contractor, as a condition precedent to his entitlement to receive any payment for items including an element of [Note 4] Contract [] to the Contractor’s premises in Pune, is obliged to provide a Guarantee in the terms hereof for 95 percent of the Payment. ^[1]_{SEP}

AND WHEREAS we (Insert name and address of scheduled commercial bank based in India) have agreed to give the Contractor such a Bank Guarantee:

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Contractor up to a total of ----- (amount of Guarantee)----- (in words), such sum being payable in the types and proportion of currencies in which the Contract Price is payable and we hereby unconditionally, irrevocably and without demur undertake to immediately pay you, upon your first written demand and without cavil or argument any sum or sums within the limits of ----- (amount of guarantee) as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

1. We hereby waive the necessity of your demanding the said debt from the Contractor before presenting us with the demand.

2. We further agree that no change or addition to or other modification of the terms of the contract or of the Works to be performed there under or of any of the contract documents which may be made between you and the Contractor shall in any way release us from any liability under the guarantee and we hereby waive notice of any such change, addition or modification.

3. The Bank shall pay to the Employer the amount thus demanded without requiring further evidence or proof of:

- a. the default of the Contractor; or
- b. the Employer's entitlement to terminate the Contract or the employment of the Contractor under the Contract; or
- c. any termination of the Contract or the employment of the Contractor under the contract; or
- d. of the amount due and payable under this bank Guarantee.

4. The liability of the Bank under this Guarantee shall remain in full force and effect and shall not be affected or discharged in any way by and the Bank hereby waives notice of:

- a. any suspension of the Works, variation to or amendment of the Contract (including without limitation extension of time for performance or adjustment to the Tender Total or other payment under the Contract) or any concession or waiver by the Employer in respect of the Contractor's obligations under the Contract;
- b. the termination of the Contract or of the employment of the Contractor under the Contract solely as a result of default by the Contractor under the Contract;
- c. any forbearance or waiver of any right of action or remedy the Employer may have against the Contractor or negligence by the Employer in enforcing any such right of action or remedy;
- d. any other security or guarantee held or obtained by the Employer for any of the obligations of the Contractor under the Contract or any release or waiver thereof;
- e. any act or omission of the Contractor pursuant to any other arrangement with the Surety.

5. The liability of the Bank under this Guarantee shall cease on whichever of the following events first occurs:

- a. payment by the Bank of the Guaranteed Sum in full to the Employer; or
- b. receipt of written notification from the Employer that the[Note 4] have been installed and tested to the satisfaction of the Employer.

6. Until the MAHAMETRO has issued an instruction to the Bank to the effect that this Guarantee can be released, the Bank undertakes to extend the validity under the same conditions for successive periods of six (6) calendar months at a time and to forward the appropriate extension sheets to the MAHAMETRO.

SIGNATURE AND SEAL OF THE GUARANTOR

NAME OF THE BANK-----

ADDRESS-----

DATE-----

Notes:

1. The stamp papers of appropriate value shall be purchased in the name of the Bank, who issues the 'Bank Guarantee'.
2. The Bank Guarantee shall be from a scheduled commercial bank based in India, acceptable to the Employer.
3. The amount payable under this Guarantee shall be 95 percent of the aggregate of the installments of the Payment made to the Contractor prior to the date of the written demand referred to above less the aggregate of any sums in respect of items installed, tested and certified by the Employer's Representative (as defined in the Contract) in accordance with the terms of the Contract.
4. Enter name of the Contract.

Maharashtra Metro Rail Corporation Limited**(A Joint Venture of Government of India and Government of Maharashtra)****PUNE METRO RAIL PROJECT**

Design of Graphics, Fabrication, Supply, Installation, Testing and Commissioning of Signage of 4 stations viz. Dapodi, Bopodi, Khadki & Range Hill of Reach 01 and 4 stations viz. Deccan Gymkhana, Sambhaji Park, PMC & Civil Court Elevated of Reach 02 of Pune Metro Rail Project.

TENDER NO.

P1 Misc-28/2022

PART-III**CONDITIONS OF CONTRACT AND CONTRACT FORMS****SECTION-XI****SHE MANUAL**

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FORMATION OF SITE SHE COMMITTEE

Form No. SF/002 660

MINUTES OF SHE COMMITTEE MEETING

PART I: SHE MANAGEMNT

GENERAL

1.1 Scope

- 1.1.1 This document defines the principal requirements of the Employer on Safety, Health and Environment (SHE) associated with the Contractor / sub-contractor and any other agency to be practiced at construction worksites at all time.

1.2 Definition / languages

- 1.2.1 The Environmental Quality Management Manual (EQM) forms an essential part of the overall Environmental Protection System employed by Maharashtra Metro Rail Corporation Limited for the construction of Pune Metro Rail Project.

1.2.2 Definition & Abbreviations

- (a) **“Environment”** means the total surroundings of an organism including water, air and land and other living creatures.
- (b) **“Environmental Pollutant”** means any solid, liquid or gaseous substance present in such concentration as may be or tend to be injurious to environment.
- (c) **“Environmental Pollution”** means the presence in the environment of any environmental pollutant.
- (d) **“Nuisance”** is annoyance, which results from any construction activity that affects the material comfort and quality of life of the inhabitants of the area surrounding the construction site.
- (e) **“Monitoring”** is the use of direct or indirect reading field instrumentation to provide information regarding the levels of pollutants released during construction.
- (f) **“Construction Site”** is the contract limits for construction. It shall be all the area within the limits of the work as shown on the Plans. Construction Site shall also include staging, and debris disposal areas and transportation routes to and from these areas.
- (g) **“Noise”** is any unwanted sound disturbance of the environment around the area of construction operations.
- (h) **“Decibel”** is a measure on a logarithmic scale of the magnitude of a particular quantity (such as sound pressure, sound power) with respect to a standardized reference quantity.
- (i) **“A - weighted Noise levels”** in Decibels (referenced to 20 micro-Pascal) as measured with A-weighting network of standard sound level meter, abbreviated dB (A).
- (j) **“Energy Equivalent Level (L_{eq})”** is the level of a steady noise which has the same energy as the fluctuating noise level integrated over the period of measurement. L_{max} is the maximum Noise Level during the period of measurement. L_{10} and L_{90} are the percentile exceeding levels of sound which is exceeded 10% and 90% of the time of measurement.
- (k) **“Waste”** is unwanted surplus substance arising from the application of all construction operations and any substance or article, which is required to be disposed.
- (l) **“Suspended Particulate Matter”** is abbreviated as SPM and measured in $\mu\text{g}/\text{m}^3$.
- (m) **“Environmental Quality Management Manual”** is abbreviated as EQM.
- (n) **“Air Monitoring and Control Plan”** is abbreviated as AMCP.

- (o) **“Noise Monitoring and Control Plan”** is abbreviated as **PMCP**.
- (p) **“Ministry of Environment and Forests, Government of India”** is abbreviated as **MOEF**.
- (q) **“Central Pollution Control Board”** is abbreviated as **CPCB**.
- (r) Notwithstanding the definition of **“Site”** of Clause 1.1.6.7 of the GCC and in the context of the present specification the ESHS specifications, the word **“Worksite(s)”** means:
 - (i) The land where work will be carried out, or
 - (ii) the land necessary for the implantation of Worksite facilities (work camp, workshops, offices, storage areas, concrete production plants) and including special access roads, or
 - (iii) quarries for aggregates, rock material and riprap, or
 - (iv) borrow areas for sand and other selected material, or
 - (v) stockpiling areas for backfill material or other demolition rubble, or
 - (vi) any other location, specifically designated in the Contract as a Worksite

The term « Worksite(s) » encompasses any individual Worksite or all Worksites.

1.2.3 In this document:

- (i) The use of **“shall”** indicates a mandatory requirement.
- (ii) The use of **“should”** indicates a guideline that is strongly recommended.
- (iii) The use of **“may”** indicates a guideline that is to be considered.
- (iv) **“SHE”** means Safety, Health and Environment.
- (v) **“Employer”** means Maharashtra Metro Rail Corporation Limited
- (vi) **“Chief Safety Officer”** means an officer nominated by Maharashtra Metro Rail Corporation Limited who is overall responsible for monitoring all SHE functions prescribed in this document.
- (vii) **“BOCWA”** means Building & Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996
- (viii) **“BOCWR”** means Building & Other Construction Workers (Regulation of Employment and Conditions of Service) Central Rules, 1998
- (ix) **“DG”** means Director General of Ministry of Labour, Govt. of India.
- (x) **“BOCWWCA”** means Building & Other Construction Workers’ Welfare Cess Act, 1996
- (xi) **“BOCWWCR”** means Building & Other Construction Workers Welfare Cess Rules 1998
- (xii) **“MBOCWR”** means Maharashtra Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Rules, 2003
- (xiii) **“Notifications”** (Central and state) - collection of cess.
- (xiv) **“CIIBC”** means Chief Inspector of Inspection of Building and Other Constructions of Government of Maharashtra
- (xv) **“HIRA”** means Hazard Identification and Risk Assessment

1.3 Application of this document

- 1.3.1 This document applies to all aspects of the Contractor's scope of work, including all aspects conducted by sub-contractors and all other agencies. There shall be no activity associated to the Contract, which is exempted from the purview of this document.

Pursuant to Clause 4.4 of the GCC, the Contractor is fully liable for all actions, non-compliance and negligence by subcontractors, their representatives, employees and workers, to the same degree as it would be held liable for its own actions, non-compliance or negligence or that of its own representatives, employees or workers.

1.4 Purpose of this document

- 1.4.1 The objective of these guidelines is to ensure that adequate precautions are taken to avoid accidents, occupational illness and harmful effects on the environment during construction.

- 1.4.2 This document :-

- (i) Describes the SHE interfaces between Employer and the Contractor
- (ii) Details the processes by which the Contractor shall manage SHE issues while carrying out the work under the Contract.
- (iii) Describes by reference, the practices and procedures as given in the Maharashtra Metro Rail Corporation Limited Project Safety, Health & Environment Manual for best SHE performance.

- 1.4.3 These requirements shall be read together with Maharashtra Metro Rail Corporation Limited's Project SHE Manual, OHSAS 18001-1999 Occupational Health and Safety Management System and ISO 14001: 2004 Environmental Management Systems. Definition of key terms used in these requirements related to OHSAS 18001 & ISO 14001 standards are found in Maharashtra Metro Rail Corporation Limited's Project SHE Manual.

'SHE' TARGETS AND GOALS

- 1.5 The SHE targets, goals and aim for the Works are to achieve:

- (i) Zero total recordable injuries.
- (ii) Zero reportable environmental incidents
- (iii) All personnel inducted in accordance with the approved contractor SHE plans
- (iv) Total compliance of conducting inspections and audits as per approved SHE plan
- (v) 100% incident recording and reporting
- (vi) 100% adherence of usage of appropriate PPEs at work
- (vii) Executing construction work with least disturbance to the environment, adjoining area road users and traffic

COMPLIANCE

1.6 Memorandum of Understanding (MOU)

1.6.1 A Memorandum of Understanding placed at Appendix No. 1 shall be executed before the award of Contract by the Contractor with regard to various provisions on Safety, Health and Environment to be practiced during the construction work.

1.7 Maharashtra Metro Rail Corporation Limited's SHE Policy and Management Systems

1.7.1 The construction works shall be undertaken in accordance with Maharashtra Metro Rail Corporation Limited's SHE Policy and Management Systems as amended from time to time provided in Project SHE Manual.

1.8 Indian statutory requirements

1.8.1 Primary statutory regulations

1.8.1.1 Contractor shall develop thorough understanding about Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act 1996, Central Rules 1998, The Building & Other Construction Workers Welfare Cess Act 1996 and Central Welfare Rules 1998, Maharashtra Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Rules, 2003, Building and Other Construction Workers Welfare Cess act 1996 and Central Rules 1998, Notification [Central & State] - Collection of Cess, not only to satisfy the Inspectors' perspective but the use of legislation as the strong tool for effective SHE management at construction worksites. Contractor is strongly advised to practice the principle of voluntary compliance.

1.8.1.2 In order to facilitate the Contractor for better understanding on the various provisions of the above Act and Rules, a tabulated information highlighting the Sections/Rules referring to the corresponding registration of Contractors, maintenance of registers and records, hours of work and wages, cess & welfare, medical facilities and safety requirements are given in Appendix No. 2. It is an indicative one and not a limiting list.

1.8.2 In addition, the construction works shall be undertaken in accordance with all applicable legislation and Indian statutory requirements listed below but not limiting to:

- (i) Indian Electricity Act 2003 and Rules 1956
- (ii) National Building Code, 2005
- (iii) Factories Act, 1948, Maharashtra Government Factories Rules, 1963
- (iv) Motor Vehicles Act as amended in 1994 and The Central Motor Vehicles Rules, 1989
- (v) The Motor Transport Workers Act 1961 & Maharashtra Rules 1965
- (vi) Indian Road Congress Code IRC: SP: 55-2001 'Guidelines on Safety in Road Construction Zones'
- (vii) The Petroleum Act, 1934 and Rules 1976
- (viii) Gas Cylinder Rules, 2003
- (ix) Indian Explosives Act, 1884, along with the Explosives Substance Act 1908 and the Explosives Rules 1983
- (x) The (Indian) Boilers Act, 1923
- (xi) The Public Liability Insurance Act 1991 and Rules 1991
- (xii) Minimum Wages Act, 1948 and The Minimum Wages (Maharashtra Rules) 1961

- (xiii) The Contract Labour (Regulation & Abolition) Act 1970 & The Contract Labour (P&R) (Maharashtra) Rules, 1972
 - (xiv) The Child Labour (Prohibition & regulation) Act 1986 and Maharashtra Rules 1994
 - (xv) Environment Protection Act, 1986 and Rules 1986
 - (xvi) Air (Prevention and control of Pollution) Act, 1981
 - (xvii) Water (Prevention and Control of Pollution) Act, 1974
 - (xviii) The Noise Pollution (Regulation & Control) Rules, 2000
 - (xix) Notification on Control of Noise from Diesel Generator (DG) sets, 2002
 - (xx) Recycled Plastic Usage Rules, 1998
 - (xxi) Notification, Central Ground Water Board, Act January 1997
 - (xxii) The Manufacturing, Storage and Import of Hazardous Chemical Rules, 1989
 - (xxiii) Chemical Accidents (Emergency Planning, Preparedness and Response) Rules, 1996
 - (xxiv) The Hazardous Waste (Management, Handling & Trans-boundary Movement) Rules, 2007
 - (xxv) Relevant Rules / Guidelines regarding Preservation of Trees
 - (xxvi) Batteries (Management and Handling) Rules
 - (xxvii) Fly ash utilization notification, Sept 1999 as amended in August 2003.
 - (xxviii) Guidelines of Pune Urban Development Authority
 - (xxix) Guidelines of Maharashtra Pollution Control Board
- 1.8.3 Workman Compensation Act, 1923 along with allied Rules :- The Contractor shall ensure that all his employees / workmen are covered under 'Workmen Compensation Act' and shall pay compensation to his workmen as and when the eventuality for the same arises.
- 1.8.4 Notwithstanding the above Act/Rules, there is nothing in those to exempt the Contractor from the purview of any other Act or Rule in Republic of India for the safety of men and materials.
- 1.8.5 The Contractor is responsible for the sanitary repatriation of Contractor's Personnel in the event of a serious injury or illness. The Contractor will take out the necessary insurance to cover the cost of the sanitary repatriation of its Contractor's Personnel.
- 1.9 International Standards, Guidelines & ISO Certifications**
- 1.9.1 The Contractor complies with norms, standards and discharge limit values recommended by the specialised international organisations affiliated to the United Nations, as described in clause 3.4.2 below.
- 1.9.1.1 The specialised international organisations affiliated to the United Nations referred to in Clause 9.2 include:
- World Bank, including the IFC and its Environmental, Health and Safety guidelines available from <http://www.ifc.org/ehsguidelines>
- For matters not addressed in the IFC above document, the norms, standards and discharge limit values of the following institutions shall apply:
- World Health Organization (WHO)

- Inter-national Labour Organization (ILO) (in particular in pursuance to Clauses 6.20, 6.21, 6.23 and 6.24 of the GCC)
- International Maritime Organization (IMO)

3.4.3 The works should be undertaken in accordance with the applicable international guidelines, standards and specifications on SHE and every contract shall aim to achieve ISO certifications listed below during the currency of the contract:

OHSAS 18001-1999 : Occupational Health and Safety Management System.

ISO 14001-2004 : Environmental Management Systems.

1.9.4 The process of certification shall start immediately after the award of the work and complete within reasonable time. Towards this, the Contractor shall undertake the required steps including appointment of ISO consultant for obtaining the certification on Occupational Health and Safety Management System and Environment Management System.

1.9.5 In case of failure on the part of the Contractor, the Employer at the cost of the Contractor shall do the same.

1.10 Method Statement and Risk Assessment

1.10.1 Method Statement should be submitted by the Contractor. The Method Statement should include activity list, job step, equipment list, HIRA (Hazard Identification and Risk Assessment) etc.

CONTRACTOR SHE POLICY AND PLAN

1.11 The Contractor as per Section 39 of the BOCW Act shall formulate a SHE policy and get it approved by DG/CIIBC and display it at conspicuous places at work sites in Hindi and local languages understood by the majority of construction workers.

1.12 Within 4 weeks of the notification of acceptance of the tender, the Contractor shall submit a detailed and comprehensive Contract specific SHE Plan. The SHE Plan shall include detailed policies, procedures and regulations which, when implemented, will ensure compliance of the contract provisions. The SHE Plan shall include the following but not be restricted to:

- (i) A statement of the Contractor's policy, organisation and arrangements for SHE including the resources available for the implementation of the same.
- (ii) The name(s) and experience of person(s) within the Contractor's proposed management who shall be responsible for co-ordinating and monitoring the Contractor's SHE performance;
- (iii) The number of SHE staffs who shall be employed on the Works, their responsibilities, authority and line of communication with the proposed Contractor's agent;
- (iv) A statement of the Contractor's policy and procedures for identifying and estimating hazards, and the measures for addressing the same;

- (v) A list of SHE hazards anticipated for this Contract and sufficient information to demonstrate the Contractor's proposals for achieving effective and efficient health and safety procedures;
 - (vi) A description of the SHE training courses and emergency drills which shall be provided by the Contractor, with an outline of the syllabus to be followed;
 - (vii) Details of the safety equipment which shall be provided by the Contractor, including personal protective equipment;
 - (viii) A statement of the Contractor's policy and procedures for ensuring that Contractor's Equipment used on the Project Site are maintained in a safe condition and are operated in a safe manner;
 - (ix) A statement of the Contractor's policy and procedures for ensuring that sub-contractors comply with the Contractor's safety plan;
 - (x) A statement of the Contractor's disciplinary procedures with respect to SHE related matters, and
 - (xi) A statement of the Contractor's procedure for reporting and investigating accidents, dangerous occurrences or occupational illnesses
- 1.13 The Contractor shall, from time to time and as necessary are required by the Employer to produce supplements to the SHE Plan such that it is at all times a detailed, comprehensive and contemporaneous statement by the Contractor of his site safety, industrial health and environment obligations, responsibilities, policies and procedures relating to work on Site. Any and all submissions of supplements to the SHE Plan shall be made to the Employer in accordance with the agreed procedures.
- 1.14 If at any time the SHE plans is, in the Employer's opinion, insufficient or requires revision or modification to ensure the security of the Works and the safety of all workmen upon and visitors to the Site, the Employer may instruct the Contractor to revise the SHE plans, and the Contractor shall within 7 days submit the revised plan to the Employer for review.
- 1.15 Any omissions, inconsistencies and errors in the SHE Plan or the Employer's acceptance or rejection of the SHE Plan and/or supplements thereto shall be without prejudice to the Contractor's obligations with respect to site safety, industrial health and environment and shall not excuse any failure by the contractor to adopt proper and recognised safety practices throughout the execution of the Work.
- 1.16 The Contractor shall adhere to the SHE Plan and shall ensure, as far as practically possible, that all sub-contractors of all tiers require that contracting parties each have a copy of the Site SHE Plan and comply with its provisions.
- 1.17 The details of contents to be covered in the site SHE plans are given in Appendix No. 3.

DESIGNER'S ROLE

1.18 Designer's role in Safety, Health and Environment

Designer's primary role includes to minimise the risk to health and safety of those who are going to construct, maintain, clean, repair, dismantle or demolish the structures and anyone else like adjoining road users/general public, who might be affected by the work.

- 1.19 **General Philosophy:** - When considering health and safety in designer's work, they shall be expected to do what is reasonable at the time the design is prepared. It may be possible for hazards, which cannot be addressed at the feasibility stage to be looked at during detailed design. In deciding what is reasonably practicable, the risk

to health and safety produced by a feature of the design has to be weighed against the cost of excluding the feature. The overall design process does not need to be dominated by a concern to avoid all risks during the construction phase and maintenance. However, a judgement has to be made by weighing up one consideration against another, so the cost is counted not just in financial terms, but also those of fitness for purpose, aesthetics, build ability or environmental impact. By applying these principles, it may be possible to make decisions at the design stage, which will avoid or reduce risks during construction work. In many cases, the large number of design considerations will allow a number of equally valid design solutions. What is important is the approach to the solutions of design problems. This should involve a proper exercise of judgement, which takes account of health and safety issues.

1.20 Hierarchy of Risk Control

1.20.1 Designers shall need, so far as reasonably practicable, to avoid or reduce risks by applying a series of steps known as the hierarchy of risk control or principles of prevention and protection. The steps to be adopted shall include the following:-

- (i) consider if the hazard can be prevented from arising so that the risk can be avoided (e.g., alter the design to avoid the risk);
- (ii) if this cannot be achieved, the risk should be combated at source (e.g., ensure the design details of items to be lifted include attachment points for lifting);
- (iii) failing this, priority should be given to measures to control the risk that will protect all people;
- (iv) only as a last resort should measure to control risk by means of personal protection be assumed (e.g., use of safety harnesses).

1.21 Duty to provide health and safety risks in the drawing itself

1.21.1 In case of situations where the designers have carried out the design work and concluded that there are risks, which are not reasonably practicable to avoid, detailed information shall be given about the health and safety risks, which remain. This information needs to be included with the design to alert others to the risks, which they cannot reasonably be expected to know. This is essential for the parties who have to use the design information.

1.21.2 If the designers' basic design assumptions affect health or safety, or health and safety risks are not obvious from the standard design document, the designer shall provide additional information. The information shall include a broad indication of the assumptions about the precautions for dealing with the risks. The information will need to be conveyed in a clear manner; it shall be included on drawings, in written specifications or outline method statements. The level of detail to be recorded will be determined by the nature of the hazards involved and the associated level of risk.

1.22 Employer's approval

1.22.1 Every structure like scaffold, false work, launching girder, earth retaining structures etc. shall have its design calculations included in the method statements in addition to health and safety risks. Employers' designer or his approved proof check consultants as applicable as per the contract conditions shall approve all these designs.

1.23 Any non-standard structures like trestles made up of re-bars or structures which are very old, corroded, repaired for many times etc. for which no design calculations can be made accurately from any national standards, shall not be allowed to be used at sites even for short duration.

- 1.24 If any of the above-mentioned clauses are not adhered penalty shall be imposed depending upon the gravity of the unsafe act and or condition

CONTRACTOR SHE ORGANISATION

1.25 Education and Experience

1.25.1 The Contractor shall appoint the required SHE personnel as prescribed in General Instruction Maharashtra Metro Rail Corporation Limited /SHE/GI/001 (enclosed at the end) based upon the statutory requirement and establish the safety organisation based upon the Contract value. The minimum educational qualification & the work experience are given in General Instruction Maharashtra Metro Rail Corporation Limited /SHE/GI/002.

1.25.2 In order to effectively interact on labour welfare matters with the Employer and the statutory authorities enforcing the labour welfare legislations every Contractor shall employ a full time Labour Welfare Officer duly qualified and experienced as per Clause 6.1.1.

1.26 Conduct and competency

1.26.1 The conduct and functioning of the Contractor SHE personnel shall be monitored by the Employer. Any default or deficiency shall attract penalty as per details given under penalty Clause 56.0 of this document.

1.26.2 All Contractors Personnel are made aware and acknowledge their understanding of the rules of procedure and the associated provisions. Rules of procedure document are initialled by all contractors Personnel prior to the start of any physical work at any Project site.

1.26.3 The rules of procedure include a list of acts considered as serious misconduct and which must result in dismissal from any Project Area by the Contractor, or by the Engineer if the contractor is not acting in due course, should a contractor's Personnel repeatedly commit an offence of serious misconduct despite awareness of the rules of procedure, and this is without prejudice to any legal action by any public authority for non-compliance with applicable regulations

- a) Drunkenness during working hours, leading to risks for the safety of local inhabitants, customers, users and personnel.
- b) Punishable statements or attitudes, and sexual harassment in particular.
- c) Violent behaviour.
- d) Intentional damage to the assets and interests of others, or the environment.
- e) Repeated negligence or impudence leading to damage or prejudice to the environment, the population or properties, particularly breaching provisions intended to prevent the spreading of STD and AIDS.
- f) Drug use
- g) Possession and /or consumption of meat or any other part of an endangered animal or plant as defined in the Washington convention (CITES) and National Regulation.

Serious misconduct such as organization of sex trade (pimping) committing paedophile, physical aggression, drug trafficking, deliberate and severe pollution, trading and /or trafficking in all or part of protected species, shall lead to immediate dismissal as of the first report of misconduct is detected, in application of the rules of procedure and labour laws.

The contractor establishes a record for each case of serious misconduct and a copy will be provided to the contractors Personnel in question indicating all action taken to terminate the misconduct by the Contractor's personnel. This record will be shared with the Engineer.

Any person suspected by the engineer to be under the influence of alcohol or controlled substance on any Project Area is immediately suspended from his position by the Contractor, pending the results of medical tests.

1.26.4 The Contractor shall ensure that all personnel are competent to perform the job assigned to them. In the event that the Contractor is unable to demonstrate the competency of any person whose activities can directly impact on the Works' SHE performance, the Employer shall remove that person from the site without any procedural formalities.

1.27 Approval from Employer

1.27.1 The name, address, educational qualification, work experience and health condition of each personnel deployed for SHE jobs shall be submitted to the Employer in the format prescribed for the purpose for comments and approval well before the start of the work. Only on approval by the Employer these personnel are authorised to work. In case any of the SHE personnel leaves the Contractor the same shall be intimated to the Employer. The Contractor shall recruit new personnel and fill up the vacancy.

1.28 Responsibility of SHE personnel

1.28.1 For all works carried out by the Contractor and his sub-contractors, the responsibility of ensuring the required SHE manpower lies with the main Contractor only. The minimum required manpower indicated by the Employer includes the sub-contractors' work also. It shall be the responsibility of the main Contractor to provide required SHE manpower for all the works executed by all Contractors. Necessary conditions shall be included in all sub-contract documents executed by the main Contractor.

1.29 Employment status of SHE personnel

1.29.1 No Contractor shall engage SHE manpower from any outsourcing agencies in which case the effectiveness would be lost. All SHE manpower shall be on the payroll of the main Contractor only and not on the payroll of any subcontractor or outsourcing manpower agencies etc. This condition does not apply to positions like traffic marshals who are engaged almost on a daily requirement basis.

1.30 Reporting of SHE personnel

1.30.1 All SHE personnel are to report to the Chief SHE Manager who shall report directly to the Chief Project Manager. The Employer shall monitor adherence to this procedure at all times. In case of non-adherence penalty shall be levied as indicated in the penalty clause.

1.31 Inadequate SHE personnel

1.31.1 In case if the Contractor fail to provide the minimum required manpower as illustrated in General Instruction Maharashtra Metro Rail Corporation Limited /SHE/GI/001 or fail to fill up vacancies created within 14 days, the same shall be provided by the Employer at Contractor's cost. Any administrative expenses involved, providing the same like as paper advertisement or manpower consultant charges, etc shall also be at the cost of Contractor.

1.32 Prohibition of performance of other duties

1.32.1 As per Schedule VIII of BOCWR, no SHE personnel shall be required or permitted to do any work which is unconnected to, inconsistent with or detrimental to the performance of the SHE duties for respective category mentioned in General Information Maharashtra Metro Rail Corporation Limited / SHE / GI / 001

1.33 Facilities to be provided to SHE personnel

1.33.1 As per Schedule VIII of BOCWR, the Contractor shall provide all SHE personnel with such facilities, equipment and information that are necessary to enable him to dispatch his duties effectively.

- 1.33.2 The minimum Employer's requirements of such facilities / equipment's to be provided for SHE personnel are given in the General Instruction Maharashtra Metro Rail Corporation Limited /SHE/GI/003

CONTRACTOR SHE COMMITTEE

- 1.34 All employees should be able to participate in the making and monitoring of arrangements for safety, industrial health and environment at their place of work. The establishment of site SHE committees in which employees and Contractor and sub-contractor management are represented can increase the involvement and commitment of employees. The Contractor shall ensure the formation and monitor the functioning of Contractor SHE committees.

1.35 Terms of Reference

- 1.35.1 The Terms of Reference for the committee shall be as follows:

- (i) To establish company safety policies and practices
- (ii) To monitor the adequacy of the contractor's site SHE plans and ensure its implementation
- (iii) To review SHE trainings
- (iv) To review the Contractor's monthly SHE report.
- (v) To identify probable causes of accident and unsafe practices in building or other construction work and to suggest remedial measures
- (vi) To stimulate interest of Employer and building workers in safety by organizing safety week, safety competition, talks and film-shows on safety, preparing posters or taking similar other measures as and when required or as necessary.
- (vii) To go around the Construction Site with a view to check unsafe practices and detect unsafe conditions and to recommend remedial measures for their rectifications including first-aid medical and welfare facilities.
- (viii) Committee team members should perform a site inspection before every committee meetings and to monitor SHE inspection reports.
- (ix) To bring to the notice of the Employer the hazards associated with use, handling and maintenance of the equipment used during the course of building and other construction work
- (x) To suggest measures for improving welfare amenities in the construction site and other miscellaneous aspect of safety, health and welfare in building or other construction work.
- (xi) To look into the health hazards associated with handling different types of explosives, chemicals and other construction materials and to suggest remedial measures including personal protective equipment.
- (xii) To review the last safety committee meeting minutes and to take action against persons/sub-contractors for non-compliance if any

- 1.36 Within 14 days of award of Contract, the SHE Committee shall be constituted and notification regarding the same shall be communicated to the members and employees as per the format provided in Form No. SF 001

- 1.37 Site SHE Committee meeting shall be conducted at least once in a month with the minimum members listed below:

Chairman	Project Manager
Secretary	SHE Manager (In-charge)

Members	<ul style="list-style-type: none"> i) Labour Welfare Officer ii) In charge of plant and machinery iii) In charge of site electrics iv) In charge of stores. v) Senior Managers/ Engineers heading different sub functions. vi) Sub - contractor's representative vii) Labour Contractor's representative viii) Workers' representative ix) Co-contractor representative. x) SHE staffs
Employer's Representatives	Maharashtra Metro Rail Corporation Limited SHE in charge and other representatives

- 1.38 Construction SHE Committee meeting shall be conducted at least once in a week with the minimum members listed below:

Chairman	Project Manager
Secretary	SHE Manager (In-charge)
Members	<ul style="list-style-type: none"> (i) Labour Welfare Officer (ii) In charge of plant and machinery (iii) In-charge of site electricity (iv) Senior Managers / Engineers heading different sub functions (v) Sub- Contractor's representative (vi) Labour contractor's representative (vii) Workers' representatives (viii) All SHE Staffs

1.39 Co-contractors' participation

- 1.39.1 In case of depot, station and other contiguous areas where more than one main contractors are working together, the Employer shall instruct the other contractors to join for the monthly SHE committee meeting of the main civil contractor, so as to discuss and decide about the common provision of security, lighting, toilet, drinking water etc. and sharing the maintenance cost of the same etc.

- 1.39.2 The general principle for sharing the cost shall be either based on the Contract value of works executed at the contiguous area or the daily average number of workmen employed by each contractor in the contiguous area.

1.40 Minimum time between two monthly SHE Committee meetings

- 1.40.1 A minimum period of 21 days shall be maintained between any two SHE monthly committee meetings.

1.41 Agenda

1.41.1 The Secretary shall circulate the agenda of the meeting at least seven working days in advance of the scheduled date of the meeting to all members.

1.41.2 The agenda should broadly cover the following:

- (i) Confirmation of minutes
- (ii) Chairman's review/overview of site SHE performance / condition
- (iii) Previous month SHE statistics
- (iv) Incident and Accident Investigation / dangerous occurrence / near miss report
- (v) Site SHE inspection
- (vi) Sub-contractors' SHE issues
- (vii) Safety presentation by Members
- (viii) Report from Employer
- (ix) Matters arising
- (x) Any other business

1.42 Minutes of the meeting

1.42.1 The Minutes of the meeting shall be prepared as per the format provided at Form No. SF-002 and sent to all members within 2 working days preferably by mail/fax followed by hardcopy. Safety Committee meeting minutes shall also be displayed in the notice board for wider publicity to all concerned.

1.43 Disciplinary Action

1.43.1 The chairman shall inform the members of any outstanding issues in the meeting and in case of repeated offence/ non-compliance by some members or other co/sub-contractors and propose suitable disciplinary action including provisions of monetary penalty as per the relevant contract clauses, the Employer shall ensure that the same is implemented.

ID CARD AND FIRST DAY AT WORK, SHE ORIENTATION TRAINING

1.44 The Contractor shall ensure that all personnel working at the site receive an induction SHE trainings explaining the nature of the work, the hazards that may be encountered during the site work and the particular hazards attached to their own function within the operation. The training shall cover the contents as given in the General Instruction Maharashtra Metro Rail Corporation Limited /SHE/GI/004.

1.45 All personnel shall be issued a photo identity card of size 85mm x 55mm duly signed by the authorized representative of the Contractor before they are engaged for any work as per the format given in the General Instruction Maharashtra Metro Rail Corporation Limited /SHE/GI/005

1.46 Contractor shall also issue some personnel SHE handbook in a language known to the workers, which provides information on SHE and emergency procedures that all personnel working on contract are required to know and the need to follow. Contractor shall ensure that this is distributed, and its content introduced to all personnel working at the site.

SHE TRAINING

1.47 The behaviour of people at all levels of the Contractor is critical for SHE performance.

- 1.48 The Contractor shall organise quality SHE training to engage Managers, supervisors and other personnel in behavioural change and improve safety performance.
- 1.49 Training sessions are two -fold: introductory sessions for starting work at the Project Area, and technical training as required in relation to the execution of the works.
- (i) Starting work sessions are organised for each Contractor's Personnel and shall cover as a minimum
 - a) Rules of procedure
 - b) Safety rules on Project Areas.
 - c) Protection of areas adjacent to Project Area
 - d) Risks relating to sexually transmitted diseases, prostitution, human trafficking and sexual
 - e) Basic health: combating malaria and water borne diseases, improving hygiene.
- 1.50 The Contractor shall analyse the training requirements for all the employees and initiate a training program to demonstrate that all persons employed, including subcontractors, are suitably qualified, competent and fit. This will include:
- (i) Orientation training -covering all the trainings mentioned in 9.3 above
 - (ii) Detailed Job descriptions for all personnel, to include their specific SHE responsibilities
 - (iii) Specification of qualifications, competency and training requirements for all personnel
 - (iv) Assessment and recording of training needs for all personnel, including subcontractors' employees in the workforce, vendor representatives and site visitors
 - (v) A system for assessing new hirers e.g. previous training
 - (vi) A means of confirming that the system is effective
 - (vii) A matrix and schedule of training requirements, covering general, task-specific and SHE-related training, showing the training frequency and interval between refresher courses
 - (viii) Timely, competent delivery of training courses
- 1.51 The Contractor shall arrange behavioural-based training programmes for all the executives to identify, recognise and eliminate unsafe act and unsafe conditions.
- 1.52 The minimum Employer's requirement of training needs for various categories of employees are given in General Instruction Maharashtra Metro Rail Corporation Limited /SHE/GI/006
- 1.53 The contents of SHE training to Managers/Supervisors as given in General Instruction Maharashtra Metro Rail Corporation Limited /SHE/GI/007 shall be conducted.
- 1.54 The refresher-training programme to all employees shall be conducted once in six months.
- 1.55 Toolbox talk as given in the Employer's Project SHE Manual shall be conducted to all high-risk workmen every day.
- 1.56 On-the spot practical skill development training on height safety including scaffold safety, crane safety, welding safety, electrical safety, traffic safety for marshals

shall also be conducted to all foremen/ workmen who were associated to the concerned jobs.

- 1.57 Every employee including workman shall take safety Oath daily without fail.
- 1.58 All vehicle drivers including heavy vehicle operators shall be trained on defensive driving at training institute recognized by Maharashtra State Road Transport Corporation / Government of Maharashtra, or any other driving institute registered under Motor Vehicles Act.
- 1.59 All the above listed training programmes except at Clause 9.11 shall be organised by the Contractor only after taking approval from the Employer for the training faculty / organisation, content and durations.
- 1.60 In case of failure on the part of the Contractor to provide all the above-mentioned training programs to all employees in time, the same shall be provided by the Employer through accredited agencies if required by formulating a common scheme to all contractors. Any administrative expenses and training fee towards the same shall be at the cost of the Contractor.
- 1.61 The Contractor detail in the training programme the actions and ESHS training for subcontractors and other members of the joint venture when applicable.

SHE INSPECTION

- 1.62 The Contractor shall evolve and administer a system of conducting SHE inspections and other risk management analysis on a periodical basis.
- 1.63 The purpose of SHE inspection is to identify any variation in construction activities and operations, machineries, plant and equipment and processes against the SHE Plan and its supplementary procedures and programs.
- 1.64 Following SHE inspections program shall be adopted:

- (i) Planned General Inspection
- (ii) Routine Inspection
- (iii) Specific Inspection
- (iv) Other Inspection

1.64.1 Planned General Inspection

1.64.1.1 Planned general inspections are performed at predetermined intervals and it usually involves the representation from both Contractor and the Employer.

1.64.1.2 Inspections that will be classified under this inspection program are:

- (i) Monthly contractor and sub-contractors site safety committee Inspection.
- (ii) Weekly safety inspection by construction supervisors (Contractors and Sub-contractors)
- (iii) Daily safety inspection by contractor site SHE team.

1.64.2 Routine Inspection

1.64.2.1 Routine inspections are often referring to the inspection of work site, equipment and temporary structures performed by site and equipment operators and temporary structure erectors.

Inspections that will be classified under this inspection program are:

- (i) Daily Inspection of plant and equipment by operator
- (ii) Weekly Inspection of scaffold by scaffolding supervisor
- (iii) Monthly Inspection of electrical hand tools by competent electrical supervisor
- (iv) Quarterly Inspection of temporary electrical systems by competent electrical supervisor
- (v) Half-yearly inspection of lifting machinery, lifting appliances, equipment and gears by Govt. approved competent person.

1.64.2.2 The list mentioned above is not exhaustive. Contractor may add additional categories. Contractors' Site SHE Manager will ensure that a system of routine inspections is carried out periodically to all plants, equipment, powered tools and any other temporary structures that will pose a hazard to operators and workmen.

Specific Inspection

1.64.2.3 Specific inspections are performed on activities without a predetermined date. Competent supervisors usually perform inspections for ensuring an activity whether it is executed in accordance to a general set of rules; method statement submitted or developed procedures.

The following are examples that will be commonly performed as required on the construction site:

- (i) Inspection performed before a heavy lifting operation.
- (ii) Inspection performed before and after the entry of person into a confined space.
- (iii) Inspection performed before and after a welding and gas cutting operation.
- (iv) Inspection of formwork before concreting by formwork erector.

The list mentioned above is not exhaustive. The Contractor shall ensure that a competent supervisor inspects all high-risk processes and activities.

1.64.3 Other Inspection

Other inspections include the following:

- (i) Mandatory Inspections by Labour Department of Government.
- (ii) Maharashtra Metro Rail Corporation Limited site SHE management team

1.64.4 The Contractor shall prepare all required safety inspection checklist for all activity operations and equipment. Checklists will be prepared based on the Indian standards, rules and regulations and Employer's requirements. The formats provided in the Project SHE manual may be referred.

1.64.5 All inspection records and reports will be properly kept and filed for audit purpose. Inspection reports of Planned General Inspection and Routine Inspection will be used for discussion during Safety Committee Meetings.

SHE AUDIT

1.65 General

1.65.1 The purpose and scope of SHE audits is to assess potential risk, liabilities and the degree of compliance of construction Safety, Health & Environmental plan and its supplementary procedures and programs against applicable and current SHE legalisation regulations and requirements of the Employer.

1.65.2 Project Manager holds the ultimate responsibility in ensuring implementation of SHE audit program during the construction work.

1.66 Monthly Audit Rating Score (MARS)

1.66.1 Monthly Audit Rating Score (MARS) will be performed once in a month. A team consisting of Project Manager and Employer representative based on the pre-designed score-rating format will conduct it. The details of the pre-designed monthly audit score rating formats are given in the Project SHE Manual.

1.66.2 This Monthly SHE Audit Rating Score (MARS) report will enable the Employer to evaluate the general compliance by the Contractor with the Conditions of Contract, the Employer's Project SHE Manual and the Contractor's site specific SHE Plan.

1.66.3 Monthly Audits will be conducted in accordance with Maharashtra Metro Rail Corporation Limited Guidelines. The Project Manager accompanied by the Employer's Representatives shall carry out the Audit. The Contractor's senior manager and SHE in-charge should also be invited to attend.

1.66.4 **Timing** :- The Monthly Audit Rating Score (MARS) should be conducted at least 7 days prior to the scheduled date of Monthly SHE Committee meeting.

1.66.5 Evaluation

1.66.5.1 The numerical scoring has been weighed on a 1-10 scale. The audit team will use their observations noted in evaluating the points to be awarded against each of the elements of the audited section. Wherever some topics and sub-topics are not applicable the score rating need not be given. The overall audit ratings shall be achieved by:

$$\text{Overall Audit Rating} = \frac{\text{Actual Score Achieved}}{\text{Max Possible Score}} * 100$$

1.66.5.2 The criticality of the required actions for the respective sections of the Audit will be classified as:

SN	Score	Description	Action
1	< 60%	Immediate	Require Contractor to rectify within 24 hours
2	< 75%	Improvement Necessary	Contractor rectification within 7 days and confirmed in writing to Employer
3	< 90%	Improvement Desirable	Contractor rectification within one month and confirmed in writing to Employer

1.66.3 **Report** :- A copy of each Audit Report will be sent to Employer and to all subcontractors, with whom it will then be discussed in detail at the Monthly SHE Committee Meeting in order to ensure that any corrective actions are agreed upon.

1.67 Monthly Electrical Safety Audit

1.67.1 A team comprising of Contractor's senior SHE (Electrical) engineer and Employer's Representative shall conduct monthly electrical safety audit covering the following and submit the report to Employer:

- (i) Electrical accidents investigation findings and remedy
- (ii) Adequacy of power generation and power requirements
- (iii) Power distribution and transmission system in place
- (iv) Updated electrical single line diagram showing the current condition of power source and distribution including the IP44 DBs arrangement.
- (v) Electrical protection devices - selection, installation and maintenance.

- (vi) Earth or ground connection and earth pit maintenance details
- (vii) Education and training of electrical personnel undertaken
- (viii) Routine electrical inspection details
- (ix) Electrical maintenance system and register.
- (x) Name plate details of major electrical equipment
- (xi) Classified zones in the site, if any.

1.68 External SHE Audit

1.68.1 External SHE audits are to be conducted by external agencies that are competent with ISO qualified auditors with the prior approval of the Employer.

1.68.2 Areas of competence of Audit team

1.68.2.1 Practical understanding of BOCW Act and Rules, statutory requirements on health/medical and welfare of workmen, construction hazards and its prevention and control, traffic management, electrical safety, rigging, safety of construction equipment and environment management.

1.68.2.2 Audit shall be conducted as per the guidelines of ISO, ILO, and national standards. Audit report shall also be presented as per the above formats.

1.68.3 External SHE audits shall be conducted on a quarterly basis throughout the currency of the Contract.

1.68.4 Targets of SHE Audit :- The contents and coverage of the external audit shall include the following items

1.68.4.1 SHE management

- (i) Organization
- (ii) Communication and Motivation
- (iii) Time office
- (iv) Inspection
- (v) Emergency preparedness
- (vi) Budget allocation
- (vii) Education and Training
- (viii) Work permit system

1.68.4.2 Technical

- (i) Building and Structure
- (ii) Construction operational safety
- (iii) Material safety
- (iv) Hand tools and Power tools
- (v) Electrical system
- (vi) Safety Appliances

- (vii) Fire prevention and control
- (viii) Housekeeping
- (ix) Maintenance and Machinery safety
- (x) First-aid and Medical Facilities
- (xi) Welfare measures
- (xii) Environmental Management

1.68.5 Audit Documents

1.68.5.1 Contractor shall make the below listed documents available for the review by the Audit team.

- (i) SHE policy
- (ii) SHE manual
- (iii) SHE Rules and Regulation
- (iv) SHE organization chart
- (v) Annual SHE objectives / programs
- (vi) Accident / near miss statistics and analysis
- (vii) SHE Training program / records for all personnel
- (viii) Operating manuals and maintenance manual of all equipment's
- (ix) Safe worthiness certificates of all lifting appliances and gears
- (x) Medical fitness record for all personnel
- (xi) Risk identification, assessment and control details
- (xii) Environmental management reports
- (xiii) Emergency management records including mock drill

1.68.6 Audit Preparation

- (i) Audit team members are required to gather information by observations through interviews and by checks of hardware and documentation.
- (ii) Audit team shall prepare checklist to cover all parts based on SHE legislations rules and regulations and Maharashtra Metro Rail Corporation Limited requirements.
- (iii) Audit team members shall verify the facts and findings leading to the identified gaps and weakness.
- (iv) Audit leader has overall responsibility for reaching a conclusion.

1.68.7 Reporting

1.68.7.1 Audit report shall be prepared and directly sent to the Employer within 7 days of conducting the audit with a copy to the contractor.

1.68.8 Report contents

- (i) Executing summary: Based on the finalized checklists as written the findings to the Employer by the audit team members, the audit leader will compile a concise and accurate summary of observations and findings.
- (ii) Introduction: This will contain basic information regarding the facilities or organization audited, the specific audit dates (inclusion of those for preparation and post-audit activities).
- (iii) Principal positive findings: This will contain the summary of positive aspects as observed by the auditors. It will also contain highlights of those issue, which may warrant dissemination as best practice regarding methodology used or achievement.
- (iv) Audit Findings: All audit findings as detailed in the audit checklists shall be grouped together as priority 1 and 2 as detailed below in a separate listing.
 - a. Priority 1: Actions to rectify gaps or weakness should generally be implemented within 2 - weeks, if risk potential is high or unacceptable.
 - b. Priority 2: Actions should be generally implemented or rectified with a maximum of 3 - 4 weeks, if not rectified would create a likelihood of minor injury or business loss.

1.68.9 Conformity Report & Action by Employer

- 1.68.9.1 The auditor shall inspect the site after 14 days of conducting initial audit for checking the adequacy of implementation of items maintained under priority 1 by the Contractor and shall submit a conformity / non-conformity report to the Employer with a copy to the contractor.
 - 1.68.9.2 The auditor shall again inspect after 28 days of conducting initial audit for checking the adequacy of implementation of items mentioned under priority 2 by the Contractor and shall submit a conformity / non-conformity report to the Employer with a copy to the Contractor.
 - 1.68.9.3 In case of non-conformity of items mentioned by auditor, the Employer shall take necessary steps including stoppage of work and or imposing any penalty for getting the item implemented.
- #### 1.68.10 Failure of Contractor to conduct External SHE Audit
- 1.68.10.1 If the Contractor fails to conduct the external SHE audits in time, the Employer at the cost of Contractor shall get it done.

SHE COMMUNICATION

- 1.69 The Contractor shall take every effort to communicate the Safety, Occupational health and Environment management measures through posters campaigns / billboards / banners / glow signs being displayed around the work site as part of the effort to rise safety awareness amongst to the work force. Posters should be in Marathi, Hindi and English and. Posters / billboards / banners/ glow signs should be changed at least once in a month to maintain the impact.
- 1.70 The Contractor shall also observe important days as listed in General Instruction Maharashtra Metro Rail Corporation Limited /SHE/GI/008 and printing and displaying safety signage and posters as listed in General Instruction Maharashtra Metro Rail Corporation Limited /SHE/GI/009
- 1.71 The list indicated are the minimum requirements of the Employer and the Contractor is encouraged to further the SHE communication activities by formulating suitable

reward schemes for safety performers and any other activities, which deem fit for the purpose.

SHE SUBMITTALS TO THE EMPLOYER

1.72 The Contractor's SHE management should send the following reports to the Employer periodically:

- (i) Daily Reporting of total number of workmen (as given in Clause 13.2)
- (ii) Monthly SHE Report (as given in Clause 13.3)
- (iii) SHE Committee Meeting Minutes (as given in Clause 7.9.1)
- (iv) SHE Inspection Reports
- (v) SHE Audit Reports
 - a. Monthly Audit Rating Score (MARS) report
 - b. External SHE Audit
 - c. Electrical Safety Audit
- (vi) Air and Noise Quality monitoring report

1.73 Daily Reporting of total number of workmen

1.73.1 The Contractor shall report to the Employer the total number of workmen engaged by all including any subcontractor within 2 hours of starting of any shift in any day. This reporting shall be the primary duty of the Chief SHE Manager of the Contractor and reporting shall be through tele-fax / email. The onus of checking the receipt of the same by the Employer lies with the Contractor. If the information is not received or received more than 2 hrs after starting of the shift, penalty shall be levied as per relevant clause.

1.74 Monthly SHE Report

1.74.1 The Contractor shall prepare a monthly SHE reports consisting of the following and submit 3 copies within 7th of next month to the Employer as specified in the Project SHE Manual.

- (i) Monthly man-hour details as specified in the Project SHE manual
- (ii) Monthly accident / incident details as specified in the Project SHE manual
- (iii) SHE committee details
- (iv) Details of SHE trainings conducted in the month
- (v) SHE Inspection
- (vi) SHE internal audit details like electrical audit etc.
- (vii) SHE Communication activities under taken in the month indicating the number of posters displayed and balance availability in stock.
- (viii) Air quality
- (ix) Toolbox talks details
- (x) PPE details: Quantity purchased, issued to the workmen and stock available.
- (xi) Details on IP 44 panel boards, lighting poles, welding & cutting equipment's, Ladders, Hoists, tools & tackles.
- (xii) Monthly Lux meter study results
- (xiii) Housekeeping

- (xiv) Barricade maintenance details
- (xv) No of critical excavations
- (xvi) Health & Welfare activities
- (xvii) Safety walk conducted by Contractors' Project Manager in the month
- (xviii) SHE Activities Planned for next month

ACCIDENT REPORTING AND INVESTIGATION

1.75 Reporting to Employer

1.75.1 All accidents, "near miss" and dangerous occurrences shall immediately be informed verbally to the Employer. This will enable the Employer to reach to the scene of accident / dangerous occurrences to monitor/assist any rescue work and/or start conducting the investigation process so that the evidences are not lost.

1.75.2 Reports of all accidents (fatal / injury) and dangerous occurrences shall also be sent within 24 hours as per approved format.

1.75.3 No accident / dangerous occurrences are exempted from reporting to the Employer.

1.75.4 Any wilful delay in verbal and written reporting to the Employer shall be penalised as per relevant clause.

1.75.5 Near Miss

An incident or a situation with clear potential for an undesirable outcome to occur, even though no actual negative consequences happened. In other words, it is an event with potential to cause injury, property damage, environmental release or an adverse community reaction. Generally, the following events are some examples of near miss when:

- (i) A person trips over an object and falls to the ground but did not get injured
- (ii) A person has to dive or jump out of the way to avoid a collision with a motorized vehicle, a moving object like a suspended part on a conveyor or from an uncontrolled suspended load;
- (iii) A person has to jump from a falling ladder;
- (iv) An object with significant mass falls from a distance of sufficient height that would cause injury to a person if they were struck;
- (v) A machine part becomes a projectile;
- (vi) A person works on a piece of equipment that he/EHS believes is de-energized and that equipment starts up putting that person in jeopardy;
- (vii) A low speed collision occurs, and an occupant of that vehicle is not wearing a seat belt and is not injured.
- (viii) Stored energy unexpectedly releases which could cause injury if a person were struck or contacted, e.g. a high-tension spring (like your garage door spring) breaks or a pocket of steam releases;
- (ix) Any steps of the vessel entry procedure are omitted in a vessel entry;
- (x) Any emergency equipment (fire extinguisher, Scott Air Pack, Oxygen sensor, eye wash, etc) fails to operate properly when called on in an emergency.

If Protective Equipment is called for and worn and it prevents an injury, then in this case it would not be a near miss. As an example, a mechanic is wearing a hard hat in a barricaded area where hard hats must be worn and a 100gram bolt falls from a height of 2 meters and

strikes his hard hat and no injury occurs. That would not be a near miss. But if he were not wearing a hardhat and the bolt falls a meter away, then it would be a near miss.

- 14.1.6 Each non-conformity will be documented by a digital photograph with captions to provide a visual illustration, explicitly indicating the location, date of inspection and the non-conformity in question.

1.76 Reporting to Government organisations

- 1.76.1 In addition to the above verbal and written reporting to the Employer, as per Rule 210 of BOCWR, notice of any accident to a worker at the building or construction site that:

- (i) causes loss of life; or
- (ii) disables a worker from working for a period of 48 hours or more immediately following the accident;
- (iii) shall forthwith be sent by telegram, telephone, fax, or similar other means including special messenger within four hours in case of fatal accidents and 72 hours in case of other accidents, to:

- a. the Regional Labour Commissioner, wherein the Contractor has registered the firm/ work
- b. the board with which the worker involved was registered as a beneficiary;
- c. Director General and
- d. the next of kin or other relative of the worker involved in the accident;

- 1.76.2 Further, notice of accident shall be sent in respect of an accident which:

- (i) causes loss of life; or
- (ii) disables the injured worker from work for more than 10 days to
 - a. the officer-in-charge of the nearest police station;
 - b. the District Magistrate or, if the District Magistrate by order so desires, to
 - c. the Sub-Divisional Magistrate

- 1.76.3 In case of an accident causing minor injury, first-aid shall be administered, and the injured worker shall be immediately transferred to a hospital or other place for medical treatment.

- 1.76.4 Where any accident causing disablement that subsequently results in death, notice in writing of such death, shall be sent to the authorities mentioned in Clause 14.2.1 and 14.2.2 above within 72 hours of such death.

1.76.5 Reporting of dangerous occurrences

- 1.76.5.1 The following classes of dangerous occurrences shall be reported to the Inspector having jurisdiction, whether or not any disablement or death caused to the worker, namely:

- (a) collapse or failure of lifting appliances, or hoist, or conveyors, or similar equipment for handling of building or construction material or breakage or failure of rope, chain or loose gears; or overturning of cranes used in construction work;

- (b) falling of objects from height;
- (c) collapse or subsidence of soil, pipe lines, any wall, floor, gallery, roof or any other part of any structure, launching girder, platform, staging, scaffolding or means of access including formwork;
- (d) explosion of receiver or vessel used for storage of pressure greater than atmospheric pressure, of any gas or gases or any liquid or solid used as building material;
- (e) fire and explosion causing damage to any place on construction site where building workers are employed;
- (f) spillage or leakage of any hazardous substance and damage to their container;
- (g) collapse, capsizing, toppling or collision of transport equipment;
- (h) leakage or release of harmful toxic gases at the construction site;

1.76.6 In case of failure of launching girder, lifting appliance, loose gear, hoist or building and other construction work, machinery and transport equipment at a construction site, such appliances, gear, hoist, machinery or equipment and the site of such occurrence shall, as far as practicable, be kept undisturbed until inspected by the Authorities;

1.76.7 Every notice given for fatal accidents or dangerous occurrences shall be followed by a written report to the concerned Authorities under Section 39 of BOCWA and the Director General in the specified Form XIV of BOCWR.

1.77 Accident investigation

1.77.1 General

1.77.1.1 Investigations should be conducted in an open and positive atmosphere that encourages the witnesses to talk freely. The primary objective is to ascertain the facts with a view to prevent future and possibly more serious occurrences.

1.77.1.2 Accidents and Dangerous Occurrences which result in death, serious injury or serious damage must be investigated by the Contractor immediately to find out the cause of the accident/occurrence so that measures can be formulated to prevent any recurrence.

1.77.1.3 Near misses and minor accidents should also be investigated by the Contractor as soon as possible as they are signals that there are inadequacies in the safety management system.

1.77.2 Procedure of incident investigation

1.77.2.1 It is important after any accident or dangerous occurrence that information relating to the incident is gathered in an organised way. The following steps shall be followed:

- (a) take photographs and make sketches
- (b) examine involved equipment, workplace or material and the environmental conditions
- (c) interview the injured, eye-witnesses and other involved parties
- (d) consult expert opinion where necessary
- (e) identify the specific Contractor or sub-contractor involved.

1.77.2.2 Having gathered information, it is then necessary to make an analysis of incident

- (a) establish the chain of events leading to the accident or incident

- (b) find out at what stage the accident took place
- (c) consider all possible causes and the interaction of different factors that led up to the accident, and identify the most probable cause. The cause of an accident should never be classified as carelessness. The specific act or omission that caused the accident must be identified.

1.77.2.3 The next stage is to proceed with the follow-up action

- (a) report on the findings and conclusions
- (b) formulate preventive measures to avoid recurrence
- (c) publicise the findings and the remedial actions taken

1.78 Employers' independent incident investigation

- 1.78.1 In case of fatal / dangerous occurrence the Employer shall also conduct independent investigation. Contractor and his staff shall extend necessary co-operation and testify about the accident.
- 1.78.2 The Contractor shall take every effort to preserve the scene of accident till the Employer completes the investigation.
- 1.78.3 All persons summoned by the Employer in connection to witness recording shall obey the instructions without delay. Any wilful suppression of information by any person shall be removed from the site immediately and / or punishable as per relevant penalty clause.

EMERGENCY PREPAREDNESS PLAN

- 1.79 The Contractor shall prepare as required under Rule 36 of BOCWR, an Emergency Response Plan for all work sites as a part of the Contractor SHE Plan. The plan shall integrate the emergency response plans of the Contractor and all other subcontractors. The Emergency Response Plan shall detail the Contractor's procedures, including detailed communications arrangements, for dealing with all emergencies that could affect the Site. This include where applicable, injury, sickness, evacuation, fire, chemical spillage, severe weather and rescue.
- 1.80 The Contractor shall ensure that an Emergency Response Plan is prepared to deal with emergencies arising out of:
 - (i) Fire and explosion
 - (ii) Collapse of lifting appliances and transport equipment
 - (iii) Collapse of building, sheds or structure i.e.-structural failure
 - (iv) Gas leakage or spillage of dangerous goods or chemicals
 - (v) Bomb threatening, Criminal or Terrorist attack
 - (vi) Drowning of workers
 - (vii) Landslides getting workers buried floods, Earthquake, storms & other natural calamities.
 - (viii) Loss of containment of dangerous substance
- 1.81 Fire extinguishers are made available in each building at clearly identified locations, and fires are strictly forbidden outside of the cooking area.
- 1.82 Arrangements shall be made for emergency medical treatment and evacuation of the victim in the event of an accident or dangerous incident occurring, the chain of command and the responsible persons of the Contractor with their telephone

numbers and addresses for quick communication shall be adequately publicized & conspicuously displayed in the workplace.

- 1.83 Contractors shall require to tie-up with the hospitals and fire stations located in the neighbourhood for attending to the casualties promptly and emergency vehicle kept on standby duty during the working hours for the purpose.
- 1.84 Contractor shall conduct an onsite emergency mock drill once in every month for all his workers and his subcontractor's workers.
- 1.85 It shall be the responsibility of the Contractor to keep the Local Law & Order Authorities informed and seek urgent help, as the case may be, so as to mitigate the consequences of an emergency. Prompt communication to Maharashtra Metro Rail Corporation Limited, telephonically initially and followed by a written report, shall be made by the Contractor.

EXPERTS / AGENCIES FOR SHE SERVICES

- 1.86 Contractors may utilise the services of experts/agencies empanelled under Rule 250 of BOCWR for the purpose of training, internal audit and any other SHE services with prior approval of the Employer.
- 1.87 As an aide to contractors, a list of experts/agencies and the offered service are given in General Instruction Maharashtra Metro Rail Corporation Limited /SHE/GI/010 for ready reference. In addition to it if the Contractor would like to use any expert/agencies' services for any SHE activities the same can also be allowed provided that they are competent and meet to the general requirements of Employer. In every case prior approval of the Employer is mandatory.

PART II: SAFETY

HOUSEKEEPING

- 1.88 Housekeeping is the act of keeping the working environment cleared of all unnecessary waste, thereby providing a first-line of defence against accidents and injuries.
- 1.89 Contractor shall understand and accept that improper housekeeping is the primary hazard in any construction site and ensure that a high degree of housekeeping is always maintained. Indeed "Cleanliness is indeed next to Godliness"
- 1.90 Housekeeping is the responsibility of all site personnel, and line management commitment shall be demonstrated by the continued efforts of supervising staff towards this activity.
- 1.91 General Housekeeping shall be carried out by the Contractor and ensured at all times at Work Site, Construction Depot, Batching Plant, Labour Camp, Stores, Offices and toilets / urinals. Towards this the Contractor shall constitute a special group of housekeeping personnel as per General Instruction Maharashtra Metro Rail Corporation Limited /SHE/GI/001. This group shall ensure daily cleaning at work sites & surrounding areas and maintain a register as per the approved format by the Employer.
- 1.92 Adequate time shall be assigned to ensure that good housekeeping is maintained. Team of housekeeping squad shall carry out this.
- 1.93 The Contractor shall be responsible to provide segregated containers for disposal of debris at required places and regular cleaning of the same.
- 1.94 Full height fence, barriers, barricades etc. shall be erected around the site in order to prevent the surrounding area from excavated soil, rubbish etc, which may cause inconvenience to and endanger the public. The barricade especially those exposed to public shall be aesthetically maintained by regular cleaning and painting as directed by the Employer. These shall be maintained in one line and level.
- 1.95 The structure dimension of the barricade, material and composition, its colour scheme, Maharashtra Metro Rail Corporation Limited logo and other details shall be in accordance with specifications laid down in tender document.
- 1.96 All stairways, passageways and gangways shall be maintained without any blockages or obstructions. All emergency exits passageways, exits fire doors, break-glass alarm points, firefighting equipment, first aid stations, and other emergency stations shall be kept clean, unobstructed and in good working order.
- 1.97 Lumber with protruding nails shall be bent or removed and properly stacked.
- 1.98 All surplus earth and debris are removed/disposed-off from the working areas to officially designated dumpsites. Trucks carrying sand, earth and any pulverized materials etc. in order to avoid dust or odour impact shall be covered while moving. The tyres of the trucks leaving the site shall be cleaned with water, wherever the possibility of spillage on carriageways meant for regular road traffic exists.
- 1.99 No parking of trucks/trolleys, cranes and tTrailers etc. shall be allowed on roads, which may obstruct the traffic movement. All truck drivers should generally be accompanied by a Cleaner.
- 1.100 Roads shall be kept clear and materials like: pipes, steel, sand boulders, concrete, chips and brick etc. shall not be allowed on the roads to obstruct free movement of road traffic.

- 1.101 Water logging or bentonite spillage on roads shall not be allowed. If bentonite spillage is observed on road endangering the safety of road users, the Contractor shall be penalised as per relevant clause.
- 1.102 Proper and safe stacking of material are of paramount importance at yards, stores and such locations where material would be unloaded for future use. The storage area shall be well laid out with easy access and material stored / stacked in an orderly and safe manner.
- 1.103 Unused/surplus cables, steel items and steel scrap lying scattered at different places within the working areas shall be removed to identified locations(s).
- 1.104 All wooden scrap, empty wooden cable drums and other combustible packing materials, shall be removed from work place to identified location(s).
- 1.105 Empty cement bags and other packaging material shall be properly stacked and removed.
- 1.106 The Contractor shall ensure that all his sub-contractors maintain the site reasonably clean through provisions related to house keeping

WORKING AT HEIGHT/BELOW GROUND

1.107 Definitions

- 1.107.1 “**access**” and “**egress**” include ascent and descent.
- 1.107.2 “**fragile surface**” means a surface, which would fail if any reasonably foreseeable loading were to be applied to it.
- 1.107.3 “**line**” includes rope, chain or webbing
- 1.107.4 “**personal fall protection**” means:
 - (i) a fall prevention, work restraint, work positioning, fall arrest or rescue system, other than a system in which the only safeguards are collective safeguards; or
 - (ii) rope access and positioning techniques;
- 1.107.5 “**work at height**” means:
 - (i) work in any place, including a place at or below ground level;
 - (ii) obtaining access to or egress from such place while at work, except by a staircase in a permanent workplace, where, if protective measures were not taken, a person could fall a distance liable to cause personal injury;
- 1.107.6 “**work equipment**” means any machinery, appliance, apparatus, tool or installation for use at work (whether exclusively or not) and includes:
 - (a) a guard-Rail, toe-board, barrier or similar collective means of protection
 - (b) a working platform
 - (c) a net, airbag or other collective safe guard for arresting falls
 - (d) personal fall protection system
 - (e) ladders
- 1.107.7 “**working platform**” means:
 - (i) any platform used as a place of work or as a means of access to or egress from a place of work;
 - (ii) includes any scaffold, suspended scaffold, cradle, mobile platforms, trestle, gangway, gantry and stairway which is so used.
- 1.108 **Organisation and planning** :- The Contractor shall ensure that work at height is:
 - (i) properly planned for any emergencies and rescue

- (ii) appropriately supervised; and
 - (iii) carried out in a manner, which is reasonably practicable safe.
- 1.109 The Contractor shall ensure that work at height is carried out only when the weather conditions do not jeopardise the health or safety of persons involved in the work.
- 1.110 **Competence:-** The Contractor shall ensure that no person engages in any activity, including organization, planning and supervision, in relation to work at height or work equipment for use in such work unless he is competent to do so or, if being trained, is being supervised by a competent person.
- 1.111 **Avoidance of risks from work at height:-** The Contractor shall ensure that work is not carried out at height where it is reasonably practicable to carry out the work safely otherwise than at height.
- 1.112
- 1.113 Where work is carried out at height, the Contractor shall take suitable and sufficient measures as given below to prevent, so far as is reasonably practicable, any person falling a distance liable to cause personal injury.
- (i) his ensuring that the work is carried out:
 - a. from an existing place of work; or
 - b. (in the case of obtaining access or egress) using an existing means, complying to the requirements as given in Clause 18.15

Where it is reasonably practicable to carry it out safely and under appropriate ergonomic conditions; and

- (ii) Where it is not reasonably practicable for the work to be carried out in accordance with sub-paragraph (a), his providing sufficient work equipment for preventing, so far as is reasonably practicable, a fall occurring.
- 1.114 Where the measures taken under Clause 18.6 do not eliminate the risk of a fall occurring, every Contractor shall:
- (i) So far as is reasonably practicable, provide sufficient work equipment to minimise:
 - a. The distance and consequences; or
 - b. Where it is not reasonably practicable to minimise the distance, the consequences, of a fall; and
 - (ii) Without prejudice to the generality of Clause 18.4, provide such additional training and instruction or take other additional suitable and sufficient measures to prevent, so far as is reasonably practicable, any person falling a distance liable to cause personal injury.
- 1.115 Selection of 'work equipment' for work at height
- (i) The Contractor, in selecting work equipment for use in work at height, shall:
 - a. Give collective protection measures priority over personal protection measures; and
 - b. Take account of:
 - 1. The working conditions and the risks to the safety of persons at the place where the work equipment is to be used;

2. In the case of work equipment for access and egress, the distance to be negotiated;
3. The distance and consequences of a potential fall;
4. The duration and frequency of use;
5. The need for easy and timely evacuation and rescue in an emergency; and
6. Any additional risk posed by the use, installation or removal of that work equipment or by evacuation and rescue from it;

(ii) The Contractor shall select work equipment for work at height which:

- a. has characteristics including dimensions which:
 1. Are appropriate to the nature of the work to be performed and the foreseeable loadings; and
 2. Allow passage without risk; and
- b. Is in other respects the most suitable work equipment, having regard in particular to the purposes specified in Clause 18.5 and 18.6.

Special requirements for using cranes and hoists underground

1. underground hoists must be designed to allow powering of the hoist drum in both directions so that the brakes are automatically applied upon power release or failure.
2. Hoist operator must have a closed-circuit voice communication system with speaker microphone to communicate with individual landing station
3. When sinking shafts 22.8m or less, cages, skips and buckets may swing, bumper snag against shaft sides must be guided by fenders, Rails, ropes or a combination. If shaft is greater than 22.8m then hoisted objects must be rope guided for full length of travel.

1.116 Fragile surfaces

1.116.1 The Contractor shall ensure that no person at work passes across or near, or working on, from or near, a fragile surface where it is reasonably practicable to carry out work safely and under appropriate ergonomic conditions without his doing so.

1.116.2 Where it is not reasonably practicable to carry out work safely and under appropriate ergonomic conditions without passing across or near, or working on, from or near, a fragile surface, every Contractor shall:

- (i) ensure, so far as is reasonably practicable, that suitable and sufficient platforms, coverings, guard Rails or similar means of support or protection are provided and used so that any foreseeable loading is supported by such supports or borne by such protection;
- (ii) where a risk of a person at work falling remains despite the measures taken under the preceding provisions of this regulation, take suitable and sufficient measures to minimise the distances and consequences of his fall.

1.116.3 Where any person at work may pass across or near, or work on, from or near, a fragile surface, every Contractor shall ensure that:

- (i) prominent warning notices are so far as is reasonably practicable affixed at the approach to the place where the fragile surface is situated; or
- (ii) where that is not reasonably practicable, such persons are made aware of it by other means.

1.117 Falling objects

- 1.117.1 The Contractor shall, where necessary to prevent injury to any person, take suitable and sufficient steps to prevent, so far as is reasonably practicable, the fall of any material or object.
- 1.117.2 where it is not reasonably practicable to comply with the requirements of Clause 18.9, every Contractor shall take suitable and sufficient steps to prevent any person being struck by any falling material or object which is liable to cause personal injury.
- 1.117.3 The Contractor shall ensure that no material or object is thrown or tipped from height in circumstances where it is liable to cause injury to any person.
- 1.117.4 Every Contractor shall ensure that materials and objects are stored in such a way as to prevent risk to any person arising from the collapse, overturning or unintended movement of such materials or objects.

1.118 Danger areas

- 1.118.1 Without prejudice to the preceding requirements of these Regulations, every Contractor shall ensure that,
- (i) Where a workplace contains an area in which, owing to the nature of the work, there is a risk of any person at work;
 - a. falling a distance; or
 - b. being struck by a falling object,

which is liable to cause personal injury, the workplace is so far as is reasonably practicable equipped with devices preventing unauthorised persons from entering such area; and

- (ii) such area is clearly indicated.

1.119 Inspection of work equipment

- 1.119.1 The Contractor shall ensure that, where the safety of work equipment depends on how it is installed or assembled, it is not used after installation or assembly in any position unless it has been inspected in that position.
- 1.119.2 The Contractor shall ensure that work equipment exposed to conditions causing deterioration which is liable to result in dangerous situations is inspected
- (i) at suitable intervals; and
 - (ii) each time that exceptional circumstances which are liable to jeopardise the safety of the work equipment have occurred,

to ensure that health and safety conditions are maintained and that any deterioration can be detected and remedied in good time.

- 1.119.3 Without prejudice to Clause 18.12.1, the Contractor shall ensure that a working platform

- (i) used for construction work; and
- (ii) from which a person could fall 2 metres or more,

is not used in any position unless it has been inspected in that position or, in the case of a mobile working platform, inspected on the site, within the previous 7 days.

- 1.119.4 The Contractor shall ensure that the reports of all inspections are properly maintained and shown to the Employer as and when required.

- 1.119.5 In this clause "inspection",

- (i) means such visual or more rigorous inspection by a competent person as is appropriate for safety purposes; and
 - (ii) includes any testing appropriate for those purposes,
- 1.120 **Inspection of places of work at height :-** The Contractor shall so far as is reasonably practicable ensure that the surface and every parapet, permanent Rail or other such fall protection measure of every place of work at height are checked on each occasion before the place is used.
- 1.121 Duties of persons at work
 - 1.121.1 Any workmen employed by the Contractor shall report to the supervisor about any defect relating to work at height which he knows is likely to endanger the safety of himself or another person.
 - 1.121.2 Every workman shall use any work equipment or safety device provided to him for work at height by the Contractor, in accordance with:
 - (i) any training in the use of the work equipment or device concerned which have been received by him; and
 - (ii) the instructions respecting that use which have been provided to him by the Contractor as per the requirements of the Employer
- 1.122 Requirements for existing places of work and means of access or egress at height every existing place of work or means of access or egress at height shall:
 - (i) be stable and of sufficient strength & rigidity for the purpose for which it is intended to be or is being used;
 - (ii) where applicable, rest on a stable, sufficiently strong surface;
 - (iii) be of sufficient dimensions to permit the safe passage of persons and the safe use of any plant or materials required to be used and to provide a safe working area having regard to the work to be carried out there;
 - (iv) possess suitable and sufficient means for preventing a fall;
 - (v) possess a surface which has no gap
 - a. through which a person could fall;
 - b. through which any material or object could fall and injure a person; or
 - c. giving rise to other risk of injury to any person, unless measures have been taken to protect persons against such risk;
 - (vi) be so constructed and used, and maintained in such condition, as to prevent, so far as is reasonably practicable:
 - a. the risk of slipping or tripping; or
 - b. any person being caught between it and any adjacent structure;
 - (vii) where it has moving parts, be prevented by appropriate devices from moving inadvertently during work at height.
- 1.123 Requirements for guard Rails, toe-boards, barriers and similar collective means of protection
 - (i) Unless the context otherwise requires, any reference in this section to means of protection is to a guard Rail, toe-board, barrier or similar collective means of protection.
 - (ii) Means of protection shall
 - a. be of sufficient dimensions, of sufficient strength and rigidity for the purposes for which they are being used, and otherwise suitable;

- b. be so placed, secured and used as to ensure, so far as is reasonably practicable, that they do not become accidentally displaced; and
- c. be so placed as to prevent, so far as is practicable, the fall of any person, or of any material or object, from any place of work.

(iii) In relation to work at height involved in construction work

- a. the top guard-Rail or other similar means of protection shall be at least 950 millimetres above the edge from which any person is liable to fall;
- b. toe-boards shall be suitable and sufficient to prevent the fall of any person, or any material or object, from any place of work; and
- c. any intermediate guard Rail or similar means of protection shall be positioned so that any gap between it and other means of protection does not exceed 470 millimetres.

(iv) Any structure or part of a structure which supports means of protection or to which means of protection are attached shall be of sufficient strength and suitable for the purpose of such support or attachment.

1.124 Requirements for all Working Platforms

- (i) Every working platforms requires a supporting structure for holding it
- (ii) Any surface upon which any supporting structure rests shall be stable, of sufficient strength and of suitable composition safely to support the supporting structure, the working platform and any loading intended to be placed on the working platform.

(iii) Stability of supporting structure

Any supporting structure shall

- a. be suitable and of sufficient strength and rigidity for the purpose for which it is being used;
- b. in the case of a wheeled structure, be prevented by appropriate devices from moving inadvertently during work at height;
- c. in other cases, be prevented from slipping by secure attachment to the bearing surface or to another structure, provision of an effective anti-slip device or by other means of equivalent effectiveness;
- d. be stable while being erected, used and dismantled; and
- e. when altered or modified, be so altered or modified as to ensure that it remains stable.
- f. Have suitable base plates and properly footed thereby.

(iv) Stability of working platforms

A working platform shall

- a. be suitable and of sufficient strength and rigidity for the purpose or purposes for which it is intended to be used or is being used;
- b. be so erected and used as to ensure that its components do not become accidentally displaced so as to endanger any person;
- c. when altered or modified, be so altered or modified as to ensure that it remains stable; and
- d. be dismantled in such a way as to prevent accidental displacement.

(v) Safety on working platforms

A working platform shall

- a. be of sufficient dimensions to permit the safe passage of persons and the safe use of any plant or materials required to be used and to provide a safe working area having regard to the work being carried out there;
 - b. possess a suitable surface and, in particular, be so constructed that the surface of the working platform has no gap
 - 1. through which a person could fall;
 - 2. through which any material or object could fall and injure a person; or
 - 3. giving rise to other risk of injury to any person, unless measures have been taken to protect persons against such risk; and
 - c. be so erected and used, and maintained in such condition, as to prevent, so far as is reasonably practicable
 - 1. the risk of slipping or tripping; or
 - 2. any person being caught between the working platform and any adjacent structure.
- (vi) **Loading** :- A working platform and any supporting structure shall not be loaded so as to give rise to a risk of collapse or to any deformation, which could affect its safe use.
- (vii) Additional requirements for scaffolding
- Strength and stability calculations for scaffolding shall be carried out unless**
- a. a note of the calculations, covering the structural arrangements contemplated, is available; or
 - b. it is assembled in conformity with a generally recognised standard configuration.
- (viii) Depending on the complexity of the scaffolding selected, a competent person shall draw up an assembly, use and dismantling plan. This may be in the form of a standard plan, supplemented by items relating to specific details of the scaffolding in question.
- (ix) A copy of the plan, including any instructions it may contain, shall be kept available for the use of persons concerned in the assembly, use, dismantling or alteration of scaffolding until it has been dismantled.
- (x) The dimensions, form and layout of scaffolding decks shall be appropriate to the nature of the work to be performed and suitable for the loads to be carried and permit work and passage in safety.
- (xi) While a scaffold is not available for use, including during its assembly, dismantling or alteration, it shall be marked with general warning signs in accordance with and be suitably delineated by physical means preventing access to the danger zone.
- (xii) Scaffolding may be assembled, dismantled or significantly altered only under the supervision of a competent person and by persons who have received appropriate and specific training in the operations envisaged which addresses specific risks which the operations may entail and precautions to be taken, and more particularly in:
- a. understanding of the plan for the assembly, dismantling or alteration of the scaffolding concerned;
 - b. safety during the assembly, dismantling or alteration of the scaffolding concerned;

- c. measures to prevent the risk of persons, materials or objects falling;
- d. safety measures in the event of changing weather conditions which could adversely affect the safety of the scaffolding concerned;
- e. permissible loadings;
- f. any other risks which the assembly, dismantling or alteration of the scaffolding may entail.

1.125 Requirements for collective safeguards for arresting falls

- (i) Collective safeguard is a safety net, airbag or other collective safeguard for arresting falls
- (ii) A safeguard shall be used only if
 - a. a risk assessment has demonstrated that the work activity can so far as is reasonably practicable be performed safely while using it and without affecting its effectiveness;
 - b. the use of other, safer work equipment is not reasonably practicable; and
 - c. a sufficient number of available persons have received adequate training specific to the safeguard, including rescue procedures.
- (iii) A safeguard shall be suitable and of sufficient strength to arrest safely the fall of any person who is liable to fall.
- (iv) A safeguard shall:
 - a. in the case of a safeguard which is designed to be attached, be securely attached to all the required anchors, and the anchors and the means of attachment thereto shall be suitable and of sufficient strength and stability for the purpose of safely supporting the foreseeable loading in arresting any fall and during any subsequent rescue;
 - b. in the case of an airbag, landing mat or similar safeguard, be stable; and
 - c. in the case of a safeguard, which distorts in arresting a fall, afford sufficient clearance.
- (v) Suitable and sufficient steps shall be taken to ensure, so far as practicable, that in the event of a fall by any person the safeguard does not itself cause injury to that person.

1.126 Requirements for personal fall protection systems

- (i) A personal fall protection system shall be used only if
 - a. a risk assessment has demonstrated that
 - 1. the work can so far as is reasonably practicable be performed safely while using that system; and
 - 2. the use of other safer work equipment is not reasonably practicable; and
 - b. the user and a sufficient number of available persons have received adequate training specific to the operations envisaged, including rescue procedures.
- (ii) A personal fall protection system shall
 - a. be suitable and of sufficient strength for the purposes for which it is being used having regard to the work being carried out and any foreseeable loading;
 - b. where necessary, fit the user;

- c. be correctly fitted;
 - d. be designed to minimise injury to the user and, where necessary, be adjusted to prevent the user falling or slipping from it, should a fall occur; and
 - e. be so designed, installed and used as to prevent unplanned or uncontrolled movement of the user.
- (iii) A personal fall protection system designed for use with an anchor shall be securely attached to at least one anchor, and each anchor and the means of attachment thereto shall be suitable and of sufficient strength and stability for the purpose of supporting any foreseeable loading.
 - (iv) Suitable and sufficient steps shall be taken to prevent any person falling or slipping from a personal fall protection system.
 - (v) All fall protection system should be inspected weekly as a minimum.

1.127 Requirements for Ladders

- (i) Every Contractor shall ensure that a ladder is used for work at height only if a risk assessment has demonstrated that the use of more suitable work equipment is not justified because of the low risk and
 - a. The short duration of use; or
 - b. Existing features on site, which he cannot alter.
- (ii) Only metal ladders shall be allowed. Bamboo ladders are prohibited.
- (iii) Any surface upon which a ladder rests shall be stable, firm, of sufficient strength and of suitable composition safely to support the ladder so that its rungs or steps remain horizontal, and any loading intended to be placed on it.
- (iv) A ladder shall be so positioned as to ensure its stability during use
- (v) A suspended ladder shall be attached in a secure manner and so that, with the exception of a flexible ladder, it cannot be displaced, and swinging is prevented.
- (vi) A portable ladder shall be prevented from slipping during use by:
 - a. securing the stiles at or near their upper or lower ends;
 - b. an effective anti-slip or other effective stability device; or
 - c. any other arrangement of equivalent effectiveness.
- (vii) A ladder used for access shall be long enough to protrude sufficiently above the place of landing to which it provides access, unless other measures have been taken to ensure a firm handhold.
- (viii) No interlocking or extension ladder shall be used unless its sections are prevented from moving relative to each other while in use.
- (ix) A mobile ladder shall be prevented from moving before it is stepped on.
- (x) Where a ladder or run of ladders raises a vertical distance of 9 metres or more above its base, there shall, where reasonably practicable, be provided at suitable intervals sufficient safe landing areas or rest platforms.
- (xi) Every ladder shall be used in such a way that
 - a. a secure handhold and secure support are always available to the user; and

- b. the user can maintain a safe handhold when carrying a load unless, in the case of a step ladder, the maintenance of a handhold is not practicable when a load is carried, and a risk assessment has demonstrated that the use of a stepladder is justified because of
 - 1. the low risk; and
 - 2. the short duration of use.

(xii) Ladders should be inspected weekly for any damage or corrosion.

1.128 Detailed requirements for Scaffolding

1.128.1 Scaffold General :- This procedure provides general information about the competent person, erection, inspection, and use of both welded-frame and tube-and-coupler scaffolds.

- (i) Scaffolds are intended to provide safe working positions at elevations. To eliminate fall exposures, scaffolds must have complete hand Rails, mid-Rails, and decking. Do not use fall arrest equipment as a substitute for hand Rails, mid-Rails, or a complete deck.
- (ii) Before erecting scaffolds, consider all nearby or overhead hazardous energy sources such as electrical, mechanical, pneumatic, thermal, and chemical.
- (iii) Welded-frame scaffolds are made of basic prefabricated end frames, cross-bracing, and frame-connecting devices to hold the parts firmly in place. Tube and-coupler and system scaffolds are made of various lengths of tubing clamped together by special patented couplers to support working platforms of various shapes.
- (iv) All complete scaffolds will have a top hand Rail approx. 1.1 meter above the platform, mid Rail approx. 0.6 meter above the platform & a toe plate 10 cm tall from the platform.
- (v) Do not inter mix scaffold components manufactured by different manufacturers unless the component parts fit together without force or modification.
- (vi) Bamboo components are not permitted on Maharashtra Metro Rail Corporation Limited Sites.

Competent person: one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, & who has authorization to take prompt, corrective measures to eliminate those.

Qualified person: one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his or her ability to solve or resolve problems related to the subject matter, the work, or the project.

1.128.2 Erecting Scaffolds

- (i) Only employees who have been trained by and are under the supervision of a competent person will erect scaffolds. The Maharashtra Metro Rail Corporation Limited Project Safety Manager must approve scaffolds higher than 50 feet (15 meters) above the base plates.
- (ii) Where fall hazards cannot be eliminated, use fall-arrest systems while erecting, modifying, and dismantling scaffolds. It is the responsibility of the competent person to determine the feasibility and type of fall-arrest system to be used.

- (iii) Set scaffold legs on base plates placed on foundations or mudsills that are adequate for supporting the maximum intended loads. Scaffold boards and
- (iv) masonry blocks are not appropriate scaffold foundations. The total load on a scaffold consists of the sum of the weight of the workers and materials on a scaffold plus the weight of the scaffold.
- (v) Install adjusting screws only between the base plate and the vertical frame section. Never use adjusting screws together with casters. Do not extend adjusting screws beyond 12 inches (30 centimetres).
- (vi) The position and number of braces used on a scaffold not only restricts the amount of side movement, but also determines the strength of the scaffold. Never use cross-braces as substitutes for hand Rails or mid Rails.
- (vii) When the height of a scaffold exceeds three times the smallest width of the base, secure it to the building or structure at every other lift and every 9 meters horizontally. The scaffold should be secured by both ties and braces to prevent movement Equip scaffold working platforms with hand Rails approximately one-meter-high, mid Rails, and toe boards, all secured rigidly. Working platforms should be completely decked with safety planks, manufactured scaffold decking, or laminated wooden planks.
- (viii) To allow access to the working platform of a tubular welded frame scaffold, the ladder built into the end frames can be used if it has been specifically designed and constructed by the manufacturer for the purpose of access.
- (ix) Employees engaged in erecting or dismantling tubular-welded frame scaffolds may use the end-frame horizontal members for access provided they are parallel, level, and are not more than 22 inches apart vertically. Hook-on attachable ladders shall be installed as soon as scaffold erection has progressed to a point that permits safe installation and use. Consideration should be given to breaking the ladder at approximately 6-meter intervals. Retractable or vertical lifelines should be used for fall protection while climbing more than 20-feet.
- (x) When portable straight or extension ladders are used for access to tube-and coupler scaffolds, the 4-to-1 slope should be maintained to avoid a horizontal tube interfering with the use of the ladder.
- (xi) Scaffold users should be able to step off the scaffold access ladder directly onto the working platform. Provide entry gates for scaffolds to eliminate the need for users to climb over handRails.
- (xii) Tag or otherwise identify scaffolds that should not be occupied or that require particular safety precautions. The tag should indicate special requirements, the date of erection, and the signature of the competent person.
- (xiii) Scaffolds and their components must be capable of supporting, without failure, at least four times the maximum intended load. Materials should be evenly distributed on platforms and not concentrated in one small area.
- (xiv) During erection of scaffolds, the electrical clearances shall be maintained as per the tabulation mentioned herein in this document

1.128.3 Scaffold Inspection

- (i) A competent person shall visually inspect all components of the scaffold for defects prior to each shift's use and following any occurrence that could affect the scaffold's structural integrity. Defective components will be immediately discarded.
- (ii) Before erecting and while dismantling scaffolds, inspect all components. Scaffold components should be straight and free from bends, kinks, dents,

and severe rusting. Immediately discard defective components. Inspections should include an evaluation of the following components:

- a. Hand Rails, mid-Rails, toe boards, cross-bracing and steel tubing for nicks and other damage, especially near the centre span, and for signs that welding arcs may have struck the equipment
- b. weld zones on the scaffold frame for cracks
- c. the end of tubing for splits or cracks
- d. manufactured decks for loose bolts or rivet connections and bent, kinked, or dented frames
- e. safety planks for rot, cracks, cuts, and other external damage
- f. tie rods or bolts and angle iron cleats
- g. cams, springs, threaded connection, toggle pins, or other quick-connecting devices
- h. Casters for rough rolling surfaces, "sticky" swivels & defective locking mechanisms.

- (iii) Scaffold Inspection Tag, Boards, identifying that the scaffold is "Safe for Use" or "Scaffolds Under Construction" must be attached to all scaffolds.

1.128.4 Scaffold Training

- (i) Employees involved in the erection, dismantling, moving, repairing, etc., of scaffolding shall receive training from a competent person. The purpose of the training is to recognize any hazards associated with the work in question. Training shall consist of:
 - a. The nature of scaffold hazards
 - b. The correct procedures for erecting, disassembling, moving, operating, repairing, inspecting, and maintaining the type of scaffold.
 - c. The design criteria, maximum intended load-carrying capacity, and intended use of the scaffold.
- (ii) Employees who perform work while on a scaffold shall be trained by a qualified person, so they will recognize hazards associated with the type of scaffold being used and understand the procedures to control those hazards. Training will cover the following topics as necessary:
 - a. The nature of any electrical hazards, fall hazards, & falling object hazards in the work area.
 - b. The correct procedures for dealing with electrical hazards and for erecting, maintaining, and disassembling the fall protection systems and falling object protection systems used.
 - c. The proper use of the scaffold and the proper handling of materials on the scaffold.
 - d. The maximum intended load and the load-carrying capacities of the scaffolds used.

1.128.5 Suspended Scaffolding

Swinging stages, toothpicks, boatswain chairs, float, and needle beams require special approval prior to use.

Attach & secure safety harness before stepping on these scaffolds & do not remove until clear of the scaffold. Tie off to independent lifeline or building structure. One lifeline per person.

OVERHEAD PROTECTION

- 1.129 All contractors shall provide overhead protections as per Rule 41 of BOCWR.
- 1.130 Overhead protection should be erected along the periphery of every building which is under construction and the building height shall be 15m or above after construction.
- 1.131 Overhead protection shall be minimum 2m wide and the outer edge shall be 150mm higher than the inner edge and an angle not more than 20° to its horizontal sloping into the building.
- 1.132 Overhead protection shall not be erected more than a height of 5m from the base of the building.
- 1.133 Areas of inadvertent hazard of falling of material shall be guarded or barricaded or roped-off thereby by the Contractor.

SLIPPING, TRIPPING, CUTTING, DROWNING & FALLING HAZARDS :- As per Rule 42 of BOCWR:

- 1.134 All places should be free from dust, debris or similar materials.
- 1.135 Sharp projections or any protruding nails or similar objects shall be suitably guarded or shall even be avoided to make the place safe to work.
- 1.136 Contractor shall not allow workmen to work or use platforms, scaffolds/passageways or any walkways, which has water, or oil or similar substances spilt and has a slipping hazard, unless it is cleaned off or covered or sanded or saw dusted or make it safe with any suitable material.
- 1.137 When workers are exposed to areas where fall into water is possible, the Contractor shall provide suitable and adequate equipment for saving the workers from drowning and rescuing from such hazard. If the Employer considers, the Contractor shall provide well-equipped boat or launch, manned with trained personnel at the work place.
- 1.138 Open side or opening where worker, equipment, vehicle or lifting appliance may fall at a building or outside shall be guarded suitably except in places of free access by reasons of nature of work.
- 1.139 Suitable safety net shall be provided at places of material / man falling is possible in accordance with national standards.
- 1.140 The collapse of formwork in the construction industry has the potential for severe injury and death. The four stages of the use of formwork (erection, adjustment, concrete placement and dismantling) all need to be managed in a risk assessment framework. Implementing suitable control measures can eliminate or reduce the potential for events such as the collapse of formwork. Suitable control measures include:
 - (i) keeping the documentation for the formwork at the workplace;
 - (ii) following the formwork documentation;
 - (iii) planning to ensure that all elements of the process are conducted in a safe manner - eg ensuring operators such as crane operators, concrete placers are suitably licensed and trained, appropriate personal protective equipment is used etc;
 - (iv) erecting the formwork on foundations which will support the loads to be imposed on the formwork;

- (v) not erecting formwork near excavation;
- (vi) ensuring materials used in the erection of formwork are not defective;
- (vii) securing loose material which may be dislodged as a result of inclement weather;
- (viii) inspecting the formwork assembly before and during the placement of concrete;
- (ix) not attaching equipment to the formwork assembly unless specifically designed for this purpose; and not using a stripping process which may cause damage to the permanent structure.

LIFTING APPLIANCES AND GEAR

- 1.141 Lifting appliances means a crane, hoist machinery, derrick, winch, gin pole, sheer legs, jack, hoist drum, slewing machinery, slewing bearing fasteners, loffing machinery sheaves, pulley blocks, hooks or other equipment used for lifting materials, objects or building workers and lifting gears means ropes, chain slings, shackles, hooks, lifting lugs, wire ropes, lifting eyebolts and eyenuts and other accessories of a lifting appliance.
- 1.142 No machine shall be selected to do any lifting on a specific job until its size and characteristics are considered against:
- (i) the weights, dimensions and lift radii of the heaviest and largest loads
 - (ii) the maximum lift height, the maximum lift radius and the weight of the loads that must be handled at each
 - (iii) the number and frequency of lifts to be made
 - (iv) how long the crane will be required on site
 - (v) the type of lifting to be done (for example, is precision placement of loads important?)
 - (vi) the type of carrier required (this depends on ground conditions and machine capacity In its operating quadrants) capacity is normally greatest over the rear, less over the side, and non-existent over the front
 - (vii) whether loads will have to be walked or carried
 - (viii) whether loads will have to be suspended for lengthy periods
 - (ix) the site conditions, including the ground where the machine will be set up, access roads and ramps it must travel, space for erection and any obstacles that might impede access or operation
- 1.143 The Contractor shall ensure that a valid certificate of fitness issued as per Clause 21.5 is available for all lifting appliances including synchronised mobile jacks, pre-stressing hydraulic jacks, jacks fitted with launching girders etc. and Employer's approval before inducting to the site. Only after obtaining the approval from the Employer any lifting appliances and gear shall be used.
- 1.144 The laminated photocopies of fitness certificate issued by competent person, the Employers' approval letter, the operators' photo, manufacturer's load chart and competency certificate shall always be either kept in the operator cabin or pasted on the visible surface of the lifting appliances.
- 1.145 All lifting appliances and loose gears shall be clearly marked for its safe working load and identification by stamping or other suitable means.

- 1.146 The Contractor shall also maintain a register containing a system of identification of all tools & tackles, its date of purchase, safe working load, competent person date of examination etc.
- 1.147 Test and periodical examination of lifting appliances and gears
- 1.147.1 All lifting appliances including all parts and gears thereof, whether fixed or movable shall be thoroughly tested and examined by a competent person once at least in every six months or after it has undergone any alterations or repairs liable to affect its strength or stability. Within the validity, if the lifting appliances are shifted to a new site, re-examination by the same competent person for ensuring its safety shall also be done.
- 1.147.2 Contractors can utilise the services of any competent person as defined in Factories Act, 1948 and approved by Chief Inspector of Factories with the permission of the Employer.
- 1.147.3 All alarms and signals like automatic safe load indicators (SLI), boom angle indicators, boom extension indicators, over lift boom alarm, swing alarm, hydraulic safety valves, mechanical radius indicators, load moment indicators etc. shall be periodically examined and maintained always in working condition
- 1.148 Automatic safe load indicators
- 1.148.1 As stipulated in relevant Rule of GBOCWR 2003, no lifting appliances gear or any other material handling appliance is used, if:
- (i) the Inspector having jurisdiction is not satisfied with reference to a certification of test or examination or to an authenticated record maintain as provided under these rules; and
 - (ii) in the view of such Inspector, the lifting appliance, lifting gear or any other material handling appliance is not safe for use in building or other construction work; and
 - (iii) no pulley block is used in building or other construction work unless the safe working load and its identification are clearly marked on such block.
- 1.148.2 Every lifting appliances and gears like cranes, hydras etc, if so constructed that the safe working load may be varied by raising or lowering of the jib or otherwise shall be attached with an automatic indicator of safe working loads approved by Bureau of Indian standards/ International certifying bodies which gives a warning to the operator and arrests further movements of the lifting parts.
- 1.149 Qualification of operator of lifting appliances and of signaller etc.
- 1.149.1 The Contractor shall not employ any person to drive or operate a lifting machine-like crane, hydra etc whether driven by mechanical power or otherwise or to give signals to work as a operator of a rigger or derricks unless he:
- (i) is above twenty-one years of age and possesses a valid heavy transport vehicle driving licence as per Motor Vehicle Act and Rules.
 - (ii) is absolutely competent and reliable
 - (iii) possesses the knowledge of the inherent risks involved in the operation of lifting appliances by undergoing a formal training at any institution of national importance acceptable to Employer
 - (iv) is medically examined periodically as specified in Schedule VII of BOCW Rules.
- 1.150 General requirements of appliances
- 1.150.1 **Out-off level :-** One of the most severe effects of being out-off fit level is that side loads develop in the boom. Because of side loads all mobile cranes lose capacity

rapidly as the degree of out-of-level increases & therefore control of out-of-level is of utmost importance.

1.150.2 Boom

- (i) The boom is one of the more critical elements of the crane and must be in perfect condition at all time. No boom section with a bent lattice member shall be allowed
- (ii) All welds shall be crack and corrosion free
- (iii) No member of the boom shall be bent
- (iv) All telescopic boom shall be free from cracks, rust, flaking or cracked paint, bulges, greases or varnishes

1.150.3 The sweep area (work area) of the construction machinery shall be always free from obstructions.

1.150.4 All hydraulic piping and fittings shall be maintained leak proof.

1.150.5 The operator cab shall possess good and safe:

- (i) structure, windows and windshield wipers
- (ii) Drivers chair and foot rest
- (iii) Control handles
- (iv) Cab instrumentation
- (v) Telecommunication
- (vi) Cab out fitting
- (vii) wind indicator with an adjustable set point shall be in a position representative for the wind on the crane. The indicator shall give continuous information regarding constant speeds and gusts.

1.151 Mandatory rigging requirements

1.151.1 Rigging shall be done under experienced and qualified rigger only.

1.151.2 The primary requirement in rigging shall be to assess the weight of load before attempting any lift.

1.151.3 All hooks shall be fitted with Master Rings having certificate of fitness from the competent person, so that the hooks are subjected to balanced vertical loading only.

1.151.4 Only four legged slings shall be allowed which includes master link (ring), intermediate master link (ring) if necessary, chain / wire rope sling, sling hook or other terminal fitting.

1.151.5 Hand spliced slings up to 32mm diameter shall not be used at site for any lifting purpose.

1.151.6 No load shall be slewed over public areas without stopping the pedestrians and road traffic first.

1.151.7 Requirements of outriggers

- (i) All outriggers shall be fully extended and all tyres are clear of the ground
- (ii) Heavy duty blocking having large bearing area shall be necessary to prevent sinking of floats

1.151.8 All loads shall have tag-lines attached in order to ensure that the load can be controlled at all times.

1.151.9 No close working to any live overhead power line is permitted without the operation of a strict Permit to Work.

1.151.10 Minimum lighting is to be ensured at all lifting operations.

1.152 Failure to do any of the above shall attract penalty from the Employer as per relevant clause

LAUNCHING OPERATION

1.153 As launching operation is one of the riskiest job, the Contractor shall take utmost precaution at all stages like; planning, establishing casing yard, casting segments, transporting segments, fabrication and erection of launching girders, launching of segments, pre-stressing, auto launching of girders and dismantling of launching girders.

1.154 The Contractor shall prepare a comprehensive Method Statement for the launching operation, adhering to the SHE conditions laid down in conditions of contract on SHE and Project SHE Manual. Particular reference shall be made to the provisions on working at height. As the entire process of launching has to be undertaken at an elevated level, the safety of workers and the girder is paramount important. The following general guidelines shall be adhered throughout the launching operation.

- (i) Necessary 'working platforms' and fall protection anchorage arrangement shall be provided in the launching girder itself.
- (ii) Provisions for mounting light fittings shall also be made available in the launching girder.
- (iii) The casting yard shall be established ensuring the provision given in Clause 38.0
- (iv) The workmen engaged in fabrication of reinforcement, concreting the segment shall be provided with necessary PPEs including compulsory hand protection gloves.
- (v) Casting and curing of segment shall be undertaken under the direct supervision of the responsible engineer of the Contractor.
- (vi) Trucks with valid registration, licence, safe worthiness certificate, Employer's approval certificate, and pollution under check certificate shall only be used for transport of segments.
- (vii) All vehicle drivers including heavy vehicle operators shall be trained on defensive driving at training institute recognized by Maharashtra State Road Transport Corporation / Government of Maharashtra, or any other driving institute registered under Motor Vehicles Act.
- (viii) Drivers shall also have undergone proper medical examination as per relevant clause mentioned under 'Medical Facilities'.
- (ix) The segments shall be rigidly secured to the truck with necessary wooden wedges and necessary red indicators/safety tapes provided so that the vehicle is clearly seen by other road users both in day / night time. Further, necessary arrangements / modification should be made in the trailer and Engineer / Employer approval shall be obtained before the transportation starts.
- (x) Every launching girder shall have a responsible engineer on duty all the time.
- (xi) All the time from erection to dismantling the area between the two piers wherein launching is in progress shall always be barricaded.

- (xii) Unloading of segments from trucks, lifting of segments, shifting of segments, gluing shall be done under the direct supervision of the approved engineer of the Contractor.
 - (xiii) Auto launching shall be done only after approval from the Employer. After every auto launching the stability of launching girder shall be ensured.
 - (xiv) The vertical deflection of launching girder shall be monitored at all critical stages like with/without loads and after every auto launching.
 - (xv) A register containing all important operational details from erection to dismantling of launching girders shall be maintained and made available to Employer whenever called for.
 - (xvi) Test certificate for all lifting gears including Macalloy bars shall be maintained at a location closer to the launching girder itself so that it can be referred during all inspections.
 - (xvii) Adequate lighting at all time shall be ensured in the entire area of operation.
 - (xviii) Access to drinking water & toilet shall be ensured to all workmen engaged for launching process.
 - (xix) Proper access ladders/stairways shall be maintained for safe ascending / descending of workmen / engineers.
- 1.155 Non-adherence to any of the clauses mentioned above shall be viewed seriously by the Employer and penalty levied as per relevant clause.

CONSTRUCTION MACHINERY

- 1.156 Construction machineries may include dumpers and dump trucks, lift trucks and telescopic handlers piling rigs, vibro hammers, Rail welding equipment's, mobile elevating work platforms, cranes, tipper lorries, lorry loaders, skip wagons, 360° excavators, 180° backhoe loaders, crawler tractors, scrapers, graders, loading shovels, trenchers, side booms, pavers, planers, chippers, road rollers, locomotives, tankers and browsers, tRailers, hydraulic and mechanical breakers etc.
- 1.157 Safe worthiness certificate
- 1.157.1 Every construction equipment shall be in sound mechanical working condition and certified by either competent person under Factories Act or manufacturers' warranty in case of brand new equipment's or authorized persons / firms approved by Employer before induction to any site.
- 1.157.2 Every such certificate shall have the date of purchase, main overhauling undertaken in the past, any accident to the equipment, visual examination details, critical components safety check, list of safety devises and its working condition, manufacturer's maintenance checklist, past projects wherein the equipment's were used etc as its minimum content.
- 1.158 **Reverse Horns :-** All Vehicles shall be fitted with audible reverse alarms and maintained in good working condition. Reversing shall be done only when there is adequate rear-view visibility or under the directions of a banks man
- 1.159 General operating procedures
- (i) Drivers entering site shall be instructed to follow the safe system of work adopted on site. These shall be verbal instructions or, preferably, written

instructions showing the relevant site rules, the site layout, delivery areas, speed limits, etc.

- (ii) No passengers shall be carried, unless specific seating has been provided in accordance with the manufacturers' recommendations.
 - (iii) Working on gradients beyond any equipment's capability shall not be allowed.
 - (iv) Prevention of dumper and dump truck accidents should be managed by providing wheel stops at a sufficient distance from the edges of excavations, spoil heaps, pits, etc.
 - (v) The manufacturer's recommended bucket size must not be exceeded in excavators.
 - (vi) If excavators operating on a gradient which cannot be avoided, it must be ensured that the working cycle is slowed down, that the bucket is not extended too far in the downhill direction, and that travel is undertaken with extreme caution. A large excavator must never be permitted to travel in a confined area, or around people, without a banks man to guide the driver, who should have the excavator attachment close in to the machine, with the bucket just clear of the ground. On wheeled excavators, it is essential that the tyres are in good condition and correctly inflated. If stabilizing devices are fitted, they should be employed when the machine is excavating.
 - (vii) When the front shovel of the 180° backhoe loaders is being employed, the backhoe attachment shall be in its "travel" position, with the safety locking device in place.
 - (viii) When operating the backhoe in poor ground conditions, the stabilisers tend to sink into the surface of the ground, reducing stability. Therefore, frequent checks shall be made for the stability of the machine. The loading shovel should always be lowered to the ground to stabilise the machine when the backhoe is employed.
 - (ix) The netting operation of the skip wagons should be carried out prior to lifting the skip to reduce the risks of working on the rear platform.
 - (x) If a tractor dozer is employed on clearing scrub or felling trees, it shall be provided with adequate driver protection.
 - (xi) When two or more scrapers are working on the same job, a minimum distance of at least 25m shall be kept between them.
 - (xii) In case of hydraulic breakers, hydraulic rams & hoses shall be in good working condition.
- 1.160 All wood working machines shall be fitted with suitable guards and devices such as top guard, riving knife, push stick, guards for drive belts and chains, and emergency stop switch easily accessible by the operator.

1.161 Requirements related to use of Bulldozers

1.161.1 General

- (i) Be careful when working near the edge of banks, ditches, cuts or fills, or near overhanging material. The vibration and weight of the machine may cause the edge to give way or overhanging material to fall.
- (ii) Before starting work, ensure that an observer is present when plant is required to work in water where the depth may endanger the operator.

- (iii) Avoid obstacles such as rocks or logs. If forced to cross them, use extreme caution and change to the lowest gear.
- (iv) Ease up to the balance point and ease down to minimise the jolt on contact with the other side.
- (v) When receiving a wire rope on a drum or through Sheaves, operators should disengage the master clutch, idle the engine, and lock the brakes.

NOTE: All operators should stop engines before working with ropes wound on front-mounted drums.

1.161.2 Clearing Operations

- (i) When clearing trees, watch out for dead branches in treetops.
- (ii) Dozer operators should make sure that all persons are standing clear before pushing over trees, dozing rocks or rolling logs.
- (iii) A long rope should be used to pull over large dead trees. (Make sure in advance that a falling tree will clear the machine and operator).
- (iv) In excavation work, operators should be alert to dangers from overhanging dirt and rocks. In such cases, dozers should be equipped with the relevant overhead protection.

1.162 Requirements related to use of Excavators

- (i) When excavating trenches, place the excavated material at a distance of one and a half times the depth of the trench from the edge of that trench. Where this is not practicable, place excavated materials at least one (1) metre from the edge of the trench.
- (ii) Ensure the ground beneath the machine is not undercut.
- (iii) Watch boom clearance when travelling. Uneven ground may cause the boom to weave and collide with obstructions.
- (iv) Avoid jerky slewing or sudden braking. These can make the machine unstable and overload machine components.
- (v) Ensure the operator has the appropriate restricted operator's licence if the excavator is to be used in the crane mode.
- (vi) When an excavator is used in the crane mode, check that the lifting weight is well within the approved lifting capacity for the machine. This lifting capacity shall be clearly and permanently marked on each machine.
- (vii) Only operate attachments while stationary, as operation during travelling may starve one of the Track drive motors and result in an unintended turn.
- (viii) Consider implementing a 'Permit to Work' system, particularly when working near power lines or underground power for example: - that the height of power lines is known; - that the underground location is known; and - visible measure, such as tiger tails, are put in place.

1.163 Requirements related to use of Trucks

1.163.1 General

- (i) Drive defensively
- (ii) Obey road signs
- (iii) Never race with other vehicles
- (iv) When following another vehicle, always allow enough distance to stop safely.
- (v) One truck length for every 10 km per hour of truck speed should be the minimum distance between vehicles.
- (vi) Reversing is the most hazardous truck operation. Reversing alarms, which are fitted on some trucks, are effective in warning persons of the danger. Reverse trucks only when they are under the direction of a signalman or when satisfied that the way is clear and will remain clear.
- (vii) Be cautious of spillage from loaded units and any hazards the spillage might present to people on the ground and to the tyres of other plant.
- (viii) Trucks sometimes fall over a tip head because the driver backs over the edge or the edge collapses under the weight of the truck.
- (ix) Use a protective beam or timber baulk or back under the control of a signalman in order to avoid this happening.
- (x) Principal Contractors should provide an earth mound to at least half the wheel diameter. This is a known control that is also used in the mining industry.
- (xi) Where ground conditions are soft, or the tip head is likely to subside, dump loads back from the edge and have a dozer move the material over the edge.

1.163.2 Loading

- (i) Never enter or leave the cab during loading.

- (ii) Watch for and avoid other vehicles, personnel and rock outcrops on entering or leaving the loading area.
- (iii) Stay a safe distance from trucks ahead at the loading point and follow the directions of the signalman or loader operator before moving into the loading position.
- (iv) Move off when signalled that loading is complete.
- (v) Load material, e.g. timber, so that it does not project beyond the truck body and present a hazard to other plant, people or structures.
- (vi) Where material is to be transported on a public road, maintain a distance of 1.2 metre or more beyond the front or rear of the vehicle, or 150 mm on either side, shall have a visible red flag or object fastened to the projecting end.
- (vii) Unusually wide or long loads require a permit from the Police Department.
- (viii) Secure loads at the lowest possible level on the tray with ropes or chains and take special care when the truck is to travel over rough terrain.
- (ix) Truck operators are responsible for giving load placement requirements to crane operators before loading operations begin.
- (x) The load should be placed so that it will remain stable during loading, unloading and travelling.

1.163.3 Unloading

- (i) Lower truck bodies before leaving the dump area.
- (ii) Only raise truck bodies to unload materials on surfaces where the vehicle will remain stable and upright.
- (iii) Never raise truck bodies to within a specified distance of overhead power line.
- (iv) Take special care when tipping a load or spreading screenings on a road.
- (v) With the tray up, trucks are less stable and are more likely to roll over, particularly on hilly sections or roads with surface irregularities or steep shoulders.
- (vi) Check that the raised tray will not foul overhead power lines or telephone wires.
- (vii) Never place part of your body under a raised truck body unless the truck body is securely propped.

1.163.4 Transporting personnel

- (i) Trucks shall not be used to transport personnel unless they are specifically designed to do so.
- (ii) Where a bus is employed for the transportation of personnel, the bus shall: -be enclosed; have seats which are attached to the vehicle; have a safe means of access and exit; and, have two means of exit in case of emergency.
- (iii) Drivers transporting personnel should be alert, dependable and careful.
- (iv) Relevant safety rules include: never allow passengers to ride with their arms outside the vehicle; only start the vehicle after everyone is seated; persons should only get on or off the vehicle when it is stationary; tools, plant or gear should be stored in a compartment separate from passengers, i.e. compartments that are designed for storage and transportation and are separate from where personnel are seated.
- (v) All items stored in this compartment should be secured against movement; and ensure that exhaust fumes do not enter the passengers' compartment.

1.163.5 Towing

- (i) When towing another vehicle, take the following precautions: ensure the towing cable is undamaged and has a safe working load adequate for the job.

- (ii) Slings, straps or chains which are used for towing should not be used for lifting any gear or materials and should be identified as such, e.g. slings and chains, etc. should be tagged "not for use in hoisting operations";
- (iii) Before reversing, ensure everyone is clear. Get help from a signalman if the rear view is obstructed;
- (iv) Attach the towing cable securely to the machines at the points recommended by the manufacturer.
- (v) If these are not known, ensure fixing points are selected that will not damage the tow cable or the machine;
- (vi) check what brakes are operational on the towed vehicle. There is unlikely to be any power assistance available for the brake system. Do not rely on parking brakes as a means of control;
- (vii) When moving off, take up the slack carefully. Do not jerk the cable, and keep it taut to avoid damage;
- (viii) keep towing speed down and as constant as possible;
- (ix) Keep clear of the area between the towing vehicle and the towed vehicle; & attach a warning sign on the rear of the towed vehicle or machine which reads "Vehicle Under Tow".

1.164 **Penalty:-** If any of the above clauses are not adhered, penalty shall be imposed as per relevant clause depending upon the gravity of the unsafe act and or condition.

MACHINE AND GENERAL AREA GUARDING

1.165 The Contractor shall ensure at the construction site all motors, cogwheels, chains and friction gearing, flywheels, shafting, dangerous and moving parts of machinery are securely fenced or legged. The fencing of dangerous part of machinery is not removed while such machinery is in motion or in use.

MANUAL LIFTING AND CARRYING OF EXCESSIVE WEIGHT

1.166 The Contractor shall ensure at his construction site of a building or other construction work that no building worker lifts by hand or carries overhead or over his back or shoulders any material, article, tool or appliances exceeding in weight as said below as per Rule 38 of BOCWR, unless aided by another building worker or device.

Person	Maximum weight in kg
Adult man	55
Adult woman	30

1.167 No building worker aided by other building worker shall lift or carry weight higher than or exceeding the sum of total of maximum limits set out for each building worker separately as mentioned in the table above.

SITE ELECTRICITY

1.168 Competency of Electrical personnel

1.168.1 The Contractor shall employ qualified and competent electrical personnel as specified in General Instruction Maharashtra Metro Rail Corporation Limited /SHE/GI/001.

1.169 Assessment of power

- 1.169.1 The Contractor shall assess the size and location of the electrical loads and the manner in which they vary with time during the currency of the Contract.
- 1.169.2 The Contractor shall elaborate as to how the total supply is to be obtained / generated. The details of the source of electricity, earthing requirement, substation / panel boards, distribution system shall be prepared and necessary approval from Employer obtained before proceeding of the execution of the job.
- 1.169.3 The main Contractor shall take consideration, the requirements of the sub / petty contractors' electric power supply and arrive at the capacity of main source of power supply from diesel generators.
- 1.169.4 As the sub / petty contractors' small capacity generators create more noise and safety hazard, no small capacity diesel generators shall be allowed for whatsoever the type of job to be executed under this contract.
- 1.169.5 If any unsafe noise making small capacity diesel generators are found used by sub / petty contractors the main contractor shall only be penalised.
- 1.170 **Work on site :-** The Contractor shall also submit electrical single line diagram, schematic diagram and the details of the equipment for all temporary electrical installation and these diagrams together with the temporary electrical equipment shall be submitted to the Employer's for necessary approval. Failure to do so shall invite penalty as per relevant clause.
- 1.171 **Strength and capability of electrical equipment:-** No electrical equipment shall be put into use where its strength and capability may be exceeded in such a way as may give rise to danger.
- 1.172 **Adverse or hazardous environments:-** Electrical equipment, which may reasonably foreseeably be exposed to:
- (a) Mechanical damage;
 - (b) the effects of the weather, natural hazards, temperature or pressure;
 - (c) the effects of wet, dirty, dusty or corrosive conditions; or
 - (d) any flammable or explosive substance, including dusts, vapours or gases,
- shall be of such construction or as necessary protected as to prevent, so far as is reasonably practicable, danger arising from such exposure.
- 1.173 Distribution system
- 1.173.1 The Contractor shall provide distribution system for control and distribution of electricity from a main AC supply of 50Hz for typical appliances:
- (a) Fixed plant - 400V 3 phase
 - (b) Movable plant fed via trailing cable over 3.75 kW - 400V, 3 phases
 - (c) Installation in site buildings - 230V single phase
 - (d) Fixed flood lighting - 230V single phase
 - (e) Portable and hand tools - 115V single phase
 - (f) Site lighting - 115V single phase
 - (g) Portable hand lamps - 115V single phase
- 1.174 Electrical protection circuits

- 1.174.1 Precautions shall be taken, either by earthing or by other suitable means, to prevent danger arising when any conductor (other than a circuit conductor) which may reasonably foreseeable become charged as a result of either the use of a system, or a fault in a system, becomes so charged. A conductor shall be regarded as earthed when conductors of sufficient strength and current-carrying capability to discharge electrical energy to earth connect it to the general mass of earth.

If a circuit conductor is connected to earth or to any other reference point, nothing which might reasonably be expected to give rise to danger by breaking the electrical continuity or introducing high impedance shall be placed in that conductor unless suitable precautions are taken to prevent that danger.

- 1.174.2 Appropriate electrical protection shall be provided for all circuits, against over load, short circuit and earth fault current.
- 1.174.3 The Contractor shall provide sufficient ELCBs (maintain sensitivity 30 mA) / RCCBs for all the equipment's (including Potable equipment's), electrical switchboards, distribution panels etc. to prevent electrical shocks to the workers.
- 1.174.4 All protection devices shall be capable of interrupting the circuit without damage to any equipment's and circuits in case of any fault may occur.
- 1.174.5 Rating of fuses and circuit breakers used for the protection of circuits should be coordinate with equipment power ratings.
- 1.174.6 Protection against lightning shall be ensured to all equipment kept in open at sites.

1.175 Cables

- 1.175.1 Cables shall be selected after full consideration of the condition to which they shall be exposed and the duties for which they are required. Supply cable up to 3.3 kV shall be in accordance with BS 6346.
- 1.175.2 For supplies to mobile or transportable equipment where operating of the equipment subjects the cable to flexing, the cable shall conform to any of these codes BS 6007/BS 6500/BS 7375.
- 1.175.3 Flexible cords with a conductor cross sectional area smaller than 1.5 mm² shall not be used and insulated flexible cable shall conform to BS 6500 and BS 7375.
- 1.175.4 Where low voltage cables are to be used, reference shall be made to BS 7375. The following standards shall also be referred to particularly for underground cables BS 6346 and BS 6708
- 1.175.5 Cables buried directly in the ground shall be of a type incorporating armour or metal sheath or both. Such cables shall be marked by cable covers or a suitable marking tape and be buried at a sufficient depth to avoid their being damaged by any disturbance of the ground. Cable routes shall be marked on the plans kept in the site electrical register.
- 1.175.6 Cabling passing under the walk way and across way for transport and mobile equipment shall be laid in ducts at a minimum depth of 0.6 meters.
- 1.175.7 Cables that need to cross open areas, or where span of 3m or more are involved, a catenary wire on poles or other supports shall be provided for convenient means of suspension. Minimum height shall be 6m above ground.
- 1.175.8 Cables carrying a voltage to earth in excess of 65V other than supply for welding process shall have metal armour or sheath, which has been effectively

earthed and monitored by the contractor. In case of flexible and trailing cables such as earthen metal sheath and/or armour should be in addition to the earth core in the cable and shall not be used as the protective conductor.

- 1.175.9 Armoured cables having an over-sheath of polyvinyl chloride (PVC) or an oil resisting, and flame-retardant compound shall be used whenever there is a risk of mechanical damage occurring
- 1.176 Plugs, socket-outlets and couplers
 - 1.176.1 The Contractor shall ensure plugs, socket-outlets, and couplers available in the construction site as "splash proof" type. The minimum degree of Ingress Protection should be of IP44 in accordance with BS EN 60529.
 - 1.176.2 Only plugs and fittings of the weatherproof type shall be used, and they should be colour coded in accordance with the Internationally recognised standards for example as detailed as follows:
 - (i) 110 volts: Yellow
 - (ii) 240 volts: Blue
 - (iii) 415 volts: Red
- 1.177 Connections
 - 1.177.1 Every joint and connection in a system shall be mechanically and electrically suitable for use to prevent danger. Proper cable connectors as per national/international standards shall only be used to connect cables.
 - 1.177.2 No loose connections or tapped joints shall be allowed anywhere in the work site, office area, stores and other areas. Penalty as per relevant clause shall be put in case of observation of any tapped joints.
- 1.178 **Portable and hand-held equipment's:-** The Contractor shall ensure the use of double insulated or all-insulated portable electrical hand equipment may be used without earthing (i.e. two core cables), but they shall still be used only on 110V because of the risk of damage to Railing leads.
- 1.179 Other equipment's:
 - 1.179.1 All equipment shall have the provision for major switch/cut-off switch in the equipment itself.
 - 1.179.2 All non-current carrying metal parts of electrical equipment shall be earthed through insulated cable
 - 1.179.3 Isolate exposed high-voltage (over 415 Volts) equipment, such as transformer banks, open switches, & similar equipment with exposed energized parts & prevent unauthorised access.
 - 1.179.4 Approved perimeter markings shall be used to isolate restricted areas from designated work areas and entryways and shall be erected before work begins and maintained for entire duration of work. Approved perimeter marking shall be installed with either red barrier tape printed with the words "DANGER-HIGH VOLTAGE" or a barrier of yellow or orange synthetic rope, approximately 1 to 1.5 meter above the floor or work surface.
- 1.180 **Work on or near live conductors:-** No person shall be engaged in any work activity on or so near any live conductor (other than one suitably covered with insulating material so as to prevent danger) that danger may arise unless:
 - (a) it is unreasonable in all the circumstances for it to be dead; and

(b) it is reasonable in all the circumstances for him to be at work on or near it while it is live; and

(c) suitable precautions (including where necessary the provision of suitable protective equipment) are taken to prevent injury.

1.181 Inspection and Maintenance

1.181.1 All electrical equipment should be permanently numbered, and a record kept of the date of issue, date of last inspection and recommended inspection period.

1.181.2 Fixed installations shall be inspected at least at three monthly intervals; routine maintenance being carried out in accordance with equipment manufactures recommendations.

LIGHTING

1.182 The Contractor shall provide sufficient site lighting, of the right type and at the right place for it to be properly effective. Lighting ought not to introduce the risk of electric shock. Therefore, 230V supplies should be used for those fittings, which are robustly installed, and well out of reach e.g. flood lighting or high-pressure discharge lamps.

1.183 **Selection of Luminaries:-** The Contractor shall select the luminaries as per the area requirement indicated below:

SN	Type of Lighting	Area of Requirement	Luminaries
1	Area Lighting	Workmen and vehicles to move about in safely.	<ul style="list-style-type: none"> • Shovel type: non-symmetrical • Symmetrical or non-symmetrical tungsten halogen
2	Beam flood lighting	Concentrated light over an area from a relatively great distance.	<ul style="list-style-type: none"> • Portable flood light (Conical beam) • Wide angle flood (fan shaped beam) • Medium or narrow angle flood (Conical beam)
3	Dispersive lighting	Lighting for indoor	<ul style="list-style-type: none"> • Dispersive (Mercury florescent) • Cargo cluster • Florescent trough
4	Walkway lighting	Lighting for stairways, ladder ways, corridors, scaffold access routes, etc.	<ul style="list-style-type: none"> • Well glass unit • Bulkhead unit (tungsten filament) • Bulk head unit (Florescent)
5	Local lighting	Lighting on sites and fittings are generally accessible to operatives	<ul style="list-style-type: none"> • PAR (Parabolic Aluminised Reflector) lamp cluster • Festoons (with or without shades) • Adjustable florescent work lamp • Portable flood lamp (mounted on own cable drum)

- 1.184 The Contractor shall ensure that luminaries should always be placed so that no person is required to work in their own shadow and so that the local light for one person is not a source of glare for the others. Strongly made clamps should be available for attaching luminaries to poles and other convenient supports.
- 1.185 Luminaries should be robust, resistant to corrosion and rain proof especially at the point of the cable entry.
- 1.186 The correct type of lamp for each luminary should always be used and when lamps need to be replaced it shall be in accordance with the supply voltage.
- 1.187 Lamp holders not fitted with a lamp should be capped off.
- 1.188 The Contractor shall take every effort to illuminate the work site as per the Employer's requirement illustrated in General Instruction Maharashtra Metro Rail Corporation Limited /SHE/GI/011.

HAND TOOLS AND POWER TOOLS

1.189 General

- 1.189.1 The Contractor is wholly responsible for the safe condition of tools and equipment used by his employees and that of his sub-contractors.
- 1.189.2 Use of short / damaged hand tools shall be avoided and the Contractor shall ensure all his hand tools used at his worksite are safe to work with or stored and shall also train his employees (including his sub-contractors) for proper use thereby.
- 1.189.3 All hand tools and power tools shall be duly inspected before use for safe operation.
- 1.189.4 All hand tools and power tools shall have sufficient grip and the design specification on par with national/international standards on anthropometrics.

1.190 Hand tools

- 1.190.1 Hand tools shall include saws, chisels, axes and hatches, hammers, hand planes, screw drivers, crow bars, nail pullers.
- 1.190.2 The Contractor shall ensure that,
 - (a) For crosscutting of hardwood, saws with larger teeth points (no. of points per inch) shall be preferred to avoid the saw jumping out of the job.
 - (b) Mushroom headed chisels shall not be used in the worksite where the fragments of the head may cause injury.
 - (c) Unless hatchet has a striking face, it shall be used as a hammer.
 - (d) Only knives of retractable blades shall be used in the worksite.
 - (e) No screwdrivers shall be used for scraping, chiselling or punching holes.
 - (f) A pilot hole shall always be driven before driving a screw.
 - (g) Wherever necessary, usage of proper PPEs shall be used by his employees.

1.191 Power tools

- 1.191.1 Power tools include drills, planes, routers, saws, jackhammers, grinders, sprayers, chipping hammers, air nozzles and drills.
- 1.191.2 The Contractor shall ensure that:
 - (i) Electric tools are properly grounded or / and double insulated.

- (ii) GFCIs/ RCCBs shall be used with all portable electric tool operated especially outdoors or in wet condition.
- (iii) Before making any adjustments or changing attachments, his workers shall disconnect the tool from the power source.
- (iv) When operating in confined spaces or for prolonged periods, hearing protection shall be required. The same shall also apply to working with equipment's, which gives out more noise as mentioned in Clause 43.0 of this document.
- (v) Tool is held firmly, and the material is properly secured before turning on the tool.
- (vi) All drills shall have suitable attachments respective of the operations and powerful for ease of operation.
- (vii) When any work / operation need to be performed repeatedly or continuously, tools specifically designed for that work shall be used. The same is applicable to detachable tool bit also.
- (viii) Size of the drill shall be determined by the maximum opening of the chuck in case of drill bit.
- (ix) Attachments such as speed reducing screwdrivers and buffers shall be provided to prevent fatigue and undue muscle strain to his workers.
- (x) Stock should be clamped or otherwise secured firmly to prevent it from moving.
- (xi) Workers shall never stand on the top of the ladder to drill holes in walls / ceilings, which can be hazardous, instead standing on the fourth or fifth rung shall be recommended.
- (xii) Electric plane shall not be operated with loose clothing or long scarf or open jacket.
- (xiii) Safety guards used on right angle head or vertical portable grinders must cover a minimum of 180° of the wheel and the spindle / wheel specifications shall be checked.
- (xiv) All power tools / hand tools shall have guards at their nip points.
- (xv) Low profile safety chain shall be used in case of wood working machines and the saw shall run at high rpm when cutting and also correct chain tension shall be ensured to avoid "kickback".
- (xvi) Leather aprons and gloves shall be used as an additional personal protection auxiliary to withstand kickback.
- (xvii) Push sticks shall be provided and properly used to hold the job down on the table while the heels move the stock forward and thus preventing kickbacks.
- (xviii) Air pressure is set at a suitable level for air actuated tool or equipment being used. Before changing or adjusting pneumatic tools, air pressure shall be turned off.
- (xix) Only trained employees shall use explosive actuated tools and the tool shall also be unloaded when not in use.
- (xx) Usage of such explosive actuated tools shall be avoided in case of places where explosive/flammable vapours or gases may be present.

- (xxi) Explosive actuated tools and their explosives shall be stored separately and be taken out and loaded only before the time of immediate use.
- (xxii) Misfired cartridges of explosive actuated tools must be placed in a container of water and be removed safely from the project.
- (xxiii) No worker shall point any power operated / hand tool to any other person especially during loading / unloading.

WELDING, GOUGING AND CUTTING

- 1.192 Gas cylinders in use shall be kept upright on a custom-built stand or trolley fitted with a bracket to accommodate the hoses and equipment or otherwise secured. The metal cap shall be kept in place to protect the valve when the cylinder is not connected for use.
- 1.193 Hose clamp or clip shall be used to connect hoses firmly in both sides of cylinders and torches.
- 1.194 All gas cylinders shall be fixed with pressure regulator and dial gauges
- 1.195 Non-return valve and Flashback arrester shall be fixed at both end of cylinder and torch.
- 1.196 Domestic LPG cylinders shall not be used for Gas welding and Cutting purpose.
- 1.197 DCP or CO2 type Fire Extinguisher not less than 5 kg shall be fixed at or near to welding process zone in an easily accessible location. Fire Extinguisher should confirm to IS 2190: 1992.
- 1.198 Use firewatchers if there is a possibility of ignition unobserved by the operator (e.g. on the other side of bulkheads).
- 1.199 Oxygen cylinders and flammable gas cylinders shall be stored separately, at least 6.6 meters (20 feet) apart or separated by a fire proof, 1.5 meters (5 feet) high partition. Flammable substances shall not be stored within 15 meters of cylinder storage areas.
- 1.200 Transformer used for electrical arc welding shall be fixed with Ammeter and Voltmeter and also fixed with separate main power switch.
- 1.201 Welding grounds and returns should be securely attached to the work by cable lugs, by clamps in the case of stranded conductors, or by bolts for strip conductors. The ground cable will not be attached to equipment or existing installations or apparatus.
- 1.202 Use a low voltage open circuit relay device if welding with alternating current in constricted or damp places.
- 1.203 Take precautions against the risk of increased fume hazards when welding with chrome containing fluxed consumables or high current metal inert gas (MIG) or tungsten inert gas (TIG) processes.
- 1.204 Avoid being in contact with water or wet floors when welding. Use duckboards or rubber protection.
- 1.205 All electrical installations shall meet the IS: 5571: 1997 and NFPA 70 for gas cylinder storage area and other hazardous areas.
- 1.206 The current for Electric arc welding shall not exceed 300 A on a hand welding operation.

DANGEROUS AND HARMFUL ENVIRONMENT

1.207 A confined space is any space that:

- (i) Is large enough and so configured that an worker can bodily enter (any portion of the body) and perform assigned work,
- (ii) Has limited or restricted mean for entry and/or exit,
- (iii) Is not designed for continuous occupancy
- (iv) Contains or has the potential to contain a hazardous atmosphere,
- (v) Contains a material that has the potential for engulfing an entrant,
- (vi) Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross section, or
- (vii) Contains other recognized serious safety or health hazard.

1.208 Contractors must ensure all confined spaces are identified and managed using documented site confined space management methods.

1.209 As per BOCWR Rule 40:

- (i) No worker shall be allowed into any confined space or tank or trench or excavation wherein there is given off any dust, fumes / vapours or other impurities which is likely to be injurious or offensive, explosive or poisonous or noxious or gaseous material or other harmful articles unless steps are carried out by the Contractor and certified by the responsible person to be safe.

1.210 Dangerous Substances: -

30.4.1 A substance is considered dangerous if one or several of its properties render it dangerous. The Contractor identifies and manages dangerous substances planned for use on the Worksite in the manner described in the present Clause.

1.210.2 The transport to the Worksite and use of dangerous substances requires prior authorisation from the Engineer.

1.210.3 Details of risks and related prevention and protection measures are included in the health and safety plan.

1.210.4 The Contractor obtains all necessary authorisations and/or licenses for the storage and use of dangerous substances from local authorities. A copy of the authorisations is provided to the Engineer.

1.210.5 For each dangerous substance used, the Contractor will implement the recommendations described (i) in the Material Safety Data Sheets (MSDS), and (ii) by the Globally Harmonized System of Classification and Labelling of Chemicals established by the United Nations for hazardous chemicals.

1.210.6 Copies of MSDSs are kept on the Worksite and made available to personnel. The Contractor provides the Engineer with copies of all MSDSs.

1.210.7 **Storage of Dangerous substances :-** Storage area are designed and equipped by the Contractor based, not only on the chemical and physical properties of the products, but also on the types of containers stored, the number of people requiring access, and the quantities of the substance used.

Pursuant to SHE Clause 53.11, the Contractor anticipates and plans for the storage and management of hazardous waste.

Storage areas for dangerous substances are subject to strict rules, which are regularly checked by the SHE manager appointed. The rules include the following as a minimum:

- a) Access to the storage area is limited to trained and authorised individuals.
- b) An inventory is maintained up-to-date.
- c) MSDSs must be available for all stored dangerous substances, and the substances must be clearly labelled.
- d) A strict and methodical storage system is implemented (storage plan posted, large or heavy packaging may not be stored at heights, equipment and tools may not be stored in the dangerous substance storage room).
- e) Compliance with product expiry dates and implementation of a disposal procedure for substances which are not needed, or which have expired.
- f) Entrances, exits and access to emergency equipment are kept clear at all times.

Storage areas are clearly identified with warning signs at the entrance. The Contractor displays the storage plan (location of the different products, maximum inventory), a summary of labelling system and information on chemical incompatibilities.

Chemicals which could react together (leading to explosions, fire, projections or the emission of dangerous gases) are physically separated.

Products that react violently with water are stored so as to prevent contact with water, even in the event of flooding.

Inflammable products are stored separately in a dedicated area with adequate ventilation at all times.

Buildings used to store large quantities of dangerous substances are isolated from other buildings to avoid the spreading of fire. Such buildings are constructed using solid and non-combustible building materials and are equipped with evacuation systems and the appropriate firefighting equipment. Access to the buildings is clear, allowing for rapid evacuation in the event of an accident. The electrical systems are reduced to the essential minimum, and access points are equipped with adequate lighting (300 lux).

All storage areas are equipped with secondary retentions. Each storage area acts as a general secondary retention. Suitable absorbents (neutralising and non-combustible) are available in the storage area to clean up any spills and leaks.

The Contractor maintains the storage area at a suitable temperature for dangerous substances to prevent overpressure and bursting of containers.

FIRE PREVENTION, PROTECTION AND FIGHTING SYSTEM

- 1.211 The Contractor shall ensure that construction site is provided with fire extinguishing equipment sufficient to extinguish any probable fire at construction site. An adequate water supply is provided at ample pressure as per national standard.

- 1.212 Recharging of fire extinguishers and their proper maintenance should be ensured and as a minimum should meet Indian National Standards
- 1.213 All drivers of vehicles, foreman, supervisors and managers shall be trained on operating the fire extinguishers and fire-fighting equipment.
- 1.214 As per the GBOCW Rules 2003, all lifting appliances' driver cabin should be provided with a suitable portable fire extinguisher.
- 1.215 Combustible scrap and other construction debris should be disposed-off site on a regular basis. If scrap is to be burnt on site, the burning site should be specified and located at a distance no less than 12 metres from any construction work or any other combustible material.
- 1.216 Every fire, including those extinguished by Contractor personnel, shall be reported to the Employer representatives.
- 1.217 Emergency plans and Fire Evacuation plans shall be prepared and issued. Mock drills should be held on a regular basis to ensure the effectiveness of the arrangements and as a part of the programme, the Telephone Number of the local fire brigade should be prominently displayed near each telephone on site.

CORROSIVE SUBSTANCES: - As per BOCWR Rule 44, corrosive substances including alkalis and acids shall be stored and used by a person dealing with such substances at a building / construction site in a manner that it does not endanger the building worker and suitable PPE shall be provided by the Contractor to the worker during such handling and work. In case of spillage of such substances on building worker, the Contractor shall take immediate remedial measures.

DEMOLITION

- 1.218 The Contractor shall ensure that:
 - (i) all demolition works be carried out in a controlled manner under the management of experienced and competent supervision.
 - (ii) the concerned department of the Government or local authority be informed, and permission obtained wherever required. Media shall also be informed regarding this concern.
 - (iii) all glass or similar materials or articles in exterior openings are removed before commencing any demolition work and all water, steam, electric, gas and other similar supply lines are put-off and such lines so located or capped with substantial coverings so as to protect it from damage and to afford safety to the building workers and public.
 - (iv) examine the walls of all structures adjacent to the structure to be demolished to determine thickness, method of support to such adjacent structures
 - (v) no demolishing work be performed if the adjacent structure seems to be unsafe unless and until remedial measures like sheet piling, shoring, bracing or similar means be ensured for safety and stability for adjacent structure from collapsing.
 - (vi) debris / bricks and other materials or articles shall be removed by means of:
 - a. chutes
 - b. buckets or hoists
 - c. through openings through floors or

d. any other safe means

- (vii) no person other than building workers or other persons essential to the operation of demolition work shall be permitted to enter a zone of demolition and the area be provided with substantial barricades.

1.219 Damages to people and property.

- 3.2.1 Pursuant to Clauses 4.14 and 17.1 of the GCC, the Contractor is responsible for damages to people and property caused by the execution of the works or the procedures used for execution.
- 3.2.2 The Engineer is informed of any damage caused to people, or the property of individuals, other than the Contractor's personnel, within 6 hours of the event, regardless of the value of the prejudice.
- 3.2.3 Housing existing before the start of the works, located within a minimum radius of 800 m around the perimeter of the quarries and within a minimum radius of 500 m around the other Worksites that will be subject to blasting, will be examined by a bailiff unless agreed upon otherwise with the Engineer.
- 3.2.4 The bailiff's sworn statement is prepared and provided to the Engineer with the SEPP.
- 3.2.5 Should any problems be detected due to the intensity of blasting, the Engineer is entitled to request that the Contractor carry out seismic measurements of the intensity of the vibrations induced by the blasting, at variable distances from the blasting points, under the supervision of the Engineer, and at the cost of the Contractor.

EXCAVATION**1.220 Excavation: The Contractor shall ensure:**

- (i) where any construction building worker engaged in excavation is exposed to hazard of falling or sliding material or article from any bank or side of such excavation which is more than one 1.5 m above his footing, such worker is protected by adequate piling and bracing against such bank or side.
- (ii) where banks of an excavation are undercut, adequate shoring is provided to support the material or article overhanging such bank.
- (iii) excavated material is not stored at least 0.65 m from the edge of an open excavation or trench and banks of such excavation or trench are stripped of loose rocks and the banks of such excavation or trench are stripped of loose rocks and other materials which may slide, roll or fall upon a construction building worker working below such bank.

- (iv) metal ladders and staircases or ramps are provided, as the case may be, for safe access to and egress from excavation where, the depth of such excavation exceeds 1.5 m and such ladders, staircases or ramps comply with the IS 3696 Part 1&2 and other relevant national standards.
- (v) trench and excavation are protected against falling of a person by suitable measures if the depth of such trench or excavation exceeds 1.5 m and such protection is an improved protection in accordance with the design and drawing of a professional engineer, where such depth exceeds 4m.

1.221 Piling

1.221.1 General Precautions

There are certain hazards which are common to all types of piling, and the following precautions are necessary:

- (i) prior to piling, all underground services should be located and made safe. A check should be made to ensure there are no cellars, underground water courses or ground conditions which might cause hazards; there should be a firm level base for the crane, or crane mats provided;
- (ii) when working on piling operations one must wear a safety helmet, and ear and eye protection where necessary;
- (iii) All cranes, lifting appliances and lifting gear must have appropriate certificates of testing and thorough examination, and should be large enough for the job;
- (iv) particular attention should be paid to the risk of damage to lifting gear from sharp edges;
- (v) Cranes used for raising or lowering workers must be fitted with a dead man's handle and lowering should be done under power; you must be carried in properly constructed cages which cannot spin or tip;
- (vi) piling contractors should be asked to provide a written method statement setting out the precautions relevant to the type of piling they are to employ;
- (vii) Induction training and information for you as supervisor or operative should be specifically related to the method statement.

1.221.2 Bored Piles: - Workers may need to enter a borehole for inspection or for clearing out in undercuts, and there are certain precautions which must be taken prior to entry:

- (i) the borehole should be at least 75 cm in diameter;
- (ii) the borehole should be treated as a confined space and the precautions which are advised elsewhere to ensure a satisfactory atmosphere must be closely followed;
- (iii) waste material from the borehole should be kept clear of the borehole;
- (iv) Descent into a borehole should be in properly designed skips, chains or cages fitted with an anti-spin device. The power source of the lifting appliance should be kept running throughout the time someone is underground;
- (v) while a worker is working down a borehole he/she must wear a safety harness;
- (vi) all workers concerned must be trained and competent in rescue from deep boreholes, and emergency rescue drills should be carried out at regular intervals;
- (vii) A banksman who can see workers in the borehole should be present at all times;
- (viii) There must be adequate lighting at safe reduced voltage and a means of communication from the borehole.
- (ix) Wherever possible, the need for workers to enter pile boreholes should be avoided by the use of television cameras and other techniques for remote inspection.

1.222 Warning signs and notices:- The Contractor shall ensure that:

- (i) suitable warning signs or notices, required for the safety of building workers carrying out the work of an excavation, shall be displayed or erected at conspicuous places in Hindi and in a language understood by majority of such building workers at such building such excavation work.
- (ii) such warning signs and notices with regard to compressed air working shall include
 - a. the danger involved in such compressed air work
 - b. fire and explosion hazard
 - c. the emergency procedures for rescue from such danger or hazards.

WORK PERMIT SYSTEM

1.223 The Contractor shall develop a Work Permit system, which is a formal written system used to control certain types of work that are potentially hazardous. A work permit is a document, which specifies the work to be done, and the precautions to be taken. Work Permits form an essential part of safe systems of work for many construction activities. They allow work to start only after safe procedures have been defined and they provide a clear record that all foreseeable hazards have been considered. Permits to Work are usually required in high-risk areas as identified by the Risk Assessments.

1.224 A permit is needed when construction work can only be carried out if normal safeguards are dropped or when new hazards are introduced by the work. Examples of high-risk activities include but are not limited to:

- (i) Entry into confined spaces
- (ii) Work in close proximity to overhead power lines and telecommunication cables.
- (iii) Hot work
- (iv) To dig where underground services may be located
- (v) Work with heavy moving machinery
- (vi) Working on electrical equipment
- (vii) Work with radioactive isotopes
- (viii) Heavy lifting operations and lifting operations closer to live power line

1.225 The permit-to-work system should be fully documented, laying down:

- (i) How the system works;
- (ii) The jobs it is to be used for;
- (iii) The responsibilities and training of those involved; and
- (iv) How to check its operation;

1.226 A Work Permit authorisation form shall be completed with the maximum duration period not exceeding 12 hours.

1.227 A copy of each Permit-to-Work shall be displayed, during its validity, in a conspicuous location in close proximity to the actual works location to which it applies.

TRAFFIC MANAGEMENT

- 1.228 The basic objective of the following guidelines is to lay down procedures to be adopted by Contractor to ensure the safe and efficient movement of traffic and also to ensure the safety of workmen at construction sites.
- 1.229 All construction workers should be provided with high visibility jackets with reflective tapes as most of viaduct and station works are either above or under right-of-way. The complicity of workmen at all times shall be increased so as to protect from speeding vehicular traffic.
- 1.230 The guiding principles to be adopted for safety in construction zone are to:
- (i) Warn the road user clearly and sufficiently in advance.
 - (ii) Provide safe and clearly marked lanes for guiding road users.
 - (iii) Provide safe and clearly marked buffer and work zones
 - (iv) Provide adequate measures that control driver behaviour through construction zones.
- 1.231 Legal permission
- 1.231.1 In all cases, the Contractor shall employ proper precautions. Wherever operations undertaken are likely to interfere with public traffic, specific traffic management plans shall be drawn up and implemented by the Contractor in consultation with the approval of local police authorities and/or the concerned metropolitan/civil authorities as the case may be.
- 1.231.2 Such traffic management plans shall include provision for traffic diversion and selection of alternative routes for transport of equipment. If necessary, the Contractor shall carry out road widening before commencement of works to accommodate the extra load.
- 1.232 The primary traffic control devices used in work zones shall include signs, delineators, barricades, cones, pylons, pavement markings and flashing lights.
- 1.233 The road construction and maintenance signs which fall into the same three major categories as do other traffic signs, that are Regulatory Signs, Warning Signs and Direction (or guidelines) Signs shall only be used. The IRC: 67 (Code of Practice for Road Signs) provide a list of traffic signs. The size, colours and placement of sign shall conform to IRC: 67.
- 1.234 **Regulatory signs** :- Regulatory signs impose legal restriction on all traffic. It is essential, therefore, that they are used only after consulting the local police and traffic authorities.
- 1.235 Warning signs
- 1.235.1 Warning signs in the traffic control zone shall be utilised to warn the drivers of specific hazards that may be encountered.
- 1.235.2 The Contractor shall place detour signage at strategic locations and install appropriate warning signs. In order to minimize disruption of access to residences and business, the Contractor shall maintain at least one entrance to a property where multiple entrances exist.
- 1.235.3 A warning sign as given in General Instruction Maharashtra Metro Rail Corporation Limited /SHE/GI/012 shall be installed at all secondary road which merges with the primary road where the construction work is in progress at sufficient distance before it merges with the primary road so as to alert the road users regarding the 'Metro Work in Progress'.

- 1.235.4 Materials hanging over / protruded from the chassis / body of any vehicle especially during material handling shall be indicated by red indicator (red light/flag) to indicate the caution to the road users.
- 1.236 **Delineators** :- The delineators are the elements of a total system of traffic control and have two distinct purposes:
- (i) To delineate and guide the driver to and along a safe path
 - (ii) As a taper to move traffic from one lane to another.
- 1.236.1 These channelizing devices such as cones, traffic cylinders, tapes and drums shall be placed in or adjacent to the roadway to control the flow of traffic. These should normally be retro-reflectors complying with IRC: 79 - Recommended Practice for Road Delineators.
- 1.236.2 **Traffic cones and cylinders** :- Traffic cones of 500mm, 750mm and 1000mm high and 300mm to 500mm in diameter or in square shape at base and are often made of plastic or rubber and normally have retro-reflectorized red and white band shall be used wherever required.
- 1.236.3 **Drums** :- Drums about 800mm to 1000mm high and 300mm in diameter can be used either as channelizing or warning devices. These are highly visible, give the appearance of being formidable objects and therefore command the respect of drivers.
- 1.236.4 **Barricades**
- (i) Full height fence, barriers, barricades etc. shall be erected around the site in order to prevent the working area from the risk of accidents due to speedy vehicular movement. Same the way barricades protect the road users from the danger due to construction equipment and other temporary structures.
 - (ii) The structure dimension of the barricade, material and composition, its colour scheme, Maharashtra Metro Rail Corporation Limited logo & other details shall be in accordance with specifications laid down in tender document.
 - (iii) All barricades shall be erected as per the design requirements of the Employer, numbered, painted and maintained in good condition and also Barricade in-charge maintains a barricade register in site.
 - (iv) All barricades shall be conspicuously seen in the dark/night time by the road users so that no vehicle hits the barricade. Complicity shall be ensured by affixing retro reflective stripes of required size and shape at appropriate angle at the bottom and middle portion of the barricade at a minimum gap of 1000mm. In addition, minimum one red light or red-light blinker should be placed at the top of each barricade.
- 1.236.5 The Contractor shall ensure that all his construction vehicles plying on public roads (like dump trucks, tRailers, etc.) have proper license to ply on public roads from the State Transport Authority. Drivers holding proper valid license as per the requirements of Motor Vehicles Act shall drive these vehicles.
- 1.236.6 The Contractor shall not undertake loading and unloading at carriageways obstructing the free flow of vehicular traffic and encroachment of existing roads by the contractor applying the excuse of work execution.

1.236.7 **Tow away vehicle :-** The Contractor shall make arrangements keeping tow away van / manpower to tow away any breakdown vehicle in the traffic flow without losing any time at his cost.

1.236.8 **Cleaning of roads :-** The Contractor shall ensure the cleanliness of roads and footpaths by deploying proper manpower for the same. The Contractor shall have to ensure proper brooming, cleaning washing of roads and footpaths on all the time throughout the entire stretch till the currency of the contract including disposal of sweepage.

WORK ADJACENT TO LIVE RAILWAYS

1.237 Whenever work is to be conducted in close proximity to the live Railways then the following measures shall need to be addressed:

- (i) The rules provided for in the Railway's manual should be followed.
- (ii) No persons are allowed to encroach onto the Railway unless the owner has given specific authority.
- (iii) Adequate protection in accordance with the Railway owner's requirements shall be followed. (Provision of Block Inspectors, Flagmen and Lookouts)
- (iv) All persons shall wear high visibility clothing at all times.
- (v) Any induction training requirements of the Railways shall be strictly observed

BATCHING PLANT AND CASTING YARD LAYOUT

1.238 The batching plant / casting yard shall be effectively planned for smooth flow of unloading and stacking the aggregates reinforcements and cement, batching plant, transport of concrete, casting the segment, stacking the segment and loading the segments to the trucks. As far as possible the conflicts should be avoided.

1.239 The batching plant / casting yard shall be barricaded and made as a compulsory PPE zone

1.240 If in case of material unloading area is not maintainable as PPE zone, the same shall be segregated properly and made as a non-PPE zone with appropriate barrications.

1.241 Electrical system shall also be suitably planned so that location of diesel generator, if any, location of DBs, routing of cables and positioning of area lighting poles/masts does not infringe on any other utility and pose danger.

1.242 Drainage shall be effectively provided, and waste water shall be disposed after proper treatment

1.243 Time office, canteen, drinking water, toilet and rest place shall be suitably located for the easy access to workers. All the facilities shall be properly cleaned and maintained during the entire period of operation.

1.244 Manual handling of cement shall be avoided to a larger extent. Whenever it is absolutely necessary the workmen shall be given full body protection, hand protection and respiratory protection as a basic measure of ensuring better health.

1.245 The PPEs provided to cement handling workmen shall conform to international standards.

1.246 Access roads and internal circulation roads shall be well laid and maintained properly at all time.

1.247 Non-adherence to any of the above provision shall be penalised as per relevant penalty clause.

PERSONAL PROTECTIVE EQUIPMENTS (PPEs)

- 1.248 The Contractor shall provide required PPEs to workmen to protect against safety and / or health hazards. Primarily PPEs are required for the following protection
- (i) Head Protection (Safety helmets)
 - (ii) Foot Protection (Safety footwear, Gumboot, etc)
 - (iii) Body Protection (High visibility clothing (waistcoat/jacket), Apron, etc)
 - (iv) Personal fall protection (Full body harness, Rope-grap fall arrester, etc)
 - (v) Eye Protection (Goggles, Welders glasses, etc)
 - (vi) Hand Protection (Gloves, Finger coats, etc)
 - (vii) Respiratory Protection. (Nose mask, SCBAs, etc.)
 - (viii) Hearing Protection (Ear plugs, Ear muffs, etc)
- 1.249 The PPEs and safety appliances provided by the Contractor shall be of the standard as prescribed by Bureau of Indian Standards (BIS). If materials conforming to BIS standards are not available, the Contractor as approved by the Employer shall procure PPE and safety appliances.
- 1.250 All construction workers should be provided with high visibility jackets with reflective tapes confirming to the requirement specified under BS EN 471: 1994 as most of viaduct and station works are executed either above or under right-of-way. The complicity of workmen at all times shall be increased so as to protect them from speeding vehicular traffic.
- 1.251 The Contractor shall provide safety helmet, safety shoe and high visibility clothing for all employees including workmen, traffic marshal and other employees who are engaged for any work under this contract as per the following requirement.

All employees of the Contractor including workmen	Traffic marshals
Hard hat with company Logo	Hard hat with reflective tape
Safety boots	Safety boots
Hi-visibility waistcoat covering upper body and meeting the following requirements as per BS EN 471:1994:	Hi-visibility jacket covering upper body and meeting the following requirements as per BS EN 471:1994:
(a) Background in fluorescent orange-red in colour	(a) Background in fluorescent orange-red in colour
(b) Two vertical green strips of 5cm wide on front side, covering the torso at least 500 cm ²	(b) Jackets with full-length sleeves with two bands of retro reflective material, which shall be placed at the same height on the garment as those of the torso. The upper band shall encircle the upper part of the sleeves

All employees of the Contractor including workmen	Traffic marshals
<p>(c) Two diagonal strips of 5 cm wide on back in an 'X' pattern covering at least 570cm²</p> <p>(d) Horizontal strips not less than 5cm wide running around the bottom of the vertical strip in front and 'X' pattern at back.</p> <p>(e) The bottom strip shall be at a distance of 5cm from the bottom of the vest.</p> <p>(f) Strips must be retro reflective and fluorescent</p> <p>(g) Waistcoat shall have a side adjustable fit and a side and front tear-away feature on vests made of nylon.</p>	<p>between the elbow and the shoulder; the bottom of the lower band shall not be less than 5cm from the bottom of the sleeve.</p> <p>(c) Two vertical green strips of 5cm wide on front side, covering the torso at least 500 cm²</p> <p>(d) Two diagonal strips of 5 cm wide on back in an 'X' pattern covering at least 570cm²</p> <p>(e) Horizontal strips not less than 5cm wide running around the bottom of the vertical strip in front and 'X' pattern at back.</p> <p>(f) The bottom strip shall be at a distance of 5cm from the bottom of the vest.</p> <p>(g) Strips must be retro reflective and fluorescent.</p>

1.251.1 Colour coding for helmets

Safety Helmet Colour Code (Every Helmet should have the LOGO* affixed /painted)	Person to use
White	Maharashtra Metro Rail Corporation Limited staffs
Grey	All Designers, Architect, Consultants, etc.
Violet	Main Contractors (Engineers / Supervisors)
Blue	All Sub-contractors (Engineers / Supervisors)
Red	Electricians (Both Contractor and Sub-contractor)
Green	Safety Professionals(Both Contractor & Sub-contractor)
Orange	Security Guards / Traffic marshals
Yellow	All workmen

White (with sticker)	“VISITOR”	Visitors
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Note: LOGO*

- (i) Logo shall have its outer dimension 2”*2” and shall be conspicuous
- (ii) Logo shall be either painted or affixed
- (iii) No words shall come either on Top / Bottom of Logo

Logo of the corresponding main contracting company for their employees and sub-contracting company for their employees shall only be used.

- 1.252 In addition to the above any other PPE required for any specific jobs like, welding and cutting, working at height etc shall also be provided to all workmen and also ensure that all workmen use the PPEs properly while on the job.
- 1.253 The Contractor shall not pay any cash amount in lieu of PPE to the workers/sub-contractors and expect them to buy and use during work.
- 1.254 The Contractor shall at all time maintain a minimum of 10% spare PPEs and safety appliances and properly record and show to the Employer during the inspections. Failing to do so shall invite appropriate penalty as per the provisions of the contract.
- 1.255 It is always the duty of the Contractor to provide required PPEs for all visitors. Towards this required quantity of PPEs shall be kept always at the security post.

VISITORS TO SITE

- 1.256 No visitor is allowed to enter the site without the permission of the Employer. All authorised visitors should report at the site office. Contractor shall provide visitor’s helmet (White helmet with visitor sticker) and other PPEs like Safety Shoe, reflective jacket, respiratory protection etc. as per requirement of the site.
- 1.257 All Visitors shall be accompanied at all times by a responsible member of the site personnel.
- 1.258 The Contractor shall be fully responsible for all visitors’ safety and health within the site.
- 1.259 As indicated earlier in this Manual, the Engineer shall undertake regular audits at quarterly intervals, of the Contractor’s onsite practices and procedures as a means of assessing the ongoing performance of the Contractor.
- 1.260 The criteria against which the audits will be undertaken shall be derived from the clauses within the Environment Protection Requirements, contract-specific Site Environmental Plan and previous site inspection results.
- 1.261 In addition to the quarterly audits by the Engineer, site inspection shall be undertaken by the Contractor’s staff to inspect the construction activities in order to ensure that appropriate environmental protection and pollution control measures are properly followed and implemented.
- 1.262 The frequency of site inspection shall be at least once a week.
- 1.263 The Contractor shall prepare an ‘Environmental Inspection and Action Reporting System’ and submit to the Engineer for approval and make amendments as

suggested. It shall contain a contract specific comprehensive Environment Inspection checklist as requirement of Site Environmental Plan.

- 1.264 The area of inspection shall not be limited to environmental compliance within the site but areas outside the site which are likely to be affected, directly or indirectly by activities at site.
- 1.265 Results of inspection shall be discussed with Engineer and his recommendations on better environmental protection shall be notified to the Contractor for taking immediate action and rapid resolution of identified non-compliance.
- 1.266 If significant environmental problems are identified or if there is an environmental complaint or as a part of investigation work, then the Engineer shall also carry out ad hoc site inspection which shall be attended by Contractor's Representative.
- 1.267 Reporting System
 - 1.267.1 Reporting under the Environmental Management System will contain results of monitoring and inspection programs.
 - 1.267.2 In Site Environmental Plan, the Contractor shall prepare and submit monthly Environmental Quality Management Reports in accordance with requirements as per Contract.
 - 1.267.3 The monthly report shall include (but not limited to) the following:
 - a. Executive Summary
 - b. Brief mention of construction activities
 - c. Monitoring results under AMCP
 - d. Interpretation of monitoring results, significance and influencing factors
 - e. Graphical representation of monitored results over past four reporting periods.
 - f. Measures to control spill under Spill Prevention and Control Plan (SPCP).
 - g. Action taken on recommendations under site inspection programme or specific directions.
 - h. Summary of complaints, results of investigations and follow-up action
 - i. Future key issues
- 1.268 Complaint Response Process
 - 1.268.1 Inquiries, complaints and requests for information can be expected from a wide range of individuals and organizations both private and government. The majority of complaints are likely to be received by Maharashtra Metro Rail Corporation Limited, although the site offices are also likely to be contacted.
 - 1.268.2 The objective of complaint process is to ensure that public and agency complaints are addressed and resolved consistently and expeditiously.
 - 1.268.3 The Contractor's Site Manager will be notified immediately on receipt of complaint that may relate to environmental impacts. The Site Manager will immediately inform the Engineer and through him the Maharashtra Metro Rail Corporation Limited.
 - 1.268.4 Field investigation should determine whether the complaint has merit, and if so action should be taken to address the impact.

- 1.268.5 The outcome of the investigation and the action taken shall be documented on a complaint Performa prepared by the Contractor and approved by the Engineer in advance of the works.
- 1.268.6 Where possible, a formal response to each complaint received shall be prepared by the Contractor within seven days in order to notify the concerned person(s) that action has been taken.
- 1.269 Completion of the EQM Programme
 - 1.269.1 The construction of Project will be undertaken as a series of individual construction contracts with necessarily different construction program and completion dates.
 - 1.269.2 The Engineer shall maintain an overview of the 'impact causing potential' of each site or contract and monitoring parameter with a view to maintaining the most cost-effective use of the environmental resources dedicated to the Project.
 - 1.269.3 Termination of EQM should focus on the percentage contract completion status and on the basis of a history of environmental impact arising from the site over a representative period of monitoring.
 - 1.269.4 Justifiable application for termination of EQM shall be put forward by the Contractor to the Engineer, as necessary throughout the construction period.

PART III : OCCUPATIONAL HEALTH AND WELFARE

PHYSICAL FITNESS OF WORKMEN

- 1.270 The Contractor shall ensure that his employees / workmen subject themselves to such medical examination as required under the law or under the contract provision and keep a record of the same.
- 1.271 The Contractor shall not permit any employee / workmen to enter the work area under the influence of alcohol or any drugs.

MEDICAL FACILITIES

1.272 Medical Examination

- 1.272.1 The Contractor shall arrange a medical examination of all his employees including his sub-contractor employees employed as drivers, operators of lifting appliances and transport equipment before employing, after illness or injury, if it appears that the illness or injury might have affected his fitness and, thereafter, once in every two years up to the age of 40 and once in a year, thereafter.

- (i) The Contractor shall maintain the confidential records of medical examination or the physician authorized by the Employer.
- (ii) No building or other construction worker is charged for the medical examination and the cost of such examination is borne by Contractor employing such building worker.
- (iii) The medical examination shall include:
 - a. Full medical and occupational history
 - b. Clinical examination with particular reference to:
 - (a) General Physique;
 - (b) Vision: Total visual performance using standard Orth orator like Titmus Vision Tester should be estimated and suitability for placement ascertained in accordance with the prescribed job standards.
 - (c) Hearing: Persons with normal must be able to hear a forced whisper at twenty-four feet. Persons using hearing aids must be able to hear a warning shout under noisy working conditions.

Contractors personnel exposed to noise levels above 80dB(A) in order to establish initial audiograms. Annual tests are carried out to monitor any changes and detect any deterioration.

- (d) Breathing: Peak flow rate using standard peak flow meter and the average peak flow rate determined out of these readings of the test performed. The results recorded at pre-placement medical examination could be used as a standard for the same individual at the same altitude for reference during subsequent examination.
- (e) Upper Limbs: Adequate arm function and grip
- (f) Spine: Adequately flexible for the job concerned.

- (g) Lower Limbs: Adequate leg and foot concerned.
 - (h) General: Mental alertness and stability with good eye, hand and foot coordination.
 - c. Any other tests which the examining doctor considers necessary and requested by engineer. All costs to be born by Contractor
- 1.272.2 If the Contractor fails to get the medical examination conducted as mentioned above, the Employer will have the right to get the same conducted by through an agency with intimation to the Contractor and deduct the cost and overhead charges.
- 1.273 **Occupational Health Centre :-** The Contractor shall ensure at a construction site an occupational health centre, mobile or static is provided and maintained in good order. Services and facilities as per the scale lay down in Schedule X of BOCWR. A construction medical officer appointed in an occupational health centre, possess the qualification as laid down in Schedule XI of BOCWR.
- 1.274 **Ambulance van and room :-** The Contractor shall ensure at a construction site of a building or other construction work that an ambulance van and room are provided at such construction site or an arrangement is made with a nearby hospital for providing such ambulance van for transportation of serious cases of accident or sickness of workers to hospital promptly and such ambulance van and room are maintained in good repair and is equipped with standard facilities specified in Schedule IV and Schedule V of BOCWR.
- 1.275 **First-aid boxes :-** The Contractor shall ensure at a construction site one First-aid box for 100 workers provided and maintained for providing First-aid to the building workers. Every First-aid box is distinctly marked “First-aid” and is equipped with the articles specified in Schedule III of BOCWR.

The Contractor equips the Project Area with a communication system exclusively for the purpose of communication with the first aid services. Information on how to communicate with the first aid services is clearly indicated near the communication equipment.

1.276 HIV/ AIDS prevention and control

- 1.276.1 The Contractor shall adopt the Employer’s Policy on “HIV / AIDS Prevention and Control for Workmen Engaged by Contractors” and the copy of the policy is given in Appendix No. 4.
- 1.276.2 The Employer will engage a professional agency for implementing the guidelines laid down in the policy and communicate to the Contractor.
- 1.276.3 The Contractor shall extend necessary support to the appointed agency by deputing the workmen to attend the awareness creation programmes.
- 1.276.4 The Contractor shall also extend necessary organizational support to the appointed agency for the effective implementation of the Employers’ workplace policy on HIV/AIDS for workmen of the Contractors.
- 1.276.5 As laid down in the policy the Contractor shall identify peer educators (1 for every 100 workers) and refer them for professional training to the Employers’ appointed agency for the purpose.
- 1.276.6 The peer educators on completion of the training shall serve as the focal point for any information, education & awareness campaign among the workmen throughout the contract period.

- 1.276.7 The peer educators will be paid a monthly honorarium as fixed by the Employer for rendering his services in addition to his regular duty.
- 1.276.8 The total number of peer educators (1 for 100 workers) shall always be maintained by the Contractor.
- 1.276.9 In case if these peer educators leave the Contractor by creating vacancy, then the Contractor at his own expense train the new replacement peer educator from the Employers' appointed agency for the purpose.
- 1.276.10 It is suggested to the Contractor that due care should be taken to select the peer educators from among the group of workmen so that they remain with the Contractor throughout the contract period.
- 1.277 Prevention of mosquito breeding
- 1.277.1 Measures shall be taken to prevent mosquito breeding at site. The measures to be taken shall include:
- (i) Empty cans, oil drums, packing and other receptacles, which may retain water shall be deposited at a central collection point and shall be removed from the site regularly.
 - (ii) There should not be accumulation of still water at any site, In case of still water, it should be covered by earth and levelled.
 - (iii) Contractor's equipment and other items on the site, which may retain water, shall be stored, covered or treated in such a manner that water could not be retained.
 - (iv) Water storage tanks shall be provided.
- 1.277.2 Posters in Hindi and English, which draw attention to the dangers of permitting mosquito breeding, shall be displayed prominently on the site.
- 1.277.3 The Contractor at periodic interval shall arrange to prevent mosquito breeding by fumigation / spraying of insecticides. Most effective insecticides shall include SOLFAC WP 10 or Baytex, The Ideal Larvicide etc.
- 1.278 Alcohol and drugs
- 1.278.1 The Contractor shall ensure at all times that no employee is working under the influence of alcohol / drugs which are punishable under Government regulations.
- 1.278.2 Smoking at public worksites by any employee is also prohibited as per Government regulations.
- NOISE**
- 1.279 The Contractor shall consider noise as an environmental constraint in his design, planning and execution of the Works and provide demonstrable evidence of the same on Employer's request. The Contractor shall, at his own expense, take all appropriate measures to ensure that work carried out by the Contractor and by his sub-Contractors, whether on or off the Site, will not cause any unnecessary or excessive noise which may disturb the occupants of any nearby dwellings, schools, hospitals, or premises with similar sensitivity to noise.
- 1.279.1 Without prejudice to the generality of the foregoing, noise level reduction measures shall include the following:

(i) The Contractor shall ensure that all powered mechanical equipment used in the Works shall be effectively sound-reduced using the most modern techniques available including but not limited to silencers and mufflers.

(ii) The Contractor shall construct acoustic screens or enclosures around any parts of the Works from which excessive noise may be generated.

1.279.2 The Contractor shall ensure that noise generated by work carried out by the Contractor and his sub-Contractors during daytime and night time shall not exceed the maximum permissible noise limits, whether continuously or intermittently, as given in the project SHE Manual. The same may be varied from time to time by and at the sole discretion of the Employer. In the event of a breach of this requirement, the Contractor shall immediately re-deploy or adjust the relevant equipment or take other appropriate measures to reduce the noise levels and thereafter maintain them at levels which do not exceed the said limits. Such measures may include without limitation the temporary or permanent cessation of use of certain items of equipment.

1.279.3 The noise monitoring requirements are given in the project SHE Manual and the monitoring locations shall be identified.

1.280 Noise Monitoring

1.280.1 The activities which are expected to cause noise during the construction of Project, include noise from construction equipment, construction activities such as portal construction, boring for piling, earthwork excavation, concreting, viaduct construction (including shifting of launching truss / girder) and removal of spoil and movement of construction vehicles and delivery vehicles, travelling to and from the construction and disposal sites.

1.280.2 The level of impact of these noise sources depends upon the noise characteristics of the equipment and activities involved the construction schedule, and the distance from noise sensitive receptors.

1.280.3 The Noise Monitoring Control Plan (**PMCP**) will provide guidance for construction activity. It shall also address noise performance criteria used in the selection of construction equipment.

1.280.4 The Noise Control Plan shall provide for:

- (i) Definition of noise-sensitive uses in the zones affected by construction;
- (ii) Calculation of future noise levels at the closest noise-sensitive receptors to the construction activity based on construction activity and ambient noise levels;
- (iii) Evaluation and specification of the noise abatement measures that can be applied to meet the noise objectives;
- (iv) Monitoring construction activity and providing adjustments to noise abatement controls that may be required to increase their effectiveness;
- (v) It shall specify the night-time and daytime construction activities.

1.280.5 In defining the requirements of the **PMCP**, available measures for noise control, such as, the use of equipment with special exhaust silencers or enclosures, and the construction of temporary enclosures or noise barriers around specific construction site activity areas shall be considered. It should also specify the measures to be adopted to counter the impact of noise pollution for public and workers working at site during construction.

- 1.280.6 If the measured noise levels exceed the noise limits, the noise levels shall be reduced by appropriate abatement measures.
- 1.280.7 The Engineer shall monitor Contractor's performance of tasks specified and will inspect the procedures related to the control of noise.
- 1.280.8 In no case shall the Contractor expose the public to construction noise levels exceeding 90dBA (slow) or to impulsive noise levels with a peak sound pressure level exceeding 140dB as measured on an impulse sound level meter.
- 1.280.9 Limit for construction noise is based on the existing ambient noise levels in areas adjoining the construction sites.
- 1.280.10 The noise levels emanating from any source during construction, shall not exceed 5 dBA or more above existing ambient pre-construction noise levels. The same may be varied from time to time by and at the sole discretion of the Engineer.
- 1.280.11 Where there are no ambient noise measurements, the construction activities shall be limited to levels at a distance of 200 feet from the construction limits or at the nearest affected building, whichever is closer, as given in Table-2.

Table 2: Allowable Construction Noise

Land Use	Maximum Noise Level L_{max} dBA	
	Day Time	Night Time
Residential	75	65
Commercial (all times)	85	
Industrial (all times)	90	

- 1.280.12 At the surface of the construction site during night time hours, the Contractor shall use only equipment that operating under full load meets the noise limits specified in Table3, if a sensitive receptor would be affected.

Table 3: Noise Emission Limits for Construction Equipment used during night hours
(Measured at 50 feet from Construction Equipment)

SN	Equipment Category	L_{max} Level dBA
1.	Backhoe	80
2.	Bar Bender	75
3.	Chain Saw	81
4.	Compactor	80
5.	Compressor	80

6.	Concrete Mixer	85
7.	Concrete Pump	82
8.	Crane	85
9.	Dozer	85
10.	Front end loader	80
11.	Generator	82
12.	Gradall	85
13.	Grader	85
14.	Paver	85
15.	Pneumatic tools	85
16.	Scraper	85
17.	Tractor	84

Noise emission limits apply to equipment used at surface of the construction site during night time hours of 9 pm to 6 am.

1.280.13 The adjustments for close-in equipment noise shall be made in accordance with Table 4.

Table 4: Adjustments for Close-in Equipment Noise

Distance (Feet)	Level to Estimate Sound Level at 50 Feet dB (A)
19-21	8
22-23	7
24-26	6
27-29	5
30-33	4
34-37	3
38-42	2

Distance (Feet)	Level to Estimate Sound Level at 50 Feet dB (A)
43-47	1
48-50	0

Table 5: Construction Vibration Limits (Vibration Type and Permissible)

Aggregate Duration	Limit
Sustained (1 hour / day)	0.01 in/sec (80 VdB re 10^{-6} in/sec)
Transient (< 1 hour / day)	0.03 in/sec (90 VdB re 10^{-6} in/sec)
Transient (< 10 minutes / day)	0.10 in/sec (100 VdB re 10^{-6} in/sec)

1.280.14 When Diesel Generator (DG) Sets are used for operation of equipment and machinery, then 'Standards and Guidelines for control of Noise Pollution from Stationary DG Sets', under Environment (Protection) Act, 1986 shall apply.

1.280.15 Where the Engineer determines that the recorded Noise level is significantly greater than the acceptable levels, the Engineer may direct the Contractor to take effective remedial measures including, but not limited to, reviewing noise sources and modifying working procedures.

1.280.16 The Contractor shall inform the Engineer of all steps taken to investigate cause of exceedance & immediate action taken to avoid further exceedance through written reports and proposals for action under an Event Contingency Plan.

1.281 Control Requirements

1.281.1 Construction material should be operated and transported in such a manner as not to create unnecessary noise as outlined below:

- (i) Perform Work within the procedures outlined herein and comply with applicable codes, regulations, & standards established by the Central & State Govt. & their agencies.
- (ii) Keep noise to the lowest reasonably practicable level. Appropriate measures will be taken to ensure that construction works will not cause any unnecessary or excessive noise, which may disturb the occupants of any nearby dwellings, schools, hospitals, or premises with similar sensitivity to noise. Use equipment with effective noise-suppression devices and employ other noise control measures as to protect the public.
- (iii) Schedule and conduct operations in a manner that will minimize, to the greatest extent feasible, the disturbance to the public in areas adjacent to the construction activities and to occupants of buildings in the vicinity of the construction activities.

- (iv) The Contractor shall submit to the Employer a Noise Monitoring and Control Plan (**PMCP**) under contract specific Site Environmental Plan. It shall include full and comprehensive details of all powered mechanical equipment, which he proposes to use during daytime and night time, and of his proposed working methods and noise level reduction measures. The **PMCP** shall include detailed noise calculations and vibration levels to demonstrate the anticipated noise generation and vibrations by the Contractor.
- (v) The **PMCP** prepared by the Contractor shall guide the implementation of construction activity. The **PMCP** will be reviewed on a regular basis and updated as necessary to assure that current construction activities are addressed. It may appear as a regular agenda item in project coordination meetings, if noise is an issue at any location in the contract.

1.282 Occupational Noise

- (i) Protection against the effects of occupational noise exposure should be provided when the sound level exceeds the threshold values as provided in Project SHE Manual.
- (ii) When employees are subjected to sound levels exceeding those listed in the Table above, feasible administrative or engineering controls should be utilized as given in this document and Maharashtra Metro Rail Corporation Limited's Project SHE Manual.
- (iii) If such controls fail to reduce sound levels within the levels of the table, personal protective equipment shall be provided and used to reduce sound levels within the levels of the table.
- (iv) When the daily noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect should be considered, rather than the individual effect of each. Exposure to different levels for various periods of time shall be computed according to the formula and sample computations, as given in project SHE Manual.

1.283 Vibration Level

1.283.1 In locations where the alignment is close to historical / heritage structures, the Contractor shall prepare a monitoring scheme prior to construction at such locations. This scheme for monitoring vibration level at such historical / heritage sites shall be submitted to Employer for his approval. This scheme shall include:

- (i) Monitoring requirements for vibrations at regular intervals throughout the construction period;
- (ii) Pre-construction structural integrity inspections of historic and sensitive structures in project activity;
- (iii) Information dissemination about the construction method, probable effects, quality control measures and precautions to be used;
- (iv) The vibration level limits at work sites adjacent to the alignment shall conform to the permitted values.

VENTILATION AND ILLUMINATION

1.284 Ventilation

1.284.1 The Contractor shall ensure at a construction site of a building or other construction work that all working areas in a free tunnel are provided with ventilation system as approved by the DG/CIIBC and the fresh air supply in such

tunnel is not less than 6m³/min for each building worker employed underground in such tunnel and the free air flow movement inside such tunnel is not less than 9m/min.

1.284.2 The oxygen level shall not be less than 19.5% in the working environment.

1.285 Illumination

1.285.1 The Contractor shall take every effort to illuminate the work site as per the Employer's

requirement illustrated in General Instruction MAHA-METRO/SHE/GI/011.

1.285.2 The Contractor shall conduct a monthly illumination monitoring by lux meter for all the locations and the report shall be sent to the Employer within 7th of the next month and the same shall be reviewed during the monthly SHE committee meeting.

RADIATION

1.286 The use of radioactive substances and radiating apparatus shall comply with the Government regulatory requirements and all subsidiary legislation

1.287 Operations involving ionising radiation shall only be carried out after having been reviewed without objection by the Employers representative and shall be carried out in accordance with a method statement.

1.288 Each area containing irradiated apparatus shall have warning notices and barriers, as required by the Regulations, conspicuously posted at or near the area.

1.289 Radioactive substances will be stored, used or disposed shall be strictly in accordance with the Government Enactments.

1.290 The Contractor shall ensure that all site personnel and members of the public are not exposed to radiation.

1.291 **Asbestos :-** Asbestos fibres are naturally occurring and extremely aerodynamic. Because of this, almost everyone is exposed to asbestos. Asbestos fibres can become a health risk if inhaled at high concentrations over extended periods of time. Asbestos is only dangerous if it becomes airborne. As long as asbestos-containing materials are not damaged, the asbestos fibres do not become airborne, and do not pose a health hazard to building occupants.

As a preventive action, no asbestos containing material will be used during any of the site activity mitigate the hazard

1.292 **Lead-Based Paint :-** Lead-based paint is a source of lead poisoning. Ingestion and inhalation of lead dust that is created as lead-based paint chips and peels, or from improper sanding or scraping of lead-based painted surfaces can lead to exposure.

Paints and other chemicals used for painting should be stored in a proper contained area.

Empty Paint containers, waste paint brushes, clothes stained with paint should be properly disposed.

WELFARE MEASURES FOR WORKERS

1.293 Latrine and Urinal Accommodation

- 1.293.1 The Contractor shall provide one latrine seat for every 20 workers up to 100 workers and thereafter one for every additional 50 workers. In addition, one urinal accommodation shall be provided for every 100 workers.
- 1.293.2 When women are employed, separate latrine and urinals accommodation shall be provided on the same scale as mentioned above.
- 1.293.3 Latrine and urinals shall be provided as per Section 33 of BOCWA and maintained as per Rule 243 of BOCWR and shall also comply with the requirements of public health author
- 1.293.4 **Moving sites :-** In case of works like Track laying, the zone of work is constantly moving at elevated level. In such cases mobile toilets with proper facility to drain the sullage shall be provided at reasonably accessible distance.
- 1.293.5 In case if the Contractor fail to provide required number of urinals and latrines or fail to maintain it as per the requirements of Public Health laws, the Employer shall have the right to provide/maintain through renowned external agencies at the cost of the Contractor.
- 1.294 **Canteen :-** In every workplace wherein not less than 250 workers are ordinarily employed, the Contractor shall provide an adequate canteen conforming to Section 37 of BOCWA, Rule 244 of BOCWR and as stipulated in Rule 247 of BOCWR the charges for food stuff shall be based on 'no profit no loss' basis. The price list of all items shall be conspicuously displayed in such canteen.

The contractor defines and implements actions in order to guarantee (i)the quality and quantity of food stuff(ii)compliance with health rules when preparing meals (iii)fitting out and servicing premises and equipment, both in the kitchen and food storage areas.

Contractor inspects the cleanliness of food transport vehicles, temperature control and the cold chain, as well as best before dates and takes the necessary corrective actions. The temperature of chillers is regularly checked.

The contractor checks that health requirements are met for food storage conditions in the kitchen or other locations, food prepared products are left prior to consumption, to ensure no health risks. Prepared food is eaten or thrown away, no food remains are reused.

The contractor recruits trained canteen personnel and ensures that supervisors monitor compliance with sanitary instructions. The Contractor ensures that canteen personnel have means of ensures that supervisors monitor compliance with sanitary instructions. The Contractor ensures that canteen personnel have means of ensuring compliance with health rules (changing rooms,linen,hand washers,condition of flooring and paint and existence of a cleaning plan.).This area needs to be checked every three months.

- 1.295 **Serving of tea and snacks at the workplace :-** As per Rule 246 of BOCWR, at a building or other construction work where a workplace is situated at a distance of more than 200 m from the canteen provided under Rule 244(1) of BOCWR, the Contractor employing building works shall make suitable arrangement for serving tea and light refreshment to such building works at such place.

Proper Housekeeping should be maintained at such locations where tea & snacks are served.

1.296 Drinking water

1.296.1 As per Section 32 of BOCWA the Contractor shall make in every worksite, effective arrangements to provide sufficient supply of wholesome drinking water with minimum quantity of 5 litres per workman per day. Quality of the drinking water shall conform to the requirements of national standards on Public Health IS 10500

1.296.2 While locating these drinking water facilities due care shall be taken so that these are easily accessible within a distance of 200m from the place of work for all workers at all location of work sites.

1.296.3 All such points shall be legible marked "Drinking Water" in a language understood by a majority of the workmen employed in such place. Unless the supply of drinking water is provided by a certified supplier, the quality of the drinking water provided to workers is tested at least at the start of the works and then on a monthly basis. The protocol for taking and analysing samples is based on the recommendation of the World Health Organization. The results shall be documented and made available on the Project Area.

1.297 **Labour Accommodation** :- The Contractor shall provide free of charges as near as possible, temporary living accommodation to all workers conforming to provisions of Section 34 of BOCWA. These accommodations shall have cooking place, bathing, washing and lavatory facilities.

The Contractor provides one drinking water tap per 10 personnel, one toilet for 15 contractors Personnel as a minimum and one toilet per 15 persons.

Hygiene-Sanitary areas (sinks, toilets, bathing areas, wash basins) are cleaned & disinfected by the contractors cleaning service at least once every 24 hours.

The canteen, kitchen and kitchen utensils are cleaned after each meal service.

1.298 **Creches** :- In every workplace where in more than 50 female workers are ordinarily employed, there shall be provided and maintained a suitable room for use of children under age of 6 yrs, conforming to the provisions of Section 35 of BOCWA.

1.299 **Heat Stress** :- Contractors/Subcontractors shall establish the necessary programs to ensure that project employees work safely in heat stress conditions. The reduction of adverse health effects can be accomplished by engineering controls, work practices, training, acclimatization, monitoring, water & electrolyte balance and the recognition and treatment of heat stress emergencies.

PART- IV ENVIRONMENTAL MANAGEMENT

Protection of adjacent areas

- 47.1.1** The Contractor uses construction methods and means of protection in order to avoid or minimize adverse effects that are incurred on vegetation, soils, groundwater and surface water ,biodiversity, natural drainage and the water quality in areas within any Project Area and its surroundings for the entire duration of the works.
- 47.1.2** Wetland areas include marshes, fens, mires or natural or artificial bodies of water ,whether permanent or temporary, where water is stagnant or flowing, fresh, saline or briny, including seawater with a low -tide depth of six meters or less .Filling of all or part of a wetland area is not permitted, unless the works are necessary according to the provisions of the Contract or the instructions of the Engineer.
- 47.1.3** With the exception of access situated around the site with a distance specified srxistence and conditions of residential building roads, or unless instructed otherwise by the Engineer ,the entire perimeter of land sites with a a surface area of less than 2 hectares is physically demarcated by a perimeter Track, road, signs or any other means leaving no possible ambiguity as to the location of the Project Area perimeter.
- 47.1.4** Unless instructed otherwise by the Engineer, the Contractor defines the perimeter of the Project Area at a distance of at least:
- a) 50 m from any permanent water course and outside of floodable areas.
 - b) 300 m from sensitive urban services and buildings (health centre, school, water-supply for populations)
 - c) 200 m from any housing and
 - d) 300 m from housing in the specific case of work requiring the use of explosives.
- 47.1.5** If the footprint of the works are located in the situations a) to d) above and unless agreed otherwise by the Engineer, the Contractor will contract a bailiff to make a sworn statement regarding the existence and conditions of residential buildings situated around the site with a distance specified in the above paragraph from b)to d).
- 47.1.6** The bailiff's sworn statement is prepared and provided to the Engineer with the Environment Protection Plan.
- 47.2** Selection of Borrow Areas, Backfill material stockpiles sites and access road.
- 47.2.1** The Contractor will submit to the Engineer for prior approval (i) the location of proposed borrow areas or areas to be excavated, or (ii)proposed backfill material stockpile locations or zones designated for the rubble from demolition works.
- 47.2.2** This requirement also applies to the side casting during the construction of linear infrastructure (roads, pipelines, transport routes) and which are included in the category of stockpiling of waste material.
- 47.2.3** The opening or rehabilitation of all access routes between Project Areas Will be shown on a map and approved by the Engineer prior to the start of the corresponding works.

47.3 Environmental Monitoring

- 47.3.1 The Contractor's Environmental Team shall carry out the monitoring of environmental impacts during construction. Representative sensitive receivers in the vicinity of the works shall be monitored for air quality impacts.
- 47.3.2 For carrying out impact monitoring for air, equipment shall be provided, operated and maintained by the Contractor. The equipment shall be kept in a good state of repair in accordance with the manufacturer's recommendations and maintained in proper working order with sufficient spare equipment available in the event of breakdown to maintain the planned monitoring program.
- 47.3.3 The calibration of monitoring instruments and their respective calibrators shall be carried out in accordance with the manufacturer's requirements to ensure they perform to the same level of accuracy as stated in the manufacturer's specifications.
- 47.3.4 Suspended Particulate Matter (SPM) levels shall be measured by following the standard high volume sampling method as set out in High Volume Method for Suspended Particulate, BIS: 5182-1981
- 47.3.5 24-hour average SPM concentration shall be measured by drawing air through a High Volume Sampler (HVS) fitted with pre-weighted Glass Fibre filter paper at an average flow rate not less than 1.1m³ per minute.
- 47.3.6 The minimum requirements to the specifications of sound level meter should be as given in IS: 9779-1981. (However, monitoring is deleted).
- 47.3.8 Engineer will undertake baseline monitoring to establish background levels. Action Level of the Contractor shall be based on the results of baseline monitoring program, which will be made available to him prior to start of construction.
- 47.3.9 The Contractor's monitoring program is summarized in Table 1.

Table 1: Summary of Contractor's Monitoring Programme

Parameter	Air
Sampling	RSPM, SPM 24-hours of the day CO: 12 hours from 0800 to 2000 hrs
Frequency at each location	Two 24-hour samples every 15 days at uniform intervals
Locations	To be determined by the Contractor based on air sensitive receptors
Number of locations	Two locations
Duration of Monitoring by Contractor	During civil construction
Additional Requirements	Ad hoc monitoring as required

Monitoring Reports should be submitted every month along with the Monthly SHE Report

- 47.4 Event Contingency Plan :-** The Contractor shall prepare an Event Contingency Plan under his Site Environmental Plan. The purpose is to provide, in addition to monitoring activities, procedures for ensuring that if any environmental exceedance of limiting values (either accidental or through inadequate implementation of mitigation measures on part of the Contractor) does occur, the cause is quickly identified and remedied, and that the risk of a similar event recurring is reduced.

47.5 Air Quality

- 47.5.1 The Contractor shall take all necessary precautions to minimise fugitive dust emissions from operations involving excavation, grading, and clearing of land and disposal of waste. He shall not allow emissions of fugitive dust from any transport, handling, construction or storage activity to remain visible in atmosphere beyond the property line of emission source for any prolonged period of time without notification to the Employer.
- 47.5.2 The Contractor shall use construction equipment designed and equipped to minimise or control air pollution. He shall maintain evidence of such design and equipment and make these available for inspection by Employer.
- 47.5.3 If after commencement of construction activity, Employer believes that the Contractor's equipment or methods of working are causing unacceptable air pollution impacts then these shall be inspected, and remedial proposals shall be drawn up by the Contractor, submitted for review to the Employer and implemented.
- 47.5.4 In developing these remedial measures, the Contractor shall inspect and review all dust sources that may be contributing to air pollution. Remedial measures include use of additional / alternative equipment by the Contractor or maintenance / modification of existing equipment of the Contractor.

In the event that approved remedial measures are not being implemented and serious impacts persist, the Employer may direct the Contractor to suspend work until the measures are implemented, as required under the Contract.

- 47.5.5 Contractor's transport vehicles and other equipment shall conform to emission standards fixed by Statutory Agencies of Government of India or the State Government from time to time. The Contractor shall carry out periodical checks and undertake remedial measures including replacement, if required, so as to operate within permissible norms.
- 47.5.6 The Contractor shall establish and maintain records of routine maintenance program for internal combustion engine powered vehicles and equipment used on this project. He shall keep records available for inspection by Employer.
- 47.5.7 The Contractor shall cover loads of dust generating materials like debris and soil being transported from construction sites. All trucks carrying loose material should be covered and loaded with sufficient free-board to avoid spills through the tailboard or sideboards.
- 47.5.8 The Contractor shall promptly transport all excavation disposal materials of whatever kind so as not to delay work on the project. Stockpiling of materials will only be allowed at sites designated by the Employer. The Contractor shall place

excavation materials in the dumping/disposal areas designated in the plans as given in the specifications.

- 47.5.9 The temporary dumping areas shall be maintained by the Contractor at all times until the excavate is re-utilised for backfilling or as directed by Employer. Dust control activities shall continue even during any work stoppage.
- 47.5.10 The Contractor shall place material in a manner that will minimize dust production. Material shall be minimized each day and wetted, to minimize dust production. During dry weather, dust control methods must be used daily especially on windy, dry days to prevent any dust from blowing across the site perimeter.
- 47.5.11 The Contractor shall water down construction sites as required to suppress dust, during handling of excavation soil or debris or during demolition. The Contractor will make water sprinklers, water supply and water delivering equipment available at any time that it is required for dust control use. Dust screens will be used, as feasible when additional dust control measures are needed especially where the work is near sensitive receptors.
- 47.5.12 The Contractor shall provide a wash pit or a wheel washing and/or vehicle cleaning facility at the exits from work sites such as construction Depot and batching plants. At such facility, high-pressure water jets will be directed at the wheels of vehicles to remove all spoil and dirt.
- 47.5.13 The Contractor shall design and implement his blasting techniques so as to minimise dust, noise, vibration generation and prevention fly rock.
- 47.5.14 Blasting technique should be consistent not only with nature and quantity of rock to be blasted but also the location of blasting.
- 47.5.15 Contractor shall give preference to explosives with better environmental characteristics.
- 47.5.16 The Contractor shall protect structures, utilities, pavements roads and other facilities from disfiguration and damage as a result of his activities. Where this is not possible, the Contractor shall restore the structures, utilities, pavements, roads and other facilities to their original or better, failing which the rectification/restoration work shall be carried out at the risk and cost of the Contractor.
- 47.5.16 The Contractor shall submit to the Employer an Air Monitoring and Control Plan (AMCP) under contract specific Site Environmental Plan to guide construction activity insofar as it relates to monitoring, controlling and mitigating air pollution.

47.6 Air Monitoring

- 47.6.1 Construction activities that will generate dust impacts include excavation (including related activities), material handling and stockpiling, vehicular movement, and wind erosion of unpaved work areas.
- 47.6.2 The impact of fugitive dust on ambient air pollution depends on the quantity generated, as well as the drift potential of the dust particles injected into the atmosphere. Large dust particles will settle out near the source and smaller particles are likely to undergo dispersal over greater distance from the sources and impeded settling. SPM levels will be monitored to evaluate the dust impact during the construction phase of the Project.
- 47.6.3 The Air Quality Monitoring and Control Plan (AMCP) in contract-specific Site Environmental Plan prepared by the Contractor shall establish procedures to monitor impact air quality and measures to control air pollution including dust

suppression due to construction activities at work sites. This plan shall contain description of activities that will cause degradation in air quality, environmental procedures to manage pollutants to minimise the air pollution, monitoring program, record keeping and reporting.

- 47.6.4 The Engineer shall monitor Contractor's performance of tasks specified, and will inspect necessary records, reports & procedures related to the control of air quality given in AMCP.
- 47.6.5 Information gathered during the AMCP will be catalogued and maintained by the Contractor and shall be available for review by the Engineer.
- 47.6.6 The exact location of the air monitoring stations located near air sensitive receptors adjoining the construction sites, such as residences, schools, hotels and hospitals and placement of monitoring equipment thereat shall be agreed with the Engineer prior to commencement of air monitoring program.
- 47.6.7 Impact monitoring during the course of the Works shall be carried out at the monitoring stations for two days (continuous twenty-four hours) every fifteen days and where there is a perceived air quality problem.
- 47.6.8 The Contractor shall construct suitable fence, lockable gate, 220V AC power point and suitable access at each air monitoring station. Monitoring stations shall be free from local obstructions or sheltering.
- 47.6.9 Should impact monitoring record dust levels which are:
 - indicative of a deteriorating situation such that closer monitoring is reasonably indicated, or
 - when in the opinion of the Engineer additional measurements are required in view of deteriorating air quality,

Then the Engineer may require the Contractor to increase the frequency of impact monitoring at any one or more of the monitoring stations until the results indicate an improving and acceptable level of air quality.

- 47.6.10 The Contractor shall keep records of air quality monitoring (including location, date, time). The Contractor shall submit a copy of monitoring results to the Engineer. The results should represent a statistical evaluation of data by calculating maximum, minimum, mean, standard deviation, geometric mean and percentile calculations for evaluation of frequency distribution, trends, and comparison with emission standards.
- 47.6.11 The National Ambient Air Quality Standards given in Air (Prevention and Control of Pollution) Act, 1981 may be referred by the Contractor for Limit Levels of SPM in ambient air which may be followed in estimating the pollution level caused by Contractor's activities.
- 47.6.12 Where the Engineer determines that the recorded dust level is significantly greater than the Limit levels, the Engineer may direct the Contractor to take effective remedial measures including, but not limited to, reviewing dust sources and modifying working procedures.
- 47.6.13 Where the recorded baseline levels exceed the ambient air quality standards, then at such locations the action level is the recorded base line. Contractor shall take all effective remedial measures to contain the levels to their baseline value as a result of his activities. The action level may be varied by and at the sole discretion of the Engineer.

- 47.6.14 The Contractor shall inform the Engineer of all steps taken to investigate cause of accident and immediate action taken to avoid further accident through written reports and proposals for action under an Event Contingency Plan.

WATER QUALITY

- 1.300 The Contractor shall comply with the Indian Government legislation and other State regulations in existence in Pune insofar as they relate to water pollution control and monitoring. A drainage system should be constructed at the commencement of the Works, to drain off all surface water from the work site into suitable drain outlet.
- 1.301 The Contractor shall provide adequate precautions to ensure that no spoil or debris of any kind is pushed, washed, falls or deposited on land adjacent to the site perimeter including public roads or existing stream courses and drains within or adjacent to the site. In the event of any spoil or debris from construction works being deposited or any silt washed down to any area, then all such spoil, debris or material and silt shall be immediately removed, and the affected land and areas restored to their natural state by the Contractor to the satisfaction of the Employer.
- 1.302 Due to lowering of potable water supplies in Pune and subsequent contamination of ground water, the Contractor is not allowed to discharge water from the site without the approval of the Employer. The Contractor must comply with the requirements of the Central Ground Water Board for discharge of water arising from dewatering. Any water obtained from dewatering systems installed in the works must be either re-used for construction purposes and this water may subsequently be discharged to the drainage system or, if not re-used, recharged to the ground water at suitable aquifer levels. The Contractor must submit his proposals for approval of Employer, on his proposed locations of dewatering of excavation and collection of water for either construction re-use or recharge directly to aquifers. The Contractor's recharge proposals must be sufficient for recharging of the quantity of water remaining after deduction of water re-used for construction. During dewatering, the Contractor shall monitor ground water levels from wells to ensure that draw down levels do not exceed allowable limits. The Contractor will not be permitted to directly discharge, to the drainage system, unused ground water obtaining from the excavation without obtaining approval of Employer or the Agency controlling the system.
- 1.303 The Contractor shall ensure that earth, bentonite, chemicals and concrete agitator washings etc. are not deposited in the watercourses but are suitably collected and residue disposed off in a manner approved by local authorities.
- 1.304 All water and waste products (surface runoff and wastewater) arising on the site shall be collected and removed from the site via a suitable and properly designed temporary drainage system and disposed off at a location and in a manner, that will cause neither pollution nor nuisance.
- 1.305 Any mud slurry from drilling, diaphragm wall construction or grouting etc. shall not be discharged into the drainage system unless treatment is carried out that will remove silt, mud particles, bentonite etc. The Contractor shall provide treatment facilities as necessary to prevent the discharge of contaminated ground water.
- 1.306 The Contractor shall discharge wastewater arising out of site office, canteen or toilet facilities constructed by him into sewers after obtaining prior approval of agency controlling the system. A wastewater drainage system shall be provided to drain wastewater into the sewerage system.
- 1.307 The bentonite mixing, treatment and handling system shall be established by the Contractor giving due regard to its environmental impacts. The disposal of redundant

bentonite shall be carefully considered whether in bulk or liquid form. The disposal location will be advised and agreed with the relevant authorities.

- 1.308 The Contractor shall take measures to prevent discharge of oil and grease during spillage from reaching drainage system or any water body. Oil removal / interceptors shall be provided to treat oil waste from workshop areas etc.
- 1.309 The Contractor shall apply to the appropriate authority for installing bore wells for water supply at site.

ARCHAEOLOGICAL AND HISTORICAL PRESERVATION

- 1.310 The Contractor shall seek to accommodate archaeological and historical preservation concerns that may arise due to the construction of the project especially in close vicinity of such areas where such monuments may be located.
- 1.311 The Contractor shall consult the Archaeological Survey of India (ASI) and other parties, on the advise of the Employer, to identify and assess construction effects and seek ways to avoid, minimize or mitigate adverse effects on such monuments.
- 1.312 Adverse effects may include reasonably foreseeable effects caused by the construction that may occur later in time, be farther removed in distance or those that alter, howsoever temporarily, the significance of the structure.

LANDSCAPE AND GREENERY

- 1.313 As far as is reasonably practicable, the Contractor shall maintain ecological balance by preventing deforestation and defacing of natural landscape. In respect of ecological balance, the Contractor shall observe the following instructions.

50.1.2 Specific agreement from the Engineer is obtained prior to any clearing works.

50.1.3 Vegetation clearing chemicals is not permitted

50.1.4 Vegetation clearing using bulldozer is not permitted in zones less than 30 m from areas designated as sensitive by the Engineer, where only manual clearing is authorised.

50.1.4 Unless otherwise specified in the Contract or if otherwise instructed by the Engineer, burning vegetation is not permitted.

50.1.5 Areas cleared prior to undertaking earthworks are shown on a plan with a minimum scale of 1/10,000. Plans are submitted to the Engineer for validation prior to starting clearing works.

50.1.6 Clearing is undertaken without damage to adjacent non -cleared areas. Topsoil is stored within the cleared areas at the vedge of the cleared zone. Clearing is undertaken working from the edge of the zone inwards.

- 1.314 The Contractor shall, so conduct his construction operations, as to prevent any avoidable destruction, scarring or defacing of natural surroundings in the vicinity of work.

- 1.315 Where destruction, scarring, damage or defacing may occur as a result of operations relating to Permanent or Temporary works, the same shall be repaired, replanted or otherwise corrected at Contractor's expense. All work areas shall be smoothened and graded in a manner to conform to natural appearance of the landscape as directed by the Employer.

- 1.316 A suggested list of trees / shrubs suitable for planting and landscaping is found in Employer's Project SHE Manual.

FELLING OF TREES

- 1.317 The Contractor shall identify the number and type of trees that are required to be felled as a result of construction of works and facilities related to Project and inform the Employer.
- 1.318 All trees and shrubbery, which are not specifically require to be cleared or removed for construction purposes, shall be preserved and shall be protected from any damage that may be caused by Contractor's construction operations and equipment. The Contractor shall not fell, remove or dispose of any tree or forest produce in any land handed over to him for the construction of works and facilities related to Project except with the previous permission obtained from the Forest Department.
- 1.319 The Employer shall arrange permission from the forest department for trees to be felled or transplanted. The Employer will permit the removal of trees or shrubs only after prior approval.
- 1.320 Special care shall be exercised where trees or shrubs are exposed to injuries by construction equipment, blasting, excavating, dumping, chemical damage or other operation and the Contractor shall adequately protect such trees by used of protective barriers or other methods approved by the Employer. Trees shall not be used for anchorage.

FLY ASH

- 1.321 The Employer may require the Contractor to use fly ash as a percentage substitution of cement, in concrete for certain structures and works.
- 1.322 In all such uses of Fly Ash, the Contractor shall maintain a detailed record of usage of Fly Ash. The Contractor shall also collect related details and provide to the Employer.
- 1.323 The reporting details on consumption of Fly Ash are found in Employer's SHE Manual.

Biodiversity- :- Contractor shall ensure that all personnel are informed and aware of the importance to protect Fauna and flora. Information and awareness training is documented.

- 1.324 The Contractor shall ensure that all personnel are informed and aware of wildlife encounters procedures. Information and awareness training is documented.
- 1.325 Wherever possible areas shall be cleared from one side to another, or from the inside out, to prevent animals becoming trapped.
- 1.326 The Contractor personnel shall not approach, injure, hunt capture, possess feedc, transport, rear or trade wild animal and /or collect birds eggs while working on the project.
- 1.327 The con tractors personnel shall not collect flora species while working on the project.
- 1.328 The Contractor shall protect excavations with temporary fencing to prevent injury to animal.
- 1.329 The contractor shall release any trapped uninjured animals immediately and report the same to the Engineer.
- 1.330 The Contractor shall not start forest fires.
- 1.331 The Contractor shall not introduce invasive alien species
- 1.332 All construction machinery imported from overseas shall be inspected to detect IAS and washed before dispatching to the Project Areas.

- 1.333 The Contractor plans earthworks and optimises the management of space to ensure that all cleared surfaces and areas exposed to soil erosion are minimised on all Project Areas.

54 Erosion and Sediment Transport

- 54.1 The Contractor plans earthworks and optimises the management of space to ensure that all cleared surfaces and areas exposed to soil erosion are minimised on all Project Areas.
- 54.2 Top soil -unless indicated otherwise by the Engineer, the top 25 centimetres of the soil start of works and removal of topsoil. Barriers can be used for the will be considered as top soil.
- 54.3 Earthworks for the temporary occupation of the Project Area are preceded by the clearing of topsoil and the storage of this soil separately from underlying sterile soil.
- 54.4 Topsoil is stored according to the provision approved by the Engineer to enable reuse during Project Area rehabilitation.
- 54.2 Draining and rainwater run -off**
- 54.2.1 The gradient of Project Area allows the collection and drainage of rainwater from the entire surface area to one or several discharge points. No pools of water are created.
- 54.2.2 Suspended solids in rainwater are removed using sediment traps/settling ponds. Rainwater from vehicle parking areas, machinery areas, workshops is subject to treatment with only water separators.
- 54.2.3 Rainwater pre -treatment units are sized, cleaned, maintained and accessible to ensure compliance with the effluent quality criteria.
- 54.2.3 The Contractor installs sediment control barriers to slow the flow of water and control sediment transport at Project Areas with (i) a gradient of more than 20%and (ii) where land is disturbed by the works or where stockpiled mineral material exposed to sheer or rill erosion.
- 54.2.4 Sediment control barriers are installed on the slope or at the v base of the slope to protect the natural drainage system from sediment accumulation at levels higher than the natural situation. These barriers comply with the followi9ng principles
- a) Made with geo textiles or straw bales or any other means pre -approved b y the Engineer.
 - b) Deployed before the physical demarcation of working areas.
 - c) Installed cleaned, maintained & replaced according to manufacturer recommendations.
 - d) Drainage surface area does not exceed 1,000 m2 per 30 m of barrier. The length of the slope behind the barrier is less than 30 m and is not used for flows in excess of 30l/s.
- 54.3 Back filling and stockpiling of backfill materials
- 54.3.1 To ensure stability and resistance to rainwater runoff erosion. mineral material stockpiles do exceed a height of 6m, with a maximum slope of 3H:2V (height : volume).The slope is crossed at a height of 3 m by a berm with a minimum width of 2m and with a peripheral drainage trench.

- 54.3.2 For permanent backfill material stockpiles, the stockpiles is shaped and compacted every 30 cm to ensure long -term stability.
- 54.3.3 Temporary stockpiles for more than 60 days are protected against runoff erosion by (i) revegetation using fast growing grass species, either by direct seeding or by hydro seeding or (ii) using other natural anti-erosion cover with prior approval from the Engineer.
- 54.4.4 Side casting during the construction of linear structures (roads, pipelines, transport lines) will be permitted in the following conditions
- 54.4.5 For natural gradients with a slope <40% the side cast materials are piled to create a slope of less than 2H:IV

For natural gradients with a slope >40% to ensure stability 3m wide berms will be installed perpendicular to the slope and onto which the side cast material is deposited. Regular earthwork s to maintain the form of the side case and long term stability of the side cast is carried out .The slope of the side cast in general does not exceed 3H:2V

55 WASTE

- 55.1.1 The Contractor is required to develop, institute and maintain a Waste Management Programme (WMP) during the construction of the project for his works, which may include:
 - (i) Identification of disposal sites
 - (ii) Identification of quantities to be excavated and disposed off
 - (iii) Identification of split between waste and inert material
 - (iv) Identification of amounts intended to be stored temporarily onsite location of such storage.
 - (v) Identification of intended transport means and route.
 - (vi) Obtaining permission, where required, for disposal.
- 55.1.2 Such a mechanism is intended to ensure that the designation of areas for the segregation and temporary storage of reusable and recyclable materials are incorporate into the WMP. The WMP should be prepared and submitted to the Engineer for approval.
- 55.1.3 The Contractor shall handle waste in a manner that ensures they are held securely without loss or leakage thus minimizing potential for pollution. The Contractor shall maintain and clean waste storage areas regularly.
- 55.1.4 The Contractor shall remove waste in a timely manner and disposed off at landfill sites after obtaining approval of the competent authorities namely Pune Municipal Corporation etc.
- 55.1.6 Burning of wastes is prohibited. The Contractor shall not burn debris or vegetation or construction waste on the site but remove it in accordance with Clause 50.1 above.
- 55.1.7 The Contractor shall make arrangement to dispose of metal scrap and other saleable waste to authorized dealer and make available to the Employer on request, records of such sales.

- 55.1.8 The Contractor selects suppliers having a voluntary and documented policy to reduce the volume and weight of packaging, and to select recyclable or biodegradable packaging.
- 55.1.9 The Contractor establishes and maintains a waste register which is at the disposal of the Engineer. This register will record all waste management operations: production, collection, transport, treatment. The following aspects are documented in this register:
- a) Type of waste, using the nomenclature specified in Clause 53.12;
 - b) Waste quantities ;
 - c) Name and address of the third-party waste management facilities receiving waste or parties taking possession of the substances no longer considered as waste;
 - d) Name and address of waste transport contractors;
 - e) Planned waste treatment.
- 55.1.10 The contractor files and maintains at the disposition of the Engineer the waste manifests for the collection, transport, treatment and/or elimination of waste.
- 55.1.11 The waste register is established and available as of the Contractors mobilisation to the Worksite. This register will be archived for at least 1 year after the provisional acceptance of the works.
- 55.1.12 The Contractor implements specific waste management practices adapted to the level of danger for human health or the natural environment. Three waste categories are identified for Worksites and in Tracking documents:
- a) Hazardous waste: any waste with one or several dangerous properties as listed in appendix 2 of these SHE specifications.
 - b) Non-hazardous waste: any waste with no properties rendering it hazardous. Non-hazardous waste contaminated by hazardous material will be considered as hazardous waste, unless indicated otherwise by the Engineer.
 - c) Inert waste: any waste unaffected by any significant physical, chemical or biological modifications, which does not decompose, burn or produce any physical or chemical reaction, is not biodegradable and does not damage any substance with which it comes into contact in a manner likely to cause damage to the environment or human health.
- 55.1.13 The Contractor assesses, documents and effectively implements any local recycling or re-use options for its waste.
- 55.1.14 Waste is categorised and stored separately prior to removal from the Worksites, depending on the level of danger, phase (liquid, solid or gas), the waste management solution to be applied and its potential in terms of recycling or reuse.
- 55.1.15 Waste is collected from each Worksite at the same rate that it is produced and is placed in temporary locations meeting the following criteria:
- a) Located at a distance of over 100 m from any natural sensitive area and over 500 m from any socioeconomic sensitive area (school, market, healthcare centre, water well or catchment area), with the exception of waste storage area in camps.
 - b) Protected from moving machinery and vehicles, but easy to access for regular collection.

- c) Located on a flat impervious surface to prevent infiltrations.
 - d) Under cover for non-inert waste.
 - e) Stored in containers of the appropriate size, tightness and level of resistance depending on the danger and phase (solid, liquid, gas) of the waste.
 - f) Liquid wastes storage is equipped with secondary retention with a volume at least equal to the volume of the waste contained in the containers.
 - g) Hazardous waste stored pursuant to Clause 30.4.7 of the present SHE specifications.
- 55.1.16 Waste is removed from Worksites and transported to recycling, treatment and waste management facilities on a regular basis. The frequency of removal, approved by the Engineer, guarantees:
- a) No over flow from containers.
 - b) No unpleasant odour or emissions which are dangerous for human health.
 - c) No proliferation of insects, rodents, dogs or other animals which are harmful or dangerous for human health.
 - d) Regular cleaning of containers and surfaces on which they are located.
- 55.2 Unless otherwise specified in the Contract or instructed by the Engineer, waste incineration is prohibited on Worksites. Two exceptions are medical waste and green waste, which unless instructed to the contrary by the Engineer, are managed.
- 55.2.1 The use of third party waste management services is subject to a documented prior audit of the treatment, storage and recycling facilities by the Contractor, to guarantee the conformity with the provisions of the present ESHS specifications on waste.
- 55.2.2 The provisions applicable to the Contractor regarding waste management also apply to any third part waste management contractors. The Engineer reserves the right to inspect third party waste management facilities and prohibit the Contractor from using the facilities if considered unacceptable.
- 55.2.3 The management of non-hazardous waste complies with the following conditions.
- 55.2.4 Non-contaminated inert waste is removed and can be disposed of to landfill with unused backfill material. The location, capacity & environmental protection measures, particularly for water courses, implemented by the Contractor or subcontractor, will comply with the provisions of the present ESHS specifications.
- 55.2.5 Non-hazardous waste that cannot be recycled is disposed of to landfill, and complying with the following criteria :
- a) Walls and base sealed by a geo-membrane or a layer of compacted clay with a permeability 10^{-7} cm/s.
 - b) Drained for the recovery of leachates, which are routed to a lagoon aerobic/anaerobic treatment prior to discharge into the natural environment or collected in a temporary storage prior to regular collection and transfer to a treatment unit (septic tank or wastewater treatment plant).
 - c) Regularly compacted and covered by earth to limit odours and the proliferation of insects.

- d) When the landfill has reached full capacity, vents are installed to evacuate gases, and the landfill covered by a geo-membrane with a minimum thickness of 1 mm, or a layer of compacted clay, and a top layer of 1.5 m of topsoil, which is revegetated.

a. HAZARDOUS WASTE MANAGEMENT

56. If encountered or generated as a result of Contractor's activity, then waste classified as hazardous under the "Hazardous Waste (management, handling and trans-boundary movement) rules, 2007 and amendment 2008" shall be disposed off in a manner in compliance with the procedure given in the rules under the aforesaid act.
- 56.1 Chemicals classified as hazardous chemicals under "Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 of Environment (Protection) Act, 1986 shall be disposed off in a manner in compliance with the procedure given in the rules under the aforesaid act.
- 56.2 The Contractor shall identify the nature and quantity of hazardous waste generated as a result of his activities and shall file a 'Request for Authorisation' with State Pollution Control Committee along with a map showing the location of storage area.
- 56.3 Outside the storage area, the Contractor shall place a 'display board', which will display quantity and nature of hazardous waste, on date. Hazardous Waste needs to be stored in a secure place.
- 56.4 It shall be the responsibility of the Contractor to ensure that hazardous wastes are stored, based on the composition, in a manner suitable for handling, storage and transport. The labelling and packaging is required to be easily visible and be able to withstand physical conditions and climatic factors.
- 56.5 The Contractor shall approach only Authorised Recyclers of Hazardous Waste for disposal of Hazardous Waste, under intimation to the Employer.
- 56.6 Submittal of all environment related documents and records pertaining to monitoring and trend analysis on key parameters such as but not limited to consumption/efficient use of resources such as energy, water, material such as cement, fly ash, iron and steel, recycle/reuse of waste etc. that shall have demonstrated continual improvement in the implementation of Environmental Management System. In case of failure to do so, the Employer shall impose appropriate penalty as indicated under penalty clause.

b. ENERGY MANAGEMENT

- 57.1 The Contractor shall use and maintain equipment so as to conserve energy and shall be able to produce demonstrable evidence of the same upon Employer's request.
- 57.2 Measures to conserve energy include but not limited to the following:
1. Use of energy efficient motors and pumps
 2. Use of energy efficient lighting, which uses energy efficient luminaries
 3. Adequate and uniform illumination level at construction sites suitable for the task
 4. Proper size and length of cables and wires to match the rating of equipment
 5. Use of energy efficient air conditioners

The Contractor shall design site offices maximum daylight and minimum heat gain. The rooms shall be well insulated to enhance the efficiency of air conditioners and the use of solar films on windows may be used where feasible.

58 Part v- Local Labour and Relations with Local Communities

- 58.1 Labour Conditions- The Contractor should ensure decent labour conditions for workers and notably compliance with applicable Indian law and regulations. This includes Workers rights related to wages, working hours, rest and leave, overtime, minimum age, regular payment, compensation and benefits .The Contractor should respect and facilitate workers rights to organise & provide a grievance mechanism for all direct and indirect workers. The Contractor should implement non-discrimination and equal opportunity practices, and ensure prohibition of child or forced labour.
- 58.2 Local Recruitment
- 58.2.1 Local recruitment is defined as the number of positions actually allocated to people residing in the region of the Works (less than two hours by land transport to the Project Area) for more than one year and Indian Citizen.
- 58.2.2 The Contractor implements a voluntary local recruitment policy for its personnel for the duration of the Works and shall enforce this policy to its Subcontractors.
- 58.2.3 The Contractor demonstrates the effective implementation of this voluntary policy to the Engineer in its monthly activity report.
- 58.2.4 The Contractor develops a training programme aiming to support the voluntary local recruitment policy.
- 58.2.5 This training programme must be available to women and adjusted to their level of education.
- 58.2.6 An incentive mechanism to increase the share of women recruited by the Contractor and Sub Contractor may be established.
- 58.2.7 Local labour needs are estimated prior to the start of works and described in the worksite with following information
- a) Identification of positions that could be filled by local staff and the level of qualification required.
 - b) Definition of the planned procedure for the effective recruitment of these members of staff
 - c) Establishment of mechanisms to ensure non-discrimination of women in accessing recruitment procedures.
 - d) Deployment schedule for these positions.
 - e) Initial training to be provided by the Contractor for each job description.
- 56.2.8 In order to prevent outsiders from entering the Project Area, local recruitment at the Project Area, including at the entrance is prohibited.

59 Local Recruitment office

- 59.1.1 One month prior to the start of works, the contractor establishes a local recruitment office in the district where the main Project Area is located, at a location pre-approved by the Engineer.
- 59.1.2 A representative of the Contractor is present in this office at least two mornings each week, from the start of the works to a date pre-approved by the engineer.
- 59.1.3 The representative provides information on job vacancies with the Contractor for the execution of the works (required qualifications, duration and location) and on the information to be provided in applications.

- 59.1.4 Lists of local candidates are drafted by the representative allocated to the office and forwarded to the Contractor's human Resources manager on a weekly basis.
- 59.1.5- The Contractors Human Resources manager selects candidates listed by the local recruitment office based on requirements for the Works and the Contractor's recruitment procedures. A written contract between the Contractor and the local Contractors Personnel is drafted, signed and archived by the contractor.
- 59.1.6 If the Project Areas are located near to several different communities, the Human Resources manager ensures a fair distribution of local recruitment between the different communities.
- 59.1.7 The Human Resources manager will ensure that recruitment campaigns in local communities have been spread to women and that the latter have not been discriminated in recruitments.
- 59.1.8 The Contractor maintains one record per local Contractors Personnel indicating the housekeeper person allocated to the works, the type of tasks carried out, the wages paid, and any training provided. Records are available at the main Project Area at all times, so the Engineer and the authorised representatives of the government can assess the content.

60 Transport & Accommodation

- 60.1 Unless specified otherwise in the Contract, or instructed otherwise by the Engineer, the Contractor provides or enables access to daily transport for Contractor's Personnel not housed in the camps managed by the Contractor and living more than fifteen minutes' walk from the Project Area and less than one hour by land transport.
- 60.2 The transport is organised under conditions which comply with local regulations and which ensure the safety of the people transported.
- 60.3 The Contractor organises collective transport: pick -up times and locations are defined and services organised appropriately.
- 60.4 If the Project Area is moved during the working season and if the contractor retains the local personnel trained at the start of the works, the accommodation of the Contractor's Personnel is managed by the Contractor
- a) Within a mobile camp with the other non -local Contractor's Personnel: or
 - b) In villages located near to the mobile Project Area, in this case, each local Contractor's Personnel will receive a housing allowance in addition to his wages.

Part VI

61 Damage to People and Property

- 61.1 The Contractor shall not disturb or interfere with the inhabitants of local communities close to or in the Project Area, and shall respect their houses, cultures, animals, properties, customs and practices..
- 61.2 The Contractor is responsible for damages to people and property caused by the execution of the works or the procedures used for execution.
- 61.3 Access to the Project Area is prohibited to unauthorised persons. The Contractor is responsible for the security and access control of the Project Areas.
- 61.4 The Engineer is informed of any damage caused to people, or the property of individuals, other than the Contractor's personnel, within 6 hours of the event regardless of the value of the prejudice.

- 61.5 Housing existing before the start of the works, located within a minimum radius of 800 m around the perimeter of the quarries and within a minimum radius of 500 m around the other Project Areas that will be subject to blasting, will be examined by a bailiff unless agreed upon otherwise with the Engineer.
- 61.6 The Bailiff's sworn statement is prepared and provided to the engineer with the Environmental Protection Plan.
- 61.7 Should any problem be detected due to the intensity of blasting, the Engineer is entitled to request that the Contractor carry out seismic measurements of the intensity of the vibrations induced by the blasting, at variable distances from the blasting points, under the supervision of the Engineer, and at the cost of the contractor.

Part VII

62 Land Acquisition and Land Take

- 62.1 The Contractor will cover (1) occupancy indemnities for the extraction or use of construction materials & (2) the cost of acquiring the necessary land to stockpile excess backfill material.
- 62.2 The Contractor provides compensation for any prejudice suffered by the owners of the land mentioned in clause 60.1 above but also for any prejudice incurred by users of this land, if these users are not the same parties as the owners.
- 62.3 The Contractor demonstrates to the Engineer (i) who are the owner and the users, if different parties have been identified and (ii) a written agreement governing the temporary occupancy or acquisition of this land has been negotiated and duly paid up to the two parties, if different.

Part VIII

63. Traffic

- 63.1 The Contractor defines the characteristics of its fleet of vehicle and site machinery in the worksite, in the form of traffic management plan.
- 63.2 The Contractor defines in the traffic management plan the itineraries used on a map for each route between the different Project Areas and for each phase of the construction works, and obtains the validation of the Engineer. The Contractor requests that the Employer obtain the authorisations of the competent administrative authorities if public roads are used. By Engineer's instruction to update the traffic management plan shall be implemented.
- 63.3 Within one month of the physical start of works, the Contractor informs the administrative authorities of areas crossed by the Contractor's vehicles, of the itinerary and characteristics (frequency of passing, size and weight of trucks, materials carried) of the Contractor's fleet of vehicles.
- 63.4 If public roads are used, unless approved otherwise by the Engineer, the Contractor mandates the bailiff to make a sworn report regarding the state of road prior to use by the Contractor's vehicles. The report is annexed to the work site.
- 63.5 The Contractor describes in the traffic management plan the expected traffic created by its fleet of vehicles (frequency of trips between Project Areas, working hours, convoys)
- 63.6 The Contractor also describes the number and positioning of flagmen.

- 63.7 Unless specified otherwise in the Contract or instructed otherwise by the Engineer, heavy vehicles (i.e. With a GVWR of more than 3.5 tons) may not be used at night between 22.00 and 06.00
- 63.8 Speed Limits
- 63.8.1 The Contractor takes action to limit and check the speed of all vehicles and machinery used to execute the works.
- 63.8.2 The maximum speed of all machinery and vehicles of the Contractor comply with the lowest of the following. The speed limit defined according to the employer's country regulations or the following limits
- a) 10km/h within the Project Areas,
 - b) 30km/h in villages or hamlets, in towns, from 100 m before the first house.
 - c) 80km/h on unpaved roads outside of towns, villages, hamlets and camps.
- 63.8.3 In coordination with the competent Authorities, the Contractor provides and installs signs for the fleet of vehicles along public roads , when public signs are inadequate.
- 63.8.4 The Contractor provides each of its drivers with a map at the appropriate scale of the roads authorised for the execution of the works clearly indicating the maximum speeds authorised, and ensures their understanding.
- 63.9 It is strictly prohibited to transport people, equipment or products other than those required for the works and the management of Project Areas on board any of the Contractor's vehicles. The provision also applies to the transport of live animal and meat obtained from hunting, fishing or poaching.
- 63.10 The trailers, and skips used to carry materials which could be projected (sand, crushed material, aggregates, selected materials are covered with a tarpaulin for the entire itinerary between two Project Areas.
- 63.11 The Contractor carries out a regular inspection along the roads used by its fleet of vehicles to ensure compliance with the provisions of its clause 61.7 to 61.10 of the above specification. The Contractor records these inspections and the results and transmits a summary of checks carried out for the previous month to the Engineer on a monthly basis.

PART - VI: PENALTY AND AWARDS

64. CHARGES TO BE RECOVERED FROM CONTRACTOR FOR UNSAFE ACT OR CONDITION

- a. Maharashtra Metro Rail Corporation Limited intends to build an image of safety conscious organisation. Any reportable accident (fatality / injury) results in loss of life and/or property damage. These accidents not only result in loss of life but also damage the reputation of Maharashtra Metro Rail Corporation Limited. Most of the accidents are avoidable and caused preliminarily due to Contractors' negligence.

Hence Maharashtra Metro Rail Corporation Limited shall recover the cost of damages from the Contractors for every reportable incident (fatality / injury).

b. In addition, every Maharashtra Metro Rail Corporation Limited work site is exposed to public scrutiny as the work is executed just on the right-of-way. Any unsafe act / unsafe condition observed by public further damage Maharashtra Metro Rail Corporation Limited's reputation. In view of this, Maharashtra Metro Rail Corporation Limited has decided to establish safety-enforcing organisation. The cost of establishing such organisation is to be recovered from Contractors for all observed safety violations at sites.

c. The following table indicates the Safety, Health and Environment violation (unsafe act / unsafe condition) and charges to be recovered from contractors.

d.

SN	Topic	Unsafe Act / Unsafe condition	Range of Levels	Deductible Amount
1.	SHE Policy & Plan	i) SHE policy.	L1→L2	L1- Rs 5,000 per single violation, compounded to a maximum of Rs 25,000 at any single instance.
		a) non-compliance of clause 4.1		L2- Rs 10000 per single violation, compounded to a maximum of Rs 50,000 at any single instance.
		ii) SHE Plan	L1→L2	L1- Rs 100000 per single violation, compounded to a maximum of Rs 200000 at any single instance. L2- Rs 200000 per single violation, compounded to a maximum of Rs 400000 at any single instance.
		a) Not as per Employers' content and coverage (Clause 4.2,4.7)		
		b) Delay in submission (Clause 4.2, 4.4)		
		c) Not updated as per Employer's instruction as per Clause 4.4		
		d) Copies not provided to all required supervisors/engineers		
2.	SHE Organisation	Not complying to the minimum manpower requirements as mentioned in General Instruction Maharashtra Metro Rail	L1→L2	L1- Rs.100000 per month for first month and Rs 200000 for subsequent months.

		Corporation Limited /SHE/GI/001 (Clause 6.1.1)		L2- Rs.250000 per month for first month and Rs 500000 for subsequent months.
		Not filling up the vacancies created due to SHE personnel leaving the Contractor within 14 days. (Clause 6.7)		L1-Rs 50000 for first month and Rs 100000 for subsequent months. L2-Rs 150000 for first month and Rs 300000 for subsequent months.
		SHE organization not provided with required Audiovisual and other equipment's as per General Instruction. Maharashtra Metro Rail Corporation Limited /SHE/GI/012 (Clause 6.9.2)		L1- Rs 50000 for first violation and Rs 100000 for subsequent violations. L2- Rs 150000 for first violation and Rs 300000 for subsequent violations.
		Employing through outsourcing agencies and SHE personal are not in the payroll of the main Contractor. (Clause 6.5.1)		
		Disobedience/Improper conduct of any SHE personnel. (Clause 6.2)		
		Chief SHE Manager not reporting directly to CPM of Contractor. (Clause 6.6)		
3.	SHE Committee	Failed to formulate or conduct SHE Committee meeting for any month (Clause 7.4)	L1→L2	L1- Rs 100000 for the first violation and Rs 500000 for the subsequent violations. L2- Rs 200000 for the first violation and Rs 1000000 for the subsequent violations.
		Contractor and Sub-contractor representatives not attending SHE Committee meetings (Clause 7.10)		L1- Rs 5000 to the contractor of the member who had not attended the meeting for first violation and Rs 25000 for subsequent

				violations. L2- Rs 10000 to the contractor of the member who had not attended the meeting for first violation and Rs 50000 for subsequent violations.
		Failed to conduct Site inspection before conducting SHE Committee meeting (Clause 7.2.1 (viii))		L1-Rs 25000 for first violation and Rs 50000 for subsequent violations.
		Failed to send SHE Committee Meeting minutes or Agenda to Employer in time (Clause 7.8.1, 7.9.1)		L2-Rs 50000 for first violation and Rs 100000 for subsequent violations.
		Non-adherence of Clause 7.7.1		
		Non-adherence of Clause 7.9		
4.	ID Card	Non-adherence of Clause 8.1, 8.2 and 8.3	L1→L2	L1- Rs 100000 for first violation and Rs 200000 for subsequent violations. L2- Rs 250000 for first violation and Rs 500000 for subsequent violations.
5.	SHE Training	Not complying to the requirements as mentioned in conditions of contract on SHE and project SHE manual with regard to :	L1→L2	L1- Rs 50000 for first violation on & Rs 100000 for subsequent violations. L2- Rs 150000 for first violation on & Rs 300000 for subsequent violations.
		a) Induction training not given (Clause 8.1)		
		b) Supervisor/engineer/manager training not conducted as per Clause 9.6		
		c) Refresher training as per Clause 9.7 & 9.11 not conducted		

		d) Tool-box talk not conducted as per Clause 9.8		
		e) Skill development training not conducted as Clause 9.9		
		f) Daily Safety Oath not conducted as per Clause 9.1		
		g) Under ground construction training not given clause 13.2		
		h) Top management behavior based SHE training conducted (Clause 9.4)		
6.	SHE Inspection	i) Not complying to the requirements as mentioned in conditions of contract on SHE and project SHE manual as per Clause 10.0	L1→L2	L1- Rs 50000 for first violation on and Rs 100000 for subsequent violations.
		ii) Non-compliance of clause 10.3.6		L2- Rs 150000 for first violation on and Rs 300000 for subsequent violations.
7.	SHE Audit	Internal Audit : MARS i) Not conducted as per SHE Plan (Clause 11.2.1) ii) Report not sent to Employer (Clause 11.2.6) iii) Action not taken for any month (Clause 11.2.4)	L1→L2	L1- Rs 50000 for first violation on and Rs 100000 for subsequent violations. L2- Rs 150000 for first violation on and Rs 300000 for subsequent violations.
		External Audit i) Not conducted as per SHE Plan (Clause 11.4.3) ii) Report not sent to Employer (Clause 11.4.7) iii) Action not taken for any quarter (Clause 11.4.9)		L1-Rs 100000 for first violation and Rs 200000 for subsequent violations. L2-Rs 250000 for first violation and Rs 500000 for subsequent violations.
8.		Important days to be observed for SHE awareness as furnished	L1→L2	L1-Rs 10000 for first violation and Rs

	SHE Communication	by Employer not observed (Clause 12.2)		50000 for subsequent violations. L2- Rs 20000 for first violation and Rs 100000 for subsequent violations.
		Posters as furnished by Employer not printed and displayed (Clause 12.2)		L1- 2,00,000 per contract L2- 4,00,000 per contract
9.	SHE Submittals	Non-compliance of Clause 13.1	L1→L2	L1- Rs 50000 for first violation on & Rs 100000 for subsequent violations. L2- Rs 150000 for first violation on & Rs 300000 for subsequent violations.
		Non-compliance of Clause 13.2		L1-Rs 100000 for first violation and Rs 200000 for subsequent violations.
		Non-compliance of Clause 13.3		L2-Rs 250000 for first violation and Rs 500000 for subsequent violations.
10.	Injury and Incidence reporting	Fatal Accidents	L3	L3-Rs.500000 penalty & enforcement of embargo for first fatality, and Rs 1000,000 penalty and enforcement of embargo for every subsequent fatality.
		Injury Accident	L2→L3	L2-Rs 100000 for first grievously injured person and Rs 200000 for every subsequent grievously injured person (Grievous Injury as defined by

				<p>Workmen Compensation Act).</p> <p>L3- Rs 250000 for first grievously injured person and Rs 500000 for every subsequent grievously injured person</p>
		Abnormal delay in reporting accidents or willful suppression of information about any accidents/dangerous occurrence as per Clause 14.1.4	L2→L3	<p>L2-Rs 100000 for first violation and Rs 200000 for subsequent violations.</p> <p>L3-Rs 250000 for first violation and Rs 500000 for subsequent violations.</p>
		Non-compliance of the Clause 14.4	L2→L3	<p>L2- Rs 50000 for first violation on & Rs 100000 for subsequent violations.</p> <p>L3- Rs 200000 for first violation on & Rs 400000 for subsequent violations.</p>
		The contractor shall create a fund to cater, from which in any case of fatal accident or permanent disability, payments will be made to the aggrieved party over and above the statutory requirements.		
11.	Emergency preparedness Plan	Non-compliance of the Clause 15.1, 15.2, 15.3, 15.4, 15.5 and 15.6	L2→L3	<p>L2- Rs 100000 for non-compliance of any of the clauses.</p> <p>L3- Rs 200000 for non-compliance of any of the clauses.</p>
12.	House keeping	Housekeeping maintenance register not properly maintained up to date (Clause 17.4)	L1→L2	<p>L1- Rs 10000 per single violation Compounded to a maximum of Rs.100000 at any single instance.</p> <p>L2- Rs 20000 per single violation Compounded to a maximum of Rs</p>
		Surrounding areas of drinking water tanks/taps not hygienically cleaned/maintained(Clause17.4)		
		Office, stores, toilet/urinals not properly cleaned & maintained. (Clause 17.4)		

		Required dustbins at appropriate places not provided/not cleaned. (Clause 17.6)		200000 at any single instance.
		Stairways, gangways, passageways blocked. (Clause 17.9)		
		Lumber with protruding nails left as such (Clause 17.10)		
		Openings unprotected (Clause 17.7)		
		Excavated earth not removed within a reasonable time. (Clause 17.15)		
		Truck carrying excavated earth not covered / tires not cleaned. (Clause 17.11)		
		Vehicles / equipment's parked / placed on roads obstructing free flow of traffic (Clause 17.13)		
		Unused surplus cables / steel scraps lying scattered (Clause 17.17)		
		Wooden scraps, empty wooden cable drums lying scattered (Clause 17.18)		
		Water stagnation leading to mosquito breeding (Clause 42.6.1)		
13.	Working at Height / Ladders and Scaffolds	Not using or anchoring Safety Belt (Clause 18.9)	L2→L3	L1-Rs 10000 per single violation Compounded to a maximum of Rs 100000 at any single instance. L2-Rs 20000 per single violation Compounded to a maximum of Rs 200000 at any single instance.
		Not using Safety Net (Clause 18.18)		
		Absence of life line or anchorage point to anchor safety belt (Clause 18.19)		
		Non-compliance of Clause 18.17		
		Using Bamboo ladders (Clause 18.20)	L1→L2	

		Painting of ladders	L1→L2	L3-Rs 30000 per single violation
		Improper usage (less than 1m extension above landing point, not maintaining 1:4 ratio) (Clause 18.20)	L2→L3	Compounded to a maximum of Rs 300000 at any single instance.
		Aluminum ladders without base rubber bush (Clause 18.20)		
		Usage of broken / weak ladders (Clause 18.20)		
		Usage of re-bar welded ladders (Clause 18.20)		
		Improper guardRail, toe board, barriers and other means of collective protection (Clause 18.16)		
		Improper working platform (Clause 18.17)		
		Working at unprotected fragile surface (Clause 18.9)		
		Working at unprotected edges (Clause 20.0)		
14.	Lifting appliances and gear	Non-availability of fitness certificate as per Clause 21.3	L2→L3	L2-Rs 50000 per single violation Compounded to a maximum of Rs 500000 at any single instance. L3-Rs 100000 per single violation Compounded to a maximum of Rs 1000000 at any single instance.
		Documents not displayed on the machine or not available with the operator as per Clause 21.4		
		Maximum Safe Working Load not written on the machine as per Clause 21.5		
		Non-compliance of Clause 21.6		
		Non-compliance of Clause 21.7		
		Automatic safe load indicator not provided or not in working condition as per Clause 21.8		
		Age of the operator less than 21 years or without any license and non-compliance of other item as per Clause 21.9		

		Non-compliance of Clause 21.10		
		Non-compliance of any of the items mentioned regarding rigging requirements as per Clause 21.11		
		Failure to submit method statement in case of all critical lifting (Clause 21.3)		
		Person riding on crane. (Clause 23.4)		
		Creating more noise and smoke (Clause 43.1.1)		
		Absence of portable fire extinguisher in driver cabin (Clause 31.5)		
		Fail to guard hoist platform (Clause 24.0)		
		No fencing of hoist rope movement area (Clause 24.0)		
		Hoist platform not in the horizontal position (Clause 21.2)		
15.	Launching operation	Non-adherence of any of the provisions mentioned in Clause 22.2	L2→L3	<p>L2-Rs 50000 for first violation and Rs 100000 for subsequent violations.</p> <p>L3-Rs 150000 for first violation and Rs 300000 for subsequent violations.</p>
16.	Site Electrical Safety	Non-compliance of Clause 26.1.1	L2→L3	<p>L2-Rs 10000 per single violation Compounded to a maximum of Rs 100000 at any single instance.</p> <p>L3-Rs 20000 per single violation</p>
		Non-compliance of Clause 26.2.3, 26.2.4 & 26.2.5		
		Non-compliance of Clause 26.3.1		
		Non-compliance of Clause 26.7, 26.8 and 26.9.1		

		Non-compliance of Clause 26.10 and 26.13		Compounded to a maximum of Rs 200000 at any single instance
		Non-compliance of Clause 28.3.2		
		Exposed electric lines (fermentative damage) and circuits in the workplace. (Clause 26.5.1)		
		Inserting of wires directly into the socket		
		Improper grounding for the electrical appliances Clause 26.7.1)		
		Electrical cables running on the ground (clause 26.8.5 & 26.8.6)		
		Non-compliance Clause 27.0		
17.	Hand tools and Power tools	Non-compliance of Clause 28.0	L2→L3	<p>L2-Rs 10000 per single violation Compounded to a maximum of Rs 50000 at any single instance.</p> <p>L3-Rs 20000 per single violation Compounded to a maximum of Rs 100000 at any single instance.</p>
18.	Gas Cutting	Wrong colour coding of cylinder.	L2→L3	<p>L2-Rs 10000 per single violation Compounded to a maximum of Rs 50000 at any single instance.</p>
		Cylinders not stored in upright position. (Clause 29.1) Flash back arrester, non-return valve and regulator not present or not in working condition. (Clause 29.3 & 29.4)		

		Fail to put cylinders in a cylinder trolley. (Clause 29.1)		L3-Rs 20000 per single violation Compounded to a maximum of Rs 100000 at any single instance.
		Damaged hose and fail to use hose clamps (Clause 29.2)		
		Using domestic LPG cylinders (Clause 29.5)		
		Fail to store cylinder 6.6m away from fire prone materials (Clause 29.8)		
		Fire extinguisher not placed in the vicinity during operation (Clause 29.6)		
19.	Welding	Voltmeter and Ammeter not working (Clause 29.9)	L2→L3	L2-Rs 10000 per first violation and Rs 50000 for subsequent violations. L3-Rs 100000 per first violation and Rs 500000 for subsequent violations.
		Non-availability of separate switch in the transformer (Clause 29.9)		
		Improper grounding and return path. (Clause 29.10)		
		Damaged and bare openings in the welding cable. (Clause 29.10)		
		Damaged holder (Clause 29.10)		
		Fire extinguisher not placed in the vicinity during operation (Clause 29.6)		
20.	Fire precaution	Smoking and open flames in fire prone area (Clause 31.6)	L2→L3	L2-Rs 5000 per single violation Compounded to a maximum of Rs 25000 at any single instance. L3-Rs 10000 per single violation Compounded to a maximum of Rs 500000 at any single instance.
		Using more than 24V portable electrical appliances in the fire prone area (Clause 34.2.3)		
		Not proper ventilation in cylinder storage area. (Clause 29.8)		
		Absence of fire extinguishers (Clause 31.1)		
		Fire extinguishers not refilled once in a year. (Clause 31.2)		

		Fire extinguisher placed in a not easily accessible location		
21.	Excavation and confined space	Non-compliance of Clause 34.1.1	L2→L3	L2-Rs 10000 per single violation Compounded to a maximum of Rs 50000 at any single instance. L3-Rs 20000 per single violation Compounded to a maximum of Rs 100000 at any single instance.
		Non-compliance of Clause 34.2.3		
		Non-compliance of Clause 34.4		L2-Rs 10000 per first violation and Rs 50000 for subsequent violations. L3-Rs 100000 per first violation and Rs 500000 for subsequent violations.
22.	Work permit system	Non-compliance of Clause 35.2	L2→L3	L2- Rs 50000 per first violation and Rs 100000 for subsequent violations. L3- Rs 100000 per first violation and Rs 200000 for subsequent violations.
		Non-compliance of Clause 21.11.9		
23.	Traffic Management	Non-compliance of Clause 36.4.1	L2→L3	L2-Rs 100000 per first violation and Rs 200000 for subsequent violations. L3-Rs 250000 per first violation and Rs 500000 for subsequent violations.
		Non-compliance of Clause 36.8.3		
		Non-compliance of Clause 36.9.2		
		Non-compliance of Clause 36.9.3		
		Non-compliance of Clause 36.9.7		
		Non-compliance of Clause 36.9.8		
		Barricades (Clause 36.9.4)	L2	Rs 25000 per single violation Compounded to a

		i) Not Cleared, ii) Not in alignment, iii) Not numbered, iv) Not Painted, v) Red lights / reflectors not working, vi) Damages not repaired, vii) Not secured properly, viii) Barricade inspector not employed, ix) Protruding parts / portions repaired, x) Barricades maintaining register not properly maintained up to date		maximum of Rs 100000 at any single instance
		Contractor Vehicles (Clause 36.9.5 & 36.9.6) i) Over loading of vehicles, ii) Unfit drivers or operators, iii) Unlicensed vehicles, iv) Absence of traffic marshals v) Absence of reversing alarm vi) Absence of fog light (at winter) vii) Power / hand brakes not in working condition.	L2	Rs 25000 per single violation Compounded to a maximum of Rs 100000 at any single instance
		Splashing of Bentonite on roads / non-cleaning of tyres of dumpers and transit mixers (Clause 17.11 & 17.14) i) Mishandling of bentonite like splashing of bentonite outside specified width of barricading, ii) Non-cleaning of tyres of dumpers and transit mixers before leaving the site and thereby creating a traffic safety hazard to road users.	L2	a) Rs 100000 on first observation. b) Rs 200000 on second observation. c) Rs.300000 on third and subsequent observations
24.	Batching plant / Casting yard	Non-adherence of any of the provisions mentioned in Clause 38.0.	L2	Rs 10000 for single violation compounded to a maximum of Rs 100000 at any single instant.
25.	PPE (Personal Protective Equipment)	Not having (Clause 39.1)	L2→L3	L2-Rs 200 per single violation. L3-Rs 400 per single violation.
		Not wearing (or) using and kept it elsewhere (Clause 39.1)		
		Using damaged one (Clause 39.2)		
		Using wrong type (Clause 39.5)		

		Using wrong colour helmet or helmet without logo (Clause 39.4.1)	L1→L2	
		Using for other operation (e.g. Using safety helmet for storing materials or carrying water from one place to other) (Clause 39.5)	L2→L3	
		Not conforming to BIS standard (Clause 39.2)		L2-Rs 10000 for first violation and Rs 50000 for subsequent violations. L3-Rs 100000 for first violation and Rs 200000 for subsequent violations
		Non-compliance of Clause 39.6, 39.7 and 39.8		L2-Rs 50000 for first violation and Rs 100000 for subsequent violations. L3-Rs 100000 for first violation and Rs 200000 for subsequent violations.
26.	Occupational Health	Fail to conduct Medical examination to workers (Clause 42.1)	L1→L2	L1-Rs 10000 per single violation Compounded to a maximum of Rs 100000 at any single instance.
		Absence of ambulance van & room (Clause 42.3)		L2-Rs 20000 per single violation Compounded to a maximum of Rs 200000 at any single instance.
		Workers not having ID card (Clause 8.2)		L3-Rs 30000 per single violation Compounded to a maximum of Rs 300000 at any single instance.
		Absence of first-aid person in work site (Clause 42.4)	L2→L3	
		Absence or inadequacy of first-aid box (Clause 42.4)		
		Misuse of first-aid box (Clause 42.4)	L1→L2	
		First-aid box not satisfy the minimum Indian standard. (Clause 42.4)		

		Smoking inside the construction site (Clause 42.7.2)		
		Drink and drive or work (Clause 42.7.1)		
		Fumigation / insecticides not sprayed to prevent Mosquito breeding (Clause 42.6.3)		
		Non-compliance of Clause 44.1 and 44.2		
27.	Labour Welfare measures	Inadequate number of toilets (Clause 46.1.1)	L1→L2	L1-Rs 10000 per single violation Compounded to a maximum of Rs 50000 at any single instance.
		Toilets not cleaned properly (Clause 46.1.3)		L2-Rs 20000 per single violation Compounded to a maximum of Rs 100000 at any single instance.
		Toilet placed more than 500m from the work site (Clause 46.1.3)		
		Absence of water facilities for toilets and washing places (Clause 46.1.3)		
		Accommodation not provided as per BOCWA (Clause 46.5.1))		
		Absence of drinking water (Clause 46.4)		
		Excessive noise and vibration (Clause 43.0)		
		Canteen not provided (Clause 46.2)		
		Food stuff not served on no loss no profit basis (Clause 46.3)		
		Creche not provided (Clause 46.6)		
		Non-adherence of Labour welfare provisions of BOCWA (Clause 3.3.1.2)		
		Fail to register establishment and display the registration certificate at workplace (Clause 3.3.1.2)		

		Absence of workers register and records (Clause 3.3.1.2)		
		Absence of muster roll and wages register (Clause 3.3.1.2)		
		Fail to display an abstract of BOCWA and BOCWR (Clause 3.3.1.2)		
28.	Environmental Management	Tyre wash facility not provided (Clause 47.12)	L1→L2	L1-Rs 10000 per single violation Compounded to a maximum of Rs 50000 at any single instance.
		Spillage from vehicles not arrest (Clause 48.9)		L2-Rs 20000 per single violation Compounded to a maximum of Rs 100000 at any single instance.
		Air monitoring not practiced (Clause 47.17)		
		The values of air monitoring not within acceptable limits (Clause 47.17, 43.2.1)		
		Dust control measures at sites not practiced (Clause 47.13)		
		Improper disposal of debris / residues		
		Non-compliance of Clause 53.0 & 54.0		

- e. Without limiting to the unsafe acts and or conditions mentioned above in Clause 56.3 the Employer shall have the right to deduct charges for any other unsafe act and or condition depending upon the gravity of the situation on a case-to-case basis. The charges shall be in comparison with that of the similar offence indicated in Clause 56.3.
- f. Non-conformities detected during inspections carried out by the Engineer are subject to a process adapted to the severity of the situation. Non-conformities are divided into 4 categories as follows:
- Notification of observation of minor non-conformities. The non-conformity results in a notification to the on-site Contractor's representative, followed-up by a signed notification of observation prepared by the Engineer. The multiplication of notifications of observation at the Worksite, or absence of corrective actions by the Contractor, can result in the severity of the non-conformity being raised to that of level 1.
 - Level 1 non-conformity: Non-conformities that do not represent a serious immediate risk for health and environment. The non-conformity is the subject of a report addressed to the Contractor and which shall be resolved within five (5) days. The Contractor addresses to the Engineer a report explaining how

the non-conformity has been corrected. Further to an inspection and a favourable evaluation of effectiveness of the corrective action, the Engineer signs a close-out report for the non-conformity. In all cases where a non-conformity of level 1 is not resolved within one (1) month, the severity of the non-conformity is raised to level 2.

- iii. Level 2 non-conformities: applies to all non-conformities that have resulted in damage to health or the environment or which represent a high risk to health and the environment. The same procedure as for level 1 non-conformities is applied. Corrective action shall be taken by the Contractor within three (3) days. The Contractor addresses a report explaining the corrective actions implemented. All level 2 non-conformities which are not resolved within one (1) month, are raised to level 3.
- iv. Level 3 non-conformities: applies to all non-conformities that represent a risk with major consequences to health and the environment. The highest levels of the Contractor's and Engineer's hierarchies present in the Employer's country are informed immediately and the Contractor has twenty-four (24) hours to bring the situation under control. Clause 14.7 of the Particular Conditions of Contract (PC), a level 3 non-conformity results in the suspension of interim payments until the non-conformity has been resolved. If the situation requires, and in pursuance to Clause 8.8 of the PC, the Engineer can order the suspension of work until the resolution of the non-conformity.

65. STOPPAGE OF WORK

- g. The Employer shall have the right to stop the work at his sole discretion, if in his opinion the work is being carried out in such a way that it may cause accidents and endanger the safety of the persons and / or property, and / or equipment's. In such cases, the Contractor shall be informed in writing about the nature of hazards and possible injury / accident.
- h. The Contractor shall not proceed with the work until he has complied with each direction to the satisfaction of Employer.
- i. The Contractor shall not be entitled for any damages / compensation for stoppage of work, due to safety reasons and the period of such stoppage of work shall not be taken as an extension of time for Completion of the Facilities and will not be the ground for waiver of levy of liquidated damages.

66. AWARDS

The following categories will be considered for awards as per the scheme in practice of Employer:

- (i) For every safe million-man hour working without any reportable incidents
- (ii) Zero fatality contracts
- (iii) 100% adherence to voluntary reporting of all accidents throughout the currency of contract
- (iv) Safest project team of the year.
- (v) Best SHE team of the year.
- (vi) Safest Contractor of the year.

	MAHARASHTRA METRO RAIL CORPORATION LIMITED
<ul style="list-style-type: none"> • APPENDIX NO.: 1 	

i. Memorandum of Understanding between Maharashtra Metro Rail Corporation Limited and the Contractor for safe execution of contract work

This Memorandum of Understanding is made and executed by and between **MAHARASHTRA METRO RAIL CORPORATION LIMITED (MAHA-METRO)**, a Company registered under the Companies Act 1956 & having its registered office at XXXX or their authorized representative(s), hereinafter referred to as “**EMPLOYER**” (which expression shall wherever the context so requires or admits be deemed to mean and include its successors in business and assigns) of the one party

AND

M/s _____ having its registered office at _____ hereinafter referred to as the “**CONTRACTOR**” (which expression shall wherever the context so requires or admits be deemed to mean and include its successors in business and assigns) of the other party

WITNESSETH THAT

WHEREAS the EMPLOYER gives highest importance to the occupational safety, health and environment during execution of work, seeks cooperation from the CONTRACTOR in this endeavour.

Thus, this Memorandum of Understanding is for promoting the safety, health and environment aspects required to be followed at workplace/site and will be applicable to any site job to be done by the CONTRACTOR

AND

WHEREAS the CONTRACTOR has read all the terms and conditions of the EMPLOYER and whereas the CONTRACTOR has studied the following documents:

- (i) Tender Documents, including Notice Inviting Tender, General Conditions, Special Conditions;

- (ii) Conditions of Contract on Safety, Health and Environment and Project Safety, Health and Environment Manual;
- (iii) Building and Other Construction Workers (Regulations of Employment and Conditions of Service) Act 1996, Central Rules 1998 and subsequent Maharashtra BOCW Rules 2003, Building and Other Construction Workers Welfare Cess Act 1996 and Rules 1998 and notification [Central & State] Collection of cess.
- (iv) Indian Electricity Act 2003 and Rules 1956;
- (v) Corresponding International / Bureau of Indian Standard Codes.

Including the amendments to any of the above rules and any other rules & regulations or procedures, circulars, notices & advices laid down by the EMPLOYER from time to time.

Now it is hereby AGREED AND DECLARED by and between the EMPLOYER and the CONTRACTOR as follows:

- Clause - I The CONTRACTOR shall abide by the terms and conditions stipulated in Condition of Contract on Safety, Health & Environment and Project Safety, Health & Environment Manual.
- Clause - II The CONTRACTOR shall undertake full responsibility for safe execution of job at work place/site and safety of his personnel and adjoining road users during work.
- Clause - III Without giving any prior notice, the EMPLOYER shall from time to time be entitled to add/or amend any or all terms and conditions with a view to improving safety and occupational health of personnel and safety of work, with immediate effect and the same shall be binding on the CONTRACTOR. The Contractor agrees to implement all such amendments, which shall be laid down by the EMPLOYER.
- Clause - IV Besides following the guidelines, safety rules and regulations, safety codes given in various safety procedures/documents mentioned above, the CONTRACTOR shall also prepare detailed method statement which includes job safety analysis wherever there are complicated and hazardous/high risk working involved and get it approved from Employer before execution of work.
- Clause - V Any negligence or violation in implementing any of the provision of the conditions of contract on Safety, Health & Environment and Maharashtra Metro Rail Corporation Limited Safety, Health & Environment Manual shall be viewed seriously, and the Contractor is liable to compensate the Employer for the loss of reputation. The cost of damage shall be fixed on case-to-case basis.

In witness thereof, the Parties hereto by representatives duly authorised have executed this Memorandum of Understanding on _____ day of _____ 20____.

Signed on

Signed on

For and on behalf of Maharashtra Metro Rail Corporation Limited

For and on behalf of (Contractor)

Signature:


Signature:

Name:

Name:

Title:

Title:

	MAHARASHTRA METRO RAIL CORPORATION LIMITED
<ul style="list-style-type: none"> • APPENDIX NO.: 2 	

- ii. Safety, Welfare and Occupational Health requirements as per BOCW Act 1996 and Rules 1998 and Maharashtra BOCW Rules 2003

(This list has been prepared in chronological order with primary importance to Section of Act and secondary importance to Rules)

- S - Refers relevant Sections in BOCWA
R - Refers relevant Rules in BOCWR
C - Refers relevant Chapter No. in BOCWR
P - Refers to relevant rules in BOCWWCR 1998
G - Refers to relevant rules in Maharashtra BOCWR 2003


SN	Items	Relevant Sections / Rules in BOCWA and MBOCWR 2003
1.	Registration of establishment	S - 7, R - 23 to 27
2.	Display of registration certification at workplace	R - 26 (5)
3.	Hours of work	S - 28 R - 234 to 237
4.	Register of overtime	S - 28; S - 29 R - 241(1) Form XXII
5.	Weekly rest and payment at rest	R - 235
6.	Night shift	R - 236
7.	Maintenance of workers registers and records	S - 30 R - 238
8.	Notice of commencement and completion	S - 46 R - 239

SN	Items	Relevant Sections / Rules in BOCWA and MBOCWR 2003
9.	Register of persons employed as building workers	R - 240
10.	Muster roll and wages register	R - 241(1) (a); Form XVI and XVII
11.	Payment of wages	R - 248
12.	Display of notice of wages regarding	R - 249
13.	Register of damage or loss	R - 241(1)(a); Form XIX, XX, XXI
14.	Issue of wages book	R - 241(2)(a); Form XXIII
15.	Service certificate for each worker	R - 241(2)(b); Form XXIV
16.	Display an abstract of BOCWA and BOCWR	R - 241(5)
17.	Deduction of welfare cess by the government agencies	P - 4(3)
18.	Annual return	R - 242; Form XXV
19.	Drinking water	S - 32
20.	Latrines and Urinals	S - 33 R - 243
21.	Accommodation	S - 34
22.	Creches	S - 35
23.	First-aid boxes	S - 36 R - 231 and Schedule III
24.	Canteens	S - 37 R - 244
25.	Food stuff and other items served in the canteens	R - 245
26.	Supply of tea and snacks in work place	R - 246
27.	Food charges on no loss no profit basis	R - 247
28.	GBOCWR 2003 welfare Board Rules	
29.	Safety committee	S - 38 R - 208

SN	Items	Relevant Sections / Rules in BOCWA and MBOCWR 2003
30.	Safety officer	S - 38 R - 209 and Schedule VII
31.	Reporting of accidents and dangerous occurrences	S - 39 R - 210
32.	Procedure for inquiry in to the causes of accidents	R - 211
33.	Responsibility of employer	S - 44 R - 5
34.	Responsibility of Architects, Project engineer & Designers	R - 6
35.	Responsibility of workmen	R - 8
36.	Responsibility for payment of wages and compensation	S - 45
37.	Penalties and Procedures	S - 47; S - 55
38.	Excessive noise, vibration etc	R - 34
39.	Fire Protection	R - 35
40.	Emergency action plan	R - 36
41.	Fencing of motors	R - 37
42.	Lifting of carrying of excessive weight	R - 38
43.	Health, Safety and Environmental Policy	R - 39
44.	Dangerous and Harmful Environment	R - 40
45.	Overhead protection	R - 41
46.	Slipping, Tripping, Cutting, Drowning and Falling Hazards	R - 42
47.	Dust, Gases, Fumes, etc	R - 43
48.	Corrosive substance	R - 49
49.	Eye Protection	R - 45
50.	Head Protection and other protection apparel	R - 46; R - 54

SN	Items	Relevant Sections / Rules in BOCWA and MBOCWR 2003
51.	Electrical Hazards	R - 47
52.	Vehicular traffic	R - 48
53.	Stability of structure	R - 49
54.	Illumination	R - 50; R - 124
55.	Stacking of materials	R - 51
56.	Disposal of debris	R - 52
57.	Numbering and marking of floors	R - 53
58.	Lifting appliances and gears	C - VII; R - 55 to 81
59.	Runways and Ramps	C - VIII; R - 82 to 85
60.	Working on or adjacent to water	C - IX; R - 86 & 87
61.	Transport and earthmoving equipment's	C - X; R - 88 to 95
62.	Concrete work	C - XI; R - 96 to 107
63.	Demolition	C - XII; R - 108 to 118
64.	Excavation works	C - XIII; R - 119 to 168
65.	Ventilation	R - 153
66.	Construction, repair and maintenance of step roof	C - XIV; R - 169 to 171
67.	Ladders and Step ladders	C - XV; R - 172 to 174
68.	Catch platform & hoardings, chutes, safety belts and nets	C - XVI; R - 175 to 180
69.	Structural frame and formworks	C - XVII; R - 181 to 185
70.	Stacking and unstacking	C - XVIII; R - 186 & 187
71.	Scaffold	C - XIX; R - 188 to 205
72.	Cofferdams and Caissons	C - XX; R - 206 to 211
73.	Explosives	C - XXI; R - 212 & 213
74.	Piling	C - XXII; R - 214 to 222

SN	Items	Relevant Sections / Rules in BOCWA and MBOCWR 2003
75.	Medical Examination for building & other construction worker, Crane operator a Transport vehicle driver	R - 81; R - 223(a)(iii) and Schedule XII
76.	Medical examination for occupational health hazards	R - 223(a)(iv)
77.	Charging of workers for Medical Examination	R - 223(b)
78.	Occupational health centres and Medical officers	R - 225 and Schedule X & XI
79.	Ambulance van & room	R - 226 & 227 and Schedule IV & V
80.	Stretchers	R - 228
81.	Occupational health service for building workers	R - 229
82.	Medical examination for occupational health hazards	R - 223(a)(iv)
83.	Emergency care services and emergency treatment	R - 232
84.	Panel of experts and agencies	Central Rule 250
85.	Power of inspectors	Central rule 251 Maharashtra State Rules

	MAHARASHTRA METRO RAIL CORPORATION LIMITED
<ul style="list-style-type: none"> • APPENDIX NO.: 3 	


I. SITE SHE PLAN

Contract No	
Contractor Name	
Project Name	

1.	Project Highlights i) Title of the content ii) Contractor Number iii) Brief scope of work iv) Location map/ key plan v) Period of the project
2.	SHE Policy
3.	Site Organisation Chart Chart indicating reporting of SHE personnel
4.	Roles & Responsibility Individual responsibility of the: i) Project Manager ii) Construction Manager iii) Construction Supervisors iv) SHE Committee Members

	v) SHE In charge vi) Site Engineers vii) First Line Supervisors viii) Sub-contractors
5.	SHE Committee i) Details - Chairman, Members, Secretary and Employer's representative ii) Procedures for effective conduct of meeting
6.	SHE Training
7.	Subcontractor Evaluation, Selection and Control
8.	SHE Inspection
9.	SHE Audit
10.	Accident Investigation And Reporting Procedures
11.	Occupational Health Measures
12.	Labour Welfare Measures
13.	Risk assessment and mitigation procedures

14.	Safe Work Procedures <ul style="list-style-type: none"> i) Work at Height ii) Structural Steel Erection iii) Launching of segments iv) Floor, Wall Openings and Stairways v) Welding, Cutting and Bracing vi) Lifting appliances vii) Work Permit Systems viii) Electrical Equipment's ix) Mechanical Equipment's x) Excavation xi) Fire Prevention xii) Hazardous Chemicals and Solvents xiii) Ionising Radiation xiv) Lighting xv) Abrasive Blasting
15.	Work Permit System
16.	List of standard job specific PPEs to be used in the site
17.	Maintenance of Regime for construction Equipment and Machinery
18.	Traffic management
19.	Housekeeping
20.	Environmental Management
21.	Emergency Management
22.	Visitors and Security arrangement

	MAHARASHTRA METRO RAIL CORPORATION LIMITED
<ul style="list-style-type: none"> • APPENDIX NO.: 4 	

iv. WORKPLACE POLICY ON HIV/AIDS PREVENTION & CONTROL FOR

WORKMEN ENGAGED BY CONTRACTORS

“Being mobile in and of itself is not a risk factor for HIV infection. It is the situations encountered and the behaviours possibly engaged in during mobility or migration that increase vulnerability and risk regarding HIV / AIDS.”

UNAIDS, Technical update on ‘Population, Mobility and AIDS’, February 2001, p.5

Maharashtra Metro Rail Corporation Limited recognizes HIV / AIDS as a developmental challenge and realizes the need to respond to it by implementing regular HIV / AIDS prevention programmes and creating a non-discriminatory work environment for HIV infected workmen engaged by contractors. For the purpose, of making conscientious, sensitive and compassionate decision in addressing the realities of HIV / AIDS, Maharashtra Metro Rail Corporation Limited has established these guidelines based on ILO code of practice on HIV / AIDS.

- Creating awareness through professional agency using IEC (Information, Education and Communication) package specially designed for migrant workers.
- Institutional capacity building by training the project implementation team, Safety, Health & Environment (SHE) Managers, establishing linkages for efficient diagnosis and treatment of the affected workers, effective monitoring of implementation and documentation for further learning.
- Establishing peer educators by selecting them in consultation with Contractors and training them through professional agencies so that they become focal point for any information, education and awareness campaigns among the workmen throughout the contract period.
- Promotion of social marketing of condoms through State Aids Control Society

	MAHARASHTRA METRO RAIL CORPORATION LIMITED
<ul style="list-style-type: none"> General Instruction: Maharashtra Metro Rail Corporation Limited /SHE/GI/001 	

MINIMUM MANPOWER REQUIREMENTS OF SHE ORGANIZATION BASED ON CONTRACT VALUE

	1	2	3	4	5	6	7	8	9	10	11	12	13
Awarded Contract value (in Rs Cr.)	Chief SHE Manager	Senior SHE Manager	Junior SHE Manager	afety Steward	Senior SHE (Electrical) Engineer	Junior SHE (Electrical) Engineer	* Junior SHE (Fire) Manager / **Senior SHE (Fire)	Occupational Health officer with Necessary Nursing	Environmental Manager	enior SHE (Traffic) Engineer Refer Note 4)	arricade Maintenance Squad Refer Note 4)	House Keeping Squad	Labour Welfare Officer
Upto 2	-	-	1	Refer Note 1	-	1	-	-	-	-	Refer Note 5	Refer Note 6	-
Upto 10	-	1	Refer Note 1		1	Refer Note 2	-	1 (PT)	1	1			1
Upto 25	1	Refer Note 1			1		1*	1 (PT)	1	1			1
Upto 100	1				1		1*	1 (FT)	1	1			1
Upto 250	1				1		1**	2 (FT)	1	1			1 with support staff
More than 250	1				Refer Note 1		Refer Note 1	1	2**	2 (FT)			1 with support staff

Note 1: Adequate, qualified and trained SHE Professionals with required support staff to be deployed at each worksite at each shift.

Note 2: Adequate, qualified and trained Electrical Engineers / supervisors to be deployed at each worksite at each shift.

Note 3: (PT) means Part-Time and (FT) means Full-time.

Note 4: Senior SHE (Traffic) Engineer Post & Barricade Manager (including the staff) Posts are applicable to contracts where the work has to be executed either below or over the

right-of-way like Viaduct Contracts wherein erection and maintenance of barricades are paramount important.

Note 5: One Barricade Manager supported by required supervisors and workmen.

Note 6: One Housekeeping Manager supported by required supervisors and workmen.

Note 7: The Contractor appoints a person responsible for relations with external stakeholders for the site: local communities, administrative authorities, and representatives of economic activities located within one-hour travel from the Worksite. This person will be based on the Worksite on a permanent basis. Administrations and local authorities will be informed of the existence of this person as of the start of works and will be provided with telephone contact details so as to be able to contact this person if a problem arises during the execution of works or concerning the behaviour of the Contractor's employees outside the Worksite.

	MAHARASHTRA METRO RAIL CORPORATION LIMITED
<ul style="list-style-type: none"> General Instruction: Maharashtra Metro Rail Corporation Limited /SHE/GI/002 	

vi. MINIMUM QUALIFICATION AND EXPERIENCE FOR (SHE) SAFETY, ELECTRICAL, ENVIRONMENTAL, TRAFFIC ENGG. AND OCCUPATIONAL HEALTH PROFESSIONALS

SN	Designation	Qualification	Experience (in years)
1	Chief SHE Manager	<p>The Chief SHE Manager shall have qualified in any of the following degree/diploma:</p> <ul style="list-style-type: none"> i) Post Graduate Diploma in Industrial Safety & Environmental Management (PGDISEM) from National Institute of Industrial Engineering, Mumbai ii) M.E.in Industrial Safety from NIT, Trichy, Tamil Nadu iii) M.E. in Industrial Safety from MepcoSchlenk Engineering College, Sivakasi, Tamil Nadu iv) B.E. in Fire and Safety Engg. From Cochin University of Science and Engg. Cochin, Kerala v) B.E. with advanced Safety Management Diploma from CLI/RLI Mumbai/Chennai/Kolkata and Kanpur. vi) B.E / B.Arch., with one year <u>Full Time</u> advanced Safety diploma from NICMAR, Hyderabad. vii) B.E / B.Tech with any other equivalent State and Central Govt. recognized full time Degree / Diploma in Safety. viii) International qualifications like CSP (Certified Safety Professional), NEBOSH, MIOSH, MSISO etc. 	2 {for all category except (iv) and 5yrs for category (iv)}
2	Senior SHE Manager	As stated in SN1 & in addition the following categories:	2 {for category (i), (ii) and (iii) only}

SN	Designation	Qualification	Experience (in years)
		i) B.Sc.(Physics/Chemistry/Maths) with one year Full Time advanced Safety diploma from NICMAR, Hyderabad ii) B.Sc. / Diploma in Engg with advanced Safety Management Diploma from CLI / RLI / Mumbai / Chennai / Kolkata and Kanpur. iii) B.Sc. (Physics/Chemistry/Maths) with One year Full Time diploma in Safety Engineering offered by West Bengal State Technical Education Departments and similar courses by other states. iv) Any Graduate or diploma holder with 7 years of work experience in full fledged SHE department of any Public Sector/Leading Private Sector/MNC/with prior approval of employer on a case to case basis	
3	Junior SHE Manager	i) Degree in Science/Diploma in Engineering with Govt. recognized safety diplomas from Correspondence course of NICMAR, Annamalai University, National & State Productivity Councils, Other State Technical Education Boards etc. ii) Any Graduate or diploma holder with 5 years of work experience in full fledged SHE department of any Public Sector / Leading Private Sector / MNC / with prior approval of employer on a case to case basis	2 (for category (i) only)
4	Safety Steward	Any basic qualification with any SHE related certificate courses.	2
5	Senior SHE (Electrical) Manager	Degree in Electrical Engineering + Govt. recognized Electrical Licence holder	2
6	Junior SHE (Electrical) Manager	Diploma in Electrical Engineering + Govt. recognized Electrical Licence holder	1
7	Senior SHE (Fire) Manager	i) B.E. (Fire) from National Fire Service College, Pune ii) B.E (Fire & Safety) from Cochin University	2 (for category (i) and (ii) only)

SN	Designation	Qualification	Experience (in years)
		iii) Graduate with any Govt. recognized diploma in Fire Safety with 5 years of experience	
8	Junior SHE (Fire)Manager	Any Diploma holder with any Govt. recognized diploma in Industrial Fire Safety.	1
9	Occupational Health Officer	MBBS with Govt. recognized degree/diploma in Industrial/ occupational health	1
10	Environment Manager	Govt. recognized PG Degree / PG Diploma / Degree in Environmental Engineering / Science	2
11	Senior SHE (Traffic) Engineer	Govt. recognized PG Degree / Degree / Diploma in Traffic/Transportation Engineering or Planning	1
12.	House Keeping Squad - Manager	Any Diploma in Engineering	1
13	Barricade Manager	Any Diploma in Engineering	1
14	Labour Welfare Officer	Any Degree with Govt. Recognized Degree / Diploma / P G Diploma in Labour Welfare related fields like Law, Personnel / Industrial Relations etc.	2

Note 1: In some extraordinary cases where the candidate had earlier worked in any metro projects in India, they can be considered for the following posts:

- Senior SHE Manager
- Junior SHE Manager
- Safety Steward

depending upon the qualification and number of years of experience on a case-to-case basis even if they do not possess the prescribed qualification as listed above.

Note 2: In all other cases other than listed under Note 1 irrespective their earlier experience with metro projects in India the candidates shall qualify as specified above.

	MAHARASHTRA METRO RAIL CORPORATION LIMITED
<ul style="list-style-type: none"> General Instruction: Maharashtra Metro Rail Corporation Limited /SHE/GI/003 	

vii. **MINIMUM REQUIREMENTS OF SHE MONITORING AND AUDIO-VISUAL EQUIPMENTS**

- For the purpose of minimum requirements of Audio-visual and Other equipment the contracts are categorized into the following groups:


Contract Value (Initial awarded value of contract)	Group
Upto 25 Cr	A
Upto 100 Cr	B
Upto 250 Cr	C
More than 250 Cr	D

- Every contractor falling into the above groups shall provide the following minimum required audio-visual aids for conducting weekly review, monthly safety committee and other post review meeting of all fatal and major incidences effectively. These audio-visual equipment's are a must for conducting periodical in-house safety presentations in the training programmes.
- In addition to the above portable hand held digital sound level meter (SLM) and portable hand held digital lux meter are also to be provided.

SN	SHE monitoring and Audio-Visual Equipment details	SHE monitoring and Audio-Visual equipment required for			
		Group A Contract	Group B Contract	Group C Contract	Group D Contract
1.	Portable hand held Digital Sound Level Meter (SLM) Noise Monitoring deleted	1	1	1	1
2.	Portable hand held Digital Lux Meter	1	1	1	1

SN	SHE monitoring and Audio-Visual Equipment details	SHE monitoring and Audio-Visual equipment required for			
		Group A Contract	Group B Contract	Group C Contract	Group D Contract
3.	Laptop Computer with standard configuration including multimedia facilities	1	1	1	1
4.	Colour Printer	1	1	1	1
5.	Computer projector with screen	-	1	1	1
6.	Overhead projector	1			
7.	35mm Camera (For taking accident investigation photos in which case the images cannot be easily altered)	1	1	1	1
8.	Digital camera with flash of minimum 4 mega pixel and video facility	1	1	1	2
9.	Digital still camera with flash of minimum 4 mega pixels	1	2	4	6
10.	Portable loudspeaker (for tool-box talk and emergency purpose)	1	1	2	6
11.	Communication facility like mobile phone, walky-talky etc	For all supervisors and managers/engineers working in Safety, Health & Environment			
12.	Accident investigation Kit containing the following:	1	1	1	2
a)	Chalk piece for marking				
b)	Measuring tape for measuring Flexible tape - 2m length Metal Foot long scale and Metal tape - 30m				
c)	Equipment tags				
d)	Multipurpose Flash light				
e)	Barrier tape of 20m length				
f)	Accident investigation Forms and checklists				

SN	SHE monitoring and Audio-Visual Equipment details	SHE monitoring and Audio-Visual equipment required for			
		Group A Contract	Group B Contract	Group C Contract	Group D Contract
g)	Enough Paper for witness recording and other noting				
h)	Emergency Phone Numbers list				

	MAHARASHTRA METRO RAIL CORPORATION LIMITED
<ul style="list-style-type: none"> • General Instruction: Maharashtra Metro Rail Corporation Limited /SHE/GI/004 	

viii. Topics for First day at work SHE orientation training of Workmen

1. Hazard Identification Procedure

Hazards on site:

- Falls
- Earthing work
- Electricity
- Machinery
- Handling materials
- Transport
- Site housekeeping
- Fire

2. Personal Protective Equipment

- What is available?
- How to obtain it?
- Correct use and care

3. Health

- Site welfare facilities
- Potential health hazards
- First Aid/Cardio-Pulmonary Resuscitation (CPR)

4. Duties of the Contractor

- Brief outline of the responsibilities of the Contractor by law
- Details of Contractor's accident prevention policy
- Maharashtra Metro Rail Corporation Limited's SHE manual

- Building and other Constructions Welfare Law

5. Employee's Duties



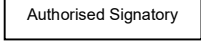
- Brief outline of responsibilities of employee under law
- Explanation of how new employees fit into the Contractor's plan for accident prevention. (Induction and orientation).

	<p align="center">MAHARASHTRA METRO RAIL CORPORATION LIMITED</p>
<ul style="list-style-type: none"> General Instruction: Maharashtra Metro Rail Corporation Limited /SHE/GI/005 	

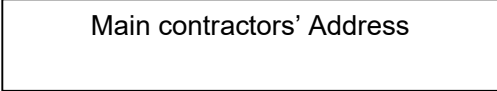
ix. ID Card Format

(85 mm x 55mm)

Front side of ID card:

Pune Metro Rail Project	
	Name & Address of Main / Sub / Labour contractor
Name: Designation: Blood Group: Valid up to:	
<div align="right">  </div>	

Backside of ID card:

Employee Address: _____ _____ _____
<div> <p>1 This card is the property of "XX"(Main / Sub / Labour Contractor) and must be returned on demand and on transfer / cancellation of employment.</p> <p>2 A charge will be levied for replacement of the card due to loss or theft</p> <p>3 If found please return it to:</p> </div>
<div align="center">  </div>

	MAHARASHTRA METRO RAIL CORPORATION LIMITED
<ul style="list-style-type: none"> General Instruction: Maharashtra Metro Rail Corporation Limited /SHE/GI/006 	

x. SHE Training details for Managers and Supervisors

1. The Law and Safety	2. Policy and Administration
Statutory requirement Appropriate regulations Duties of employer and employee	Effect of incentive on accident prevention Human relations Consultation Safety Officer: duties, aims, objectives
3. Safety and the Supervisor	4. Principles of Accident Prevention
Safety and efficient production go together Accidents affect morale and public relations	Attitudes of management, supervision and operations Methods of achieving safe operations Accident and injury causes
5. Site Inspection	6. Human Behaviour
The role of management Hazard Identification Procedure Records results Follow-up procedures Feedback	Motivating agencies Individual behaviour Environmental effects Techniques of persuasion
7. Site housekeeping	8. Health
Site organization Relationship of site housekeeping to accident occurrence Site access Equipment storage Material stacking	Medical examination Hazard to health on site Sanitation and welfare Protective clothing First Aid/CPR

Materials handling	
9. Personal Protective Equipment	10. Electricity
Eye, face, hands, feet and legs Respiratory protective equipment Protection against ionizing radiation	Appreciation of electrical hazards Power tools Arc welding Low voltage system Lighting and power system on sites ELCB, RRCB, Grounding/Ground fault circuit interrupters (GFCIs)
11. Oxygen and Acetylene Equipment	12. Equipment
Cylinder storage and maintenance Condition and maintenance of valves, regulators, and gauges Condition and maintenance of hoses and fittings Pressures	Accidents related to moving parts of machinery Appreciation of principles of guarding Importance of regular maintenance
13. Transportation	14. Excavations
Transport to and from site Hazard connected with site transport Competent drivers Dumpers Tipping trucks Movement near excavations	Method of shoring Precautions while shoring Precautions at edge of excavations Removal of shoring Sheet steel piling
15. Working platforms, Ladders, and Scaffolding	16. Cranes and other Lifting Machines
Hazards connected with the use of ladders Maintenance and inspection Type of scaffold Overloading Work on roofs Fragile material	Licensing, certification and training required for operation of cranes Slings methods Signalling Access to crane(s) Maintenance and examination

Openings in walls and floors	Ground conditions
Use of safety belts and nets	Hazards and accident prevention methods connected with the use of different types of cranes/heavy equipment
	Crane Lift Plan for all lifts
17. Lifting Tackle	18. Fire Prevention and Control
Slings - single and multi-legged	Principle causes determining fire
Safe working loads (SWLs)	Understanding fire chemistry
Safety hooks and eyebolts	Fire fighting equipment
Cause of failure	Fire fighting training
Maintenance and examination	
19. Communications	20. Manual Handling
Effective methods of communication (particular interest to non-English speaking workers)	Body posture and procedure for lifting, pushing, pulling, dragging, sitting and walking
Method and preparation of reports	Ergonomics
Safety committees	Stretching exercises
Safety meeting	

	<p style="text-align: center;">MAHARASHTRA METRO RAIL CORPORATION LIMITED</p>
<p style="text-align: center;">• General Instruction: Maharashtra Metro Rail Corporation Limited /SHE/GI/007</p>	

xi. SHE Training Matrix

Types of training	Management														Supervisor										Specific																					
	SHE Orientation	SHE Leadership	SHE Plan	SHE Improvement Plan	Management of Change	SHE Audit & Inspection	SHE Emergency Response & Preparedness	Incident/Accident Investigation & Reporting	SHE Communication	SHE Promotion & Incentives	Traffic Management	Hazard Identification & Risk Analysis	Permit to work system	Confined space entry	Scaffolding	Waste Management	Environment Monitoring	Labour welfare measures	Behavioural Based Safety	Job/Task Safety Analysis (JSA)	Safety Training Observation	Industrial First Aid & CPR	Incident / Accident Investigation & Reporting	Fire fighting	Confined Space, Testing & Inspection	Rigging	Wire Rope Inspection	Crane Inspection	Electrical / Mechanical Isolation	Permit to Work System	Confined Space Working	Explosive Handling & Control	Heavy Lifting Operation	Radiography (X-Ray)	HAZMAT Handling & Control	Welding, Cutting & Bracing	Power Actuated Hand Tool	Electrical/Mechanical Isolation	Roofing Work	Steel erection work	Scaffold Erection/Dismantling	False-work Erection / Dismantling	Painting in Confined Area			
Project Manager	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Sr. Construction Managers	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Quality Manager	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Planning engineer	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Construction Managers	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Construction Supervisors	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

Construction Foreman	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Machinery Operators	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Material Handlers	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Station Building Workers	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Steel workers	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Mechanical workers	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Other Civil workers	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Electrical workers	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Radiographers	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Transportation Drivers	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Security Officers	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Clerical Staff	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Medical Doctor	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

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xii. DAYS TO BE OBSERVED FOR CREATING SHE AWARENESS

1 st Monday to Sunday of January	Road Safety Week (Subjected to confirmation from Ministry of Road Transport, Govt. of India every year.)
16 th February	Kyoto Protocol Day
March	Red Cross Month
4 th March	National Safety Day
7 th April	World Health Day
14 th April	Fire Safety Day
April 18 to 22	Earth Week
20 th April	Earth Day
20 th April	Noise Awareness Day
28 th April	ILO World Day for Safety and Health at Work

May 1 to 7	Emergency Preparedness Week
5 th June	World Environmental Day
12 th June	World Day against Child Labours
9 th July	Occupational Health Day
17 th October	World Trauma Day
1 st December	World AIDS Day

	MAHARASHTRA METRO RAIL CORPORATION LIMITED
<ul style="list-style-type: none"> General Instruction: Maharashtra Metro Rail Corporation Limited /SHE/GI/009 	

xiii. Minimum Requirements of SHE Communication Posters / Signages / Video

- For the purpose of Minimum requirements of SHE Communication Posters / Signages / Video the contracts are categorized into the following groups:

Contract Value (Initial awarded value of contract)	Group
Upto 25 Cr	A
Upto 100 Cr	B
Upto 250 Cr	C
More than 250 Cr	D

- Every contractor falling into the above groups shall prepare a SHE Communication Plan as a part of site specific SHE Plan and shall include the following minimum requirement of Posters / Signage's / Video as applicable. In case readymade posters are available in any of the category from National Safety Council, Loss Prevention Association of India or any other safety related organisations they may procure the same and display it. In case the same is not available then the contractors shall make necessary arrangements to get the posters designed and printed on their own.

All the above are to be detailed in the Site SHE Plan and get an approval from the Employer before displaying the posters.

Table 1: Minimum number of Posters

SN	SHE Poster Title	Min No. of concepts in each title	No. of Posters / Signage / Video			
			Group A Contract	Group B Contract	Group C Contract	Group D Contract
1.	Safety Culture	5	Each 10	Each 50	Each 75	Each 100
2.	Daily Safety Oath	1 English, 1 Hindi	Each 100	Each 200	Each 500	Each 1000
3.	Mandatory PPE Usage					
a)	Signages to display the messages like PPE ZONE, NO PPE ZONE, HARD HAT AREA etc.	2 types of sizes made up of metal sheet to be mounted at different locations	Each 25	Each 50	Each 75	Each 200
b)	Helmet	5	Each 25	Each 50	Each 75	Each 200
c)	Shoe	5	Each 25	Each 50	Each 75	Each 200
d)	Goggles & Ear Protection	5	Each 25	Each 50	Each 75	Each 200
e)	Full Body Harness	5	Each 25	Each 50	Each 75	Each 200
f)	Hi-Vi Jacket	5	Each 25	Each 50	Each 75	Each 200
4.	Emergency Management Plan	5	Each 25	Each 50	Each 75	Each 200
5.	Working at Heights	10	Each 25	Each 50	Each 75	Each 200
a)	Ladder, Stairway, Scaffold - Signages to display the messages like SAFE, UNSAFE, FIT	5 types of sizes made up of metal sheet to be	Each 25	Each 50	Each 75	Each 200

SN	SHE Poster Title	Min No. of concepts in each title	No. of Posters / Signage / Video			
			Group A Contract	Group B Contract	Group C Contract	Group D Contract
	FOR USE, AVOID USE etc.	mounted at different locations				
6.	Site Electricity	5	Each 25	Each 50	Each 75	Each 200
7.	Fire and Explosion	5	Each 25	Each 50	Each 75	Each 200
8.	Crane Safety	5	Each 25	Each 50	Each 75	Each 200
9.	Slings	5	Each 25	Each 50	Each 75	Each 200
10.	Rigging Procedures	5	Each 25	Each 50	Each 75	Each 200
11.	Excavation	5	Each 25	Each 50	Each 75	Each 200
12.	Occupational Health (Mosquito Control, HIV/AIDS awareness, Dust Control, Noise Control, No Smoking/Spitting, etc.)	10	Each 25	Each 50	Each 75	Each 200
13.	First - Aid	3	Each 25	Each 50	Each 75	Each 200
14.	Labour Welfare Measures (Payment of Minimum Wages, Avoidance of Child labour, signing in the Muster Roll, in case of accidents-what to do? Etc	5	Each 25	Each 50	Each 75	Each 200
15.	Importance of "Safety Handbook"	1	25	50	75	200
16.	Traffic Safety (Speed limit, safe crossing	5	Each 25	Each 50	Each 75	Each 200

SN	SHE Poster Title	Min No. of concepts in each title	No. of Posters / Signage / Video			
			Group A Contract	Group B Contract	Group C Contract	Group D Contract
	and working within barricaded area etc.					
17.	Environmental Monitoring (Spillage of Muck, hazardous material, Improper drainage, water spray for dust containment etc.)	5	Each 25	Each 50	Each 75	Each 200
18.	Video in Hindi on PPE usage - 15 minutes duration	1	-	-	-	1

Note 1: Items mentioned under 17 is video. Items under 3 (a) and 5 (a) are metal signage boards and all other items are posters.

Table 2: Size of Posters / Signages

SN	Item	Size
1.	Posters - Standard	17"x22" -135 GSM 4 Colour Printing
2.	Posters - Special (Wherever required)	17"x22" card laminated FA Poster
3.	Posters - Mega size (Wherever required)	32"x40" Flex FA Poster
4.	First-Aid Booklet	6"x4"
5.	Safety Handbook	6"x4"
6.	Signages	Small : 12"x6" Big : 24"x12"
7.	Road Traffic Sign Boards	Strictly as per Indian Road Congress (IRC) specifications

Table 3: Safety Signage Colour (as per IS 9457)

SN	Type of signage	Colour
1	Mandatory	Blue
2	Danger	Yellow
3	Prohibit	Red
4	Safe conditions	Green



MAHARASHTRA METRO RAIL CORPORATION LIMITED

- General Instruction: Maharashtra Metro Rail Corporation Limited /SHE/GI/010

xiv. Experts / Agencies for SHE Services

xv.

SN	Organisation	Services
1.	Bureau Veritas Industrial Services (India) Pvt. Ltd., B-21 & 22, First Floor, Sector-16, NOIDA-201 301 (U.P.) Phone: 0120 - 2515055, Fax: 0120 - 2515248 E-mail: enp.delhi@in.bureauveritas.com	<ul style="list-style-type: none"> • External SHE Audit • SHE Management / Technical Training
2.	Central Labour Institute Post box no: 17851, NS Monkikar Marg Sion , Mumbai- 400 022 Tel.: 022- 4092203, Fax: 022 - 4071986 E-mail: cli@dgfasli.nic.in	SHE Management / Technical Training
3.	Construction Industry Development Council 801, 8th Floor, Hemkunt Chambers, 89, Nehru Place, New Delhi - 110 019 E-mail: cidc@vsnl.com	SHE Management / Technical Training
4.	Delhi Productivity Council 1E/10, Swami Ramtirath Nagar New Delhi - 110 055 Tel.: 23522835	SHE Management / Technical Training
5.	Det Norske Veritas AS, 203, Savitri Sadan 1, 11 Preet Vihar Community Centre, New Delhi-110 092 Phone: 011-22531502/2253/1503, 22427688/22531278 Fax: 011-2253 0247 Website: www.dnv.com	<ul style="list-style-type: none"> • External SHE Audit • SHE Management / Technical Training


SN	Organisation	Services
6.	Dr AV Baliga Memorial trust Link House, Bagadur Shah Zafar Marg Press Area, New Delhi - 110 002 Phone: 011 - 23311119	HIV / AIDS awareness
7.	Dr.Cris Research Centre For Occupational Health & Safety 306, Guru Arjuna Dev Bhawan, Ranjit Nagar Complex, New Delhi - 110 008 Phone: 9810040406, Fax: 011 - 25702929 E-mail: team@drcris.com Website: www.drcris.com	<ul style="list-style-type: none"> • Ambulance Room & Van • Communication Materials • First-aid box • First-aid Training • HIV / AIDS awareness • ID Card • Medical Facilities • SHE Orientation Training
8.	DuPont Safety Resources, E.I. DuPont India Private Limited, Arihant Nitco Park 6th Floor, 90, Dr.Radha krishnan Salai, Mylapore, Chennai-600 004 Phone: 044-2847 2800, 2847 3752 Fax: 044-2847 3800 Mobile: 9381201040 Website: in.dupont.com	SHE Management Training
9.	EQMS INDIA PVT. LTD. 304 & 305, 3rd Floor, Rishabh Towers, Plot No. 16, Community Centre, Karkardooma, Delhi - 110092. Phone: 011 - 22374729 / 22374775 Fax: 011- 22374662 E-mail: eqms@eqmsindia.org Website: www.eqmsindia.com	<ul style="list-style-type: none"> • ISO Certification • SHE Management / Technical Training
10.	Green Cross Consultants 59, 7th Cross, 1st Floor,	SHE Management / Technical Training

SN	Organisation	Services
	Jai Bharath Nagar, Banglore-560 033 Phone: 080-2549 6782 E-mail: etgrangan@yahoo.com	
11.	HSRTC, PENTASAFE, 201, 2nd Floor, Town Centre, AndheriKurla Road, Marol, Andheri (East), Mumbai-400 059 Phone: 022-2850 2210/20/50 Fax: 022-2850 2260 E-mail: training@penta-safe.com	SHE Practical Field Training for Height Safety
12.	Institute of Driving Training & Research, Wazirabad Road, Adjoining Loni Road flyover. New Delhi - 110 094 Phone: 011 - 22813474, 22815833 Fax: 011 - 22811131	SHE Technical Training for Vehicle Drivers.
13.	Institute for Research, Development & Training of Construction Trades & Management, An Educational Institute, Society and Trust, 1st Floor, UVCE Alumni Association Building, K.R. Circle, Bangalore-560 001 Phone: 080-22294291/22243257 Fax: 080-22243257 E-mail: ubrco@vsnl.com Website: www.instructindia.org	SHE Technical /Field Training
14.	International Engineering Company K - 10, South Extension, Part - 2, New Delhi - 110 049 Phone: 011 - 26254761, 26258130 Mobile: 9312260130 E-mail: ashok@intenco.net	<ul style="list-style-type: none"> • Crane and Lifting appliances and Gears Certification • SHE Practical Field Training for Crane Safety

SN	Organisation	Services
15.	L & T Eutectic 32, Sivaji Marg, New Delhi - 110 015 Phone: 011 - 51419538, 51419539 Fax: 011 - 51419600 Website: www.lnteutecticwelding.com	SHE Practical Field Training for Welding Safety
16.	Loss Prevention Association of India Ltd. Warden House, Sir P.M. Road, Mumbai - 400 001 Website: www.lpaindia.org	SHE Management / Technical Training
17.	MFA Crucial Moments Healthcare Pvt. Ltd., 42, Okhla Industrial Estate, Phase - II New Delhi - 110 020 Phone: 011 - 55624000 Fax: 011 - 55624010 E-mail: contact@crucialmoments.net	First-aid Training
18.	Modi care Foundation 4 Community Centre, New Friends Colony, New Delhi - 110 065 Phone: 011 - 5167235059 Fax: 011 - 26915469 E-mail: nivedita@modi.com nivedita@gmavil.com Website: www.modicarefoundation.org	HIV / AIDS awareness
19.	National Safety Council HQ and Institute Building 98A, Sector 15, industrial Area C.B.D Belapur, Navi Mumbai - 400614 Phone: 27579924	SHE Management / Technical Training
20.	NICMAR (National Institute of Construction Management and Research)	SHE Management / Technical Training

SN	Organisation	Services
	910,9th Floor, Hemkunt Chambers, 89, Nehru Place, New Delhi - 110 019 Phone: 011 - 51618415, 51618417, 51618418 Fax: 011 - 51618416	
21.	Quality Growth Services Pvt. Ltd. H-13, Kirti Nagar, New Delhi - 110 015 Fax: 011 - 25431737 / 25438598 / 25918332 E-mail: qgs@qgspl.com Website: www.qgspl.com	ISO Certification
22.	Safety Engineers Association / Safety Educational Trust - India 2/257, First Floor, Dr.Ambedkar Nagar, Manapakkam, Chennai - 600 116 Phone: 044 - 22523461 E-mail: safetrustindia@rediffmail.com	SHE Management / Technical Training
23.	SHE Management Consultancy & Support Services, 145 A, Pocket-VI, (DDA Flats), KondliGharoli, MayurVihar-II, Delhi-110 096 Fax: 011-2262 5015 Mobile: 9811153873 E-mail: r_k_p@vsnl.net	SHE Management / Technical Training
24.	St. Johns' Ambulance Red Cross Road New Delhi - 110 001	First-aid Training
25.	Vexil Business Process Services Pvt. Ltd. 208, A/4, Savitri Nagar, New Delhi - 110 017	<ul style="list-style-type: none"> • Emergency Preparedness Mock drill • SHE Management / Technical Training

SN	Organisation	Services
	Mobile: 9350232714, 98102832201, 9350232716 E-mail: info@vexilbps.com Website: www.vexilbps.com	
26.	Welding Research Institute Bharat Heavy Electricals Ltd. (BHEL) Trichirappalli, Tamil Nadu - 620 014 Phone: 0431 - 2577029, 2577283 Fax: 0431 - 2520770 E-mail: wri@bheltry.co.in	SHE Practical Field Training for Welding Safety


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xvi. Minimum Lighting Requirements

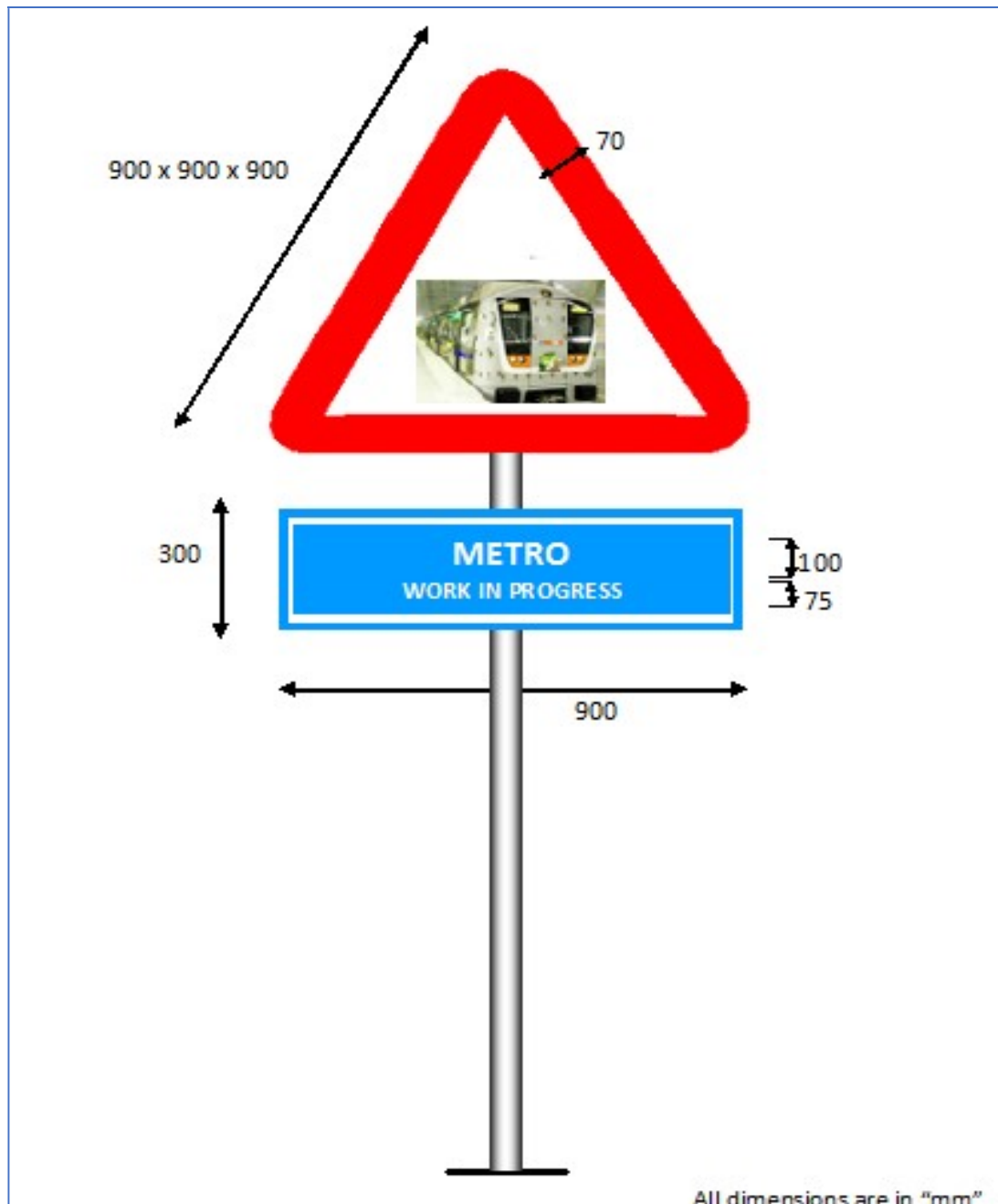
xvii.


SN	Facility or Function	Luminance - lx (lm/ft ²)
1.	Administrative areas (offices, drafting and meeting rooms, etc.)	540 (50)
2.	Construction areas <ul style="list-style-type: none"> general indoor general outdoor 	55 (5) 33 (3)

3.	Access ways • exit ways, walkways, ladders, stairs	110 (10)
4.	Maintenance / Operating areas / shops • vehicle maintenance shop • carpentry shop • outdoors field maintenance area • refueling area, outdoors • shops, fine details work • shops, medium detail work • welding shop	325 (30) 110 (10) 55 (5) 55 (5) 540 (50) 325 (30) 325 (30)
5.	Mechanical/electrical equipment rooms	110 (10)
6.	Hoists, Elevators, freight and passenger	215 (20)
7.	Warehouses and storage rooms/area • indoor stockroom, active/bulk storage • indoor rack storage • outdoor storage	110 (10) 270 (25) 33 (3)
8.	Health Centers and First aid stations and infirmaries	325 (30)
9.	Toilets, wash and dressing rooms	110 (10)
10.	Work areas - general (not listed above)	325 (30)
11.	Parking areas	33 (3)
12.	Visitor areas	215 (20)
13.	Laboratories	540 (50)

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<ul style="list-style-type: none"> General Instruction: Maharashtra Metro Rail Corporation Limited /SHE/GI/012 	

xviii. Warning Traffic Sign



	MAHARASHTRA METRO RAIL CORPORATION LIMITED
<ul style="list-style-type: none"> Form No. SF/001 	

FORMATION OF SITE SHE COMMITTEE	
Contract No.	
Contractor Name	
Contract Title	

<p>CIRCULAR</p> <p>Committee</p> <p>The following SHE Committee is constituted with immediate effect:</p> <p>Chairman:</p> <p>Members:</p> <ol style="list-style-type: none"> 1. 2. 3. 4. 5. <p>Secretary</p>
<p>Periodicity</p> <p>The committee will meet at least once in a month on the day (specify date)</p>
<p>Agenda</p> <p>Secretary will circulate agenda of the meeting at least two days in advance of the schedule date of the meeting.</p>

Circulation


Gist of the meeting will be minuted in the standard format and circulated to the following under the signature of the secretary

- | | |
|-------------|---|
| 1. Chairman | 3. Maharashtra Metro Rail Corporation Limited Representatives |
| 2. Members | 4. Others concerned |

Date:

Signed By:

CHAIRMAN

 नागरी मेट्रो NAGPUR METRO	MAHARASHTRA METRO RAIL CORPORATION LIMITED
<ul style="list-style-type: none"> Form No. SF/002 	

MINUTES OF SHE COMMITTEE MEETING			
Contract No.			
Contractor Name			
Contract Title			
Meeting No.		Date of Meeting	
Location of Meeting			

MEMBERS PRESENT		INVITEES		MEMBERS ABSENT	
REPORT SENT TO					
No. of Copies	Name / Dept.	No. of Copies	Name / Dept.	No. of Copies	Name / Dept.

Prepared by:	Location:	Date:
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MINUTES OF SHE MEETING

Item No.	Description of Discussion	Action By	Target	Remarks
1	Complaints received from Clients and corrective and preventive action			
2	Review of MOM of previous meeting			
3	NCR's / Observation from third party			
4	First - Aid cases / Reportable accident cases			
5	Future jobs and specific requirement			
6	Status of implementation of Safety plan			
7	Sub-contractor performance			
8	Analysis of first-aid cases			
9	Need for any specific system / training / PPE's / resources			
10	Observation of SHE committee during last walk down			

Next SHE Meeting is scheduled on:

Date:

Chief SHE Manager
(Signature & Name)

Date:

Project Manager
(Signature & Name)



(B) Environment and Social Management
Plan (ESMP) for
Pune Metro Rail Project

This report is based on environmental and social management plan proposed for construction phase of Pune Metro Rail Project

Table of Contents

1.	INTRODUCTION
1.1	Environmental and Social Management Plan for Pune Metro Rail project (PMRP)
2.1	Organization Structure
1.1	General Conditions for Environment and Social Welfare

Tables

Table 1-	Environmental Management/Monitoring Plan.....
Table 2-	Social Management/Monitoring Plan
Table 3 -	General Conditions for Environment and Social Welfare

Charts

Chart 1 -	Contractor SHE Organization
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Annexures

Annexure 1 -	Guidelines for Waste Management.....
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1. INTRODUCTION

Environmental Impact Assessment (EIA) and Social Impact Assessment (SIA) documents, issued to contractors/bidders along with tender document are integral part of the project documentation and are submitted to various authorities and presented at various forums in context of this project. The environmental/social management plans are primarily devised from environmental impact assessment and social impact assessment documents prepared and approved for this project and SHE Manual given in the tender document.

This ESMP is a generic document, applicable for all packages of Pune Metro Rail Project (PMRP). The contractors/bidders should consider this document as guidebook for environment/ social management during construction phase. In case further reference/ discussion is required over any issue given in this document, provisions of EIA/SIA reports, SHE manual and tender/contract document shall prevail.

The EIA and SIA documents discuss the environmental and social impacts of the project during the design, construction and operational phases of the project. It identifies the positive and negative impacts on environmental and social conditions during different phases of project and also proposes the measures to minimize the impacts.

In addition to identification of impacts and proposing mitigation measures it also proposes the monitoring plan to monitor the suitability of implemented mitigation measures. Mitigation measures and monitoring plan for a particular impact combined termed as Environmental Management Plan (EMP) or Social Management Plan (SMP) for that particular impact. Implementation of EMP/SMP for construction phase is responsibility of the civil contractor throughout the period of construction till the handover of the unit to PMRCL.

1.1 Environmental and Social Management Plan for PMRP

Table 1 and Table 2 given below presents the EMP and SMP for the PMRP. It identifies various environmental and social aspects/receptors which are likely to be impacted on account of project activity during construction phase and proposed the management and monitoring plan for each of them. The environmental/social management plans are primarily devised from environmental impact assessment and social impact assessment documents prepared and approved for this project and SHE Manual given in the tender document.

It is expected that contractor shall be primarily responsible for implementation of EMP/SMP and monitoring plans as given in Table 1 & Table 2 for PMRP. Contractor shall also be responsible for submitting the monitoring reports as outlined in the EMP/SMP.

2.1 Organization Structure

To implement EMP/SMP contractor shall employ adequate number of skilled SHE staff throughout the construction period. Number of staff required at various levels of contractor's SHE organization depends on value of contract awarded to contractor. Educational qualifications required for key SHE staff and number of SHE personnel required is given in clause 70 of SHE Manual. The proposed structure for contractor's

SHE Organization is given in Chart 1 below.



Chart 1 - Contractor SHE Organization

Table 1- Environmental Management/Monitoring Plan

Sr. No.	Environmental Aspect/Receptors	General Intent	Management Plan	Onsite Responsibility	Monitoring Plan
1	Ambient and Workplace Air Quality	To ensure that ambient and workplace air quality during construction works is within permissible limits	<p>Excavated materials to be disposed on a regular basis so that it does not</p> <p>Water to be sprinkled on stored soil/sand on daily basis to avoid dust emissions;</p> <p>Height of heaps of accumulated excavated materials should not be more than height of barricade.</p> <p>If for some reason soil is stored on site for more than 72 hours it has to be covered to avoid dust emissions;</p> <p>Diesel Generators operated within the sites to be suitably maintained at regular intervals;</p>	In Charge / Project Manager/ SHE Personnel PME in charge	<p>Workplace dust shall be visually noted and ensured that it does not aggravate;</p> <p>Ambient Air Quality to be monitored two (02) Site times in a month (for 1st fortnight & 2nd fortnight), at suitably identified location. Every Diesel Generator stack to be monitored for air emissions at least once in a six month</p> <p>Maintenance records for DGs shall be kept for inspection as and when required by GC/PMRP</p>

Sr. No.	Environmental Aspect/Receptors	General Intent	Management Plan	Onsite Responsibility	Monitoring Plan
			Internal Combustion Engine equipment operated within site must comply with minimum Bharat Stage III emission standards.		
2	Ambient and Workplace Noise Quality	To ensure that ambient and workplace noise quality during construction works is within permissible limits	Impact piling should not be allowed for piling works other than in very hard rock strata	ProjectManager /Site In Charge / P&MIn charge/SHE personal	Internal Workplace noise levels to be taken on weekly basis. Authenticated record to be verified by third party.
			Internal Combustion Engine equipment operated within site must comply with Govt. of India Emission standards		
			Diesel Generators to be operated with the suitable noise abating enclosures;		Third party ambient noise levels to be measured at least once in a month at the suitable location decided by SHE personnel/site in charge
			Provision of earplugs for workers working within the site boundaries;		

Sr. No.	Environmental Aspect/Receptors	General Intent	Management Plan	Onsite Responsibility	Monitoring Plan
			Height of barricade needs to ensure as per standards given by PMRP		
			Barricades to be aligned properly to minimize the dissipation of sound;		
3	Vibration Control	To reduce the degree of impact due to vibration during construction phase.	Latest piling technologies to be deployed by contractor to reduce the impact on nearby structures;	Project Manager / Site In charge / P&M In	Vibration monitoring to be done on a monthly basis though planned preventive maintenance with the help of professional third-party service provider
			Impact piling should not be allowed for piling works other than in very hard rock strata;	charge / SHE personal	
4	Waste Management (At Construction Site and at Utility works)	To ensure the environment is acceptable disposal / recycling of wastes generated	The contractor shall prepare the waste management plan and submit the PMRP/GC for concurrence. The guidance for preparing the waste management plan is given in Annexure-1 of this ESMP document.	Project Manager / Site In charge / SHE personal	Proper records shall be maintained for disposal of hazardous wastes, solid wastes, C&D waters, liquid (site runoff) wastes etc.
			Contractor shall dispose-off hazardous wastes as per the provisions of SHE Volume 8 Clause No. 66.		

		during construction	For further guidance please refer to Annexure 1 of this ESMP document.		
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Sr. No.	Environmental Aspect/Receptors	General Intent	Management Plan	Onsite Responsibility	Monitoring Plan
			<p>Contractor shall dispose-off <i>non-hazardous solid wastes, non-hazardous liquid wastes, biomedical wastes</i> as per the provisions of SHE Volume 8 Clause No. 65.</p> <p>Contractor shall dispose-off construction and demolition wastes as per the provisions of SHE Volume 8 Clause No. 66. For further guidance please refer to Annexure 1 of this document.</p>		
5	Sanitation and Sewage Management at construction and utility facilities	<p>To ensure hygienic sanitary conditions for workers at worksites and in camps.</p> <p>To ensure Environmentally acceptable Disposal of</p>	<p>Sufficient number of urinals as given in SHE Volume 8 Clause No. 51 should be</p> <p>Contractor shall make sufficient arrangements as given in SHE Volume 8 Clause 51.4 for drinking water facilities for construction workers</p> <p>Worker camps and canteen facilities should be protected from airborne and soil born insects and pests by taking suitable measures as described in SHE Volume 8 Clause</p>	Project Manager / Site In charge / SHE personal	<p>Location plans to be submitted for sanitary facilities at casting yard and batching plants; Cleaning schedule and records to be maintained and to be made available for inspection of GC/PMRP as and when demanded.</p> <p>Site housekeeping shall be always maintained at generally acceptable levels throughout the construction period</p>

		domestic wastes generated at construction sites and	56. & Clause 57.0 and its subsections		
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S r · N	Environmental Aspect/Receptor	General Intent	Management Plan	Onsite Responsibilit y	Monitoring Plan
			<p>General Housekeeping shall be carried out by the Contractor and ensured at all Site. Construction ea. Batching Camp, Stores, Offices and toilets/urinals. Towards this the Contractor shall constitute General Instruction PMRP/SHE/GI/001.</p> <p>In compliance to Clause 40.5 of SHE Volume 8, for disposal of sanitary waste generated at worker camps at batching plant, casting yards, suitable sanitary treatment like bio digester or equivalent /disposal to existing sewage system.</p> <p>Mobile sanitary facilities shall be deployed at</p> <p>Authorized agencies shall be deployed for disposal of sewage and other solid waste generated at worker camps and construction sites</p>		

S r .	Environmental Aspect/Receptors	General Intent	Management Plan	Onsite Responsibility	Monitoring Plan
6	Drainage System at Construction/utility sites	<p>To ensure that suitable drainage is planned at construction sites and at utility sites. So that public drainage systems and surface and GW quality are not affected.</p>	<p>All the provisions of Clause 60 of SHE Volume 8 regarding Water Quality are applicable to the contractor at all sites wherever he is performing the work.</p> <p>As per provisions of Clause 60.1 of SHE Volume 8, Contractor shall construct a drainage system at the commencement of the works, to drain off all surface water from the work site into suitable drain outlet.</p> <p>The Contractor shall provide adequate precautions to ensure that no spoil or debris of any kind is pushed, washed, falls or deposited on land adjacent to the site perimeter including public roads or Existing stream courses and drains within or adjacent to the site.</p> <p>Contractor is not allowed to discharge water from the site without the approval of the Employer. The Contractor must comply with the requirements of the</p>	Project Manager / Site Incharge / SHE personal / Planner	<p>Layout plans to be submitted for sanitary facilities at casting yard and batching plants;</p> <p>Cleaning schedule and records to be maintained and to be made available for inspection of GC/PMRP as and when demanded.</p> <p>Monsoon preparedness plan to be submitted prior to onset of monsoon for approval of GC/PMRP</p>

Sr. No.	Environmental Aspect/Receptors	General Intent	Management Plan	Onsite Responsibility	Monitoring Plan
			<p>Central Ground Water Board for discharge of water arising from dewatering (refer Clause 60.3 of SHE Volume 8)</p> <p>In the event of any spoil or debris from construction works being deposited or any silt washed down to any area, then all such spoil, debris or material and silt shall be immediately removed and the affected land and areas restored to their natural state by the Contractor to the satisfaction of GC/PMRP (refer Clause 60.2 of SHE Manual)</p> <p>Prior to arrival of monsoon (in month of May)</p> <p>suitable monsoon preparedness plan shall be prepared by the contractor and suitable resources to be made available prior to onset of monsoon</p>		
7	Disposal of Muck from sites/Soil	To ensure that	Contractor shall dispose the muck/dry soil generated at construction sites at a	ProjectManager	

	Erosion Control Plan	soil erosion from construction site is prevented to check the ambient air quality, public inconvenience	The boundaries of identified and mutually agreed disposal location shall be earmarked by contractor. Initial levels of (prior to start of soil/muck disposal) disposal area has to be recorded by the contractor with the help of surveyors and to be submitted to	/SiteIncharge/ SHE personal/Planner	Reconciliation records for soil disposal shall be submitted to GC/PMRP once in a three months; Records for dumpers shall be kept for inspection at sites which shall include the safety checklist for dumpers disposing the soil;
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S r · s	Environmental Aspect/Receptor	General Intent	Management Plan	Onsite Responsibility	Monitoring Plan
		and general aesthetics outside the construction/ut ility sites	<p>PMRP/GC.</p> <p>Contractor shall carry out the disposed soil and quantities shall submit to PMRP on quarterly basis.</p> <p>Wheel wash facilities shall be provided at every exit gate to clean or wash the wheels of every outgoing vehicle from site. Sufficient staff shall be made available at site to control the disposal of muck/soil from site such as a supervisor, labors for wheel cleaning, brooms for wheel cleaning and concrete. The dumpers carrying the muck/dry soil has to be covered while plying on the roads on the way to disposal location. Resources have to be provided for road cleaning for accidental soiling of roads during muck disposal.</p>		

			The resources include raw water, labors, traffic marshal, brooms for road cleaning		
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S r .	Environmental Aspect/Receptors	General Intent	Management Plan	Onsite Responsibility	Monitoring Plan
8	Tree protection/Cutti ng and Disposal	To ensure that overall green cover of city is maintained	<p>Contractor is only allowed to cut the trees which are falling in a ROW and which are already identified.</p> <p>For the trees which needs to be cut during construction activities but for which prior approval is not taken, necessary approval from concerned authorities shall be arranged by the PMRP</p>	ProjectManager /SiteIncharge/ SHE personal/Plann er	Records of trees which are cut and protected shall be submitted in monthly environmental reports and as and when demanded by GC/PMRP
			<p>Contractor shall keep necessary records for the disposal of biomass which is generated from tree cutting.</p> <p>Biomass shall not be stored at site for more than 15 days.</p> <p>Contractor shall protect the tree which are located within the site boundaries, but which are not required to be cut during the construction phase</p>		

9	Soil and Water Quality	To ensure that soil and groundwater and surface water quality are not	Contractor shall take all necessary precautions such that construction material, diesel, grease, waste oil, chemicals etc. does not spill on ground. Suitable storage area for such materials shall be prepared and equipment shall be made available for handling of these materials.	ProjectManager /SiteIncharge/ SHE personal/Plann er	Soil and Ground water quality shall be checked at the locations identified by GC/PMRP or independent environmental experts and records shall be submitted. The GW and Soil leachate quality shall be checked once in six months
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Sr. No	Environmental Aspect/Receptors	General Intent	Management Plan	Onsite Responsibility	Monitoring Plan
		construction	Latest version of Hazardous waste disposal and handling rules and guidelines given in SHE Manual Clause 66 shall be referred for the storage areas and for provision of PPEs and other equipment.		
10	Energy Management// Conservation	To ensure that best practices are adopted during construction phase to optimize energy consumption	<p>Contractor shall try and reduce the direct consumption of fossil fuels on site through use of energy efficient equipment at their project office and at construction sites</p> <p>Construction Equipment shall be duly serviced to ensure that they are operated at optimum level of fuel efficiency</p> <p>Only Five star labeled equipment by BEE/or its equivalent shall be used at project offices.</p> <p>Maximum use of grid power shall be planned at construction sites and at project offices</p>	Project Manager/PME Head/SHE Personnel	Monthly consumption of diesel and power units shall be compiled and submitted to GC/PMRP

S r .	Environmental Aspect/Receptors	General Intent	Management Plan	Onsite Responsibility	Monitoring Plan
11	Water Management/ Conservation	To ensure that bestpractices are adopted during construction phase to optimize energy consumptio	Contractor shall try and reduce the water consumption through use of energy efficient water fixtures at sites and project offices. Leakage of water should not be allowed through pipes and valves. Reuse of water used for curing and for other uses to be planned	PME/SHE Heads/Site In charge	Monthly records for consumption of water for domestic and construction purposes shall be submitted in environmental reports

Table 2- Social Management/Monitoring Plan

S. N	Project related Issues	General Intent	Management Plan	Monitoring Plan	Responsibility
1	Management of Economic suffering by adjoining Businesses along	Minimize the adverse impact on adjoining businesses	The buyers of shops will park their vehicles in by-lanes and visit shops thereby managing the economic sufferings to the business adjoining construction sites. PMRCL will coordinate with NMC to allow short	Public Relations Department of PMRCL	PMRP
2.	Labor Camps	Providing safe Habitation to workers	The project Contractor shall construct a labor camp site which is duly confirming the labor laws. Emergency response plan will be in place towards meeting unforeseen emergencies.	GC would monitor that Contractor comply through routine site visits	Contractor's Project Manager/Admin/SHE
3	Residential /Commercial and CPR	Ensure that all persons displaced permanently or temporarily are settled as per the Govt of Maharashtra	All possible effort will be made to minimize displacement of persons and land acquisition of private persons .Social Impact assessment consultant would provide the information and Metro samwad to make people aware of metro project and grievance address system for persons being displaced. Ensure that persons being	GC and Land Acquisition team from PMRP to work with PMC or R&R issues	PMRP

S. N	Project related Issues	General Intent	Management Plan	Monitoring Plan	Responsibility
3.	Sanitation, Sewerage and waste disposal in worker's camp.	Providinghygienic conditions in Labor camps and adequate Housekeeping in Labor camps	<p>Proper sanitation facilities at the construction workers camp shall be provided.</p> <p>Provision of Bio-digesters/treatment units to achieve the desired quality of treated waste disposal and shall be taken care by contractor for workers camp.</p> <p>The municipal solid wastes generated in worker's camp shall be collected and stored at designated place and shall be disposed-off at nearest identified disposal / landfill sites of local authority. Domestic refuse shall be collected separately for bio-degradable waste and inert</p>	GC would monitor that contractor comply through routine site visits	Contractor's Project Manager/Admin/SHE
4.	Wastage of water	Please refer Table 1- Environmental Management/Monitoring Plan (Water Management/Conservation)			
5.	Traffic management	Avoid and minimize inconvenience to public due to congestion and traffic jams during construction	<p>Location specific Traffic management plan shall be prepared to handle traffic flow particularly during peak hours. Coordination and securing assistance from local police for traffic control during the construction. Providing traffic marshals along construction sites/ openings in barricades to manage and assist traffic.</p> <p>Safety measures shall also be undertaken by installing road</p>	GC would monitor that contractor comply	Contractor's Project Manager/Admin/SHE
6.	Dust suppression	Please refer Table 1- Environmental Management/Monitoring Plan			
7.	Noise level	Please refer Table 1- Environmental Management/Monitoring Plan			
8.	Air Quality	Please refer Table 1- Environmental Management/Monitoring Plan			

9.	Occupation Health & Safety and Safety with vehicles, people and livestock		Workers shall be equipped with proper safety gears like helmets, gloves and gum boots. Periodic health checkup of construction workers. Safety education and fines.	GC would monitor that contractor comply	Contractor's Project Manager/ SHE/Stores
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1.1 General Conditions for Environment and Social Welfare

In addition to implementation of EMP as outlined in the Table 1, contractor is expected to comply with the general conditions outlined under various clauses of SHE Conditions Volume 8 of tender document. The general conditions and reference SHE clauses are listed below :

Table 3 - General Conditions for Environment and Social Welfare

Sr. No.	General Condition	Reference from SHE manual of PMRCI	Responsibility
1	The Contractor as per Rule 69 of the MBOCW shall formulate a Safety & Health policy and get it approved by Chief Inspector and display it at conspicuous places at work sites in Hindi and Marathi i.e. languages understood by the majority of construction workers.	PART I SHE Management Clause 4.0 and its subsections	Corporate SHE Head/Project Manager
2	Contractor shall set the goals for environmental performance for certain periods of project duration and shall develop the plans to improve the performance and monitor it	PART I SHE Management Clause 2.0 and its subsections	Corporate SHE Head/Project Manager/SHE Head
3	Contractor shall prepare the method statement for major activities which will be undertaken at sites. It should be ensured that environmental risk assessment should be done for every activity and suitable plan is developed to mitigate the impact.	PART I SHE Management Clause 3.0 and its subsections	Project Manager/SHE Head/Quality Head

4	Contractor shall ensure that designer (appointed by the contractor) shall include/prepare designs in a way that minimize the risk to health and safety of those who are going to construct, maintain, clean, repair, dismantle or demolish the structures and anyone else like adjoining road users/general public, who might be affected by the work.	PART I SHE Management Clause 5.0 and its subsections	Project Manager/Designed /SHE Head
5	The Contractor shall appoint the required SHE personnel as prescribed in General Instruction PMRP/SHE/GI/001 based upon the statutory requirement and establish the safety organization based upon the Contract value. The minimum educational qualification and the work experience are given in General Instruction	PART I SHE Management Clause 6.0 and its subsections	Corporate SHE Head/Project Manager/SHE Head

Sr. No.	General Condition	Reference from SHE manual of	Responsibility
6	The Contractor shall ensure the formation and monitor the functioning of Contractor SHE committees..All employees should be able to participate in the making and monitoring of arrangements for safety, industrial health and	PART I SHE Management Clause 7.0	Corporate SHE Head/Project Manager/SHE Head
7	The Contractor shall ensure that all personnel working at the site receive an induction SHE trainings explaining the nature of the work, the hazards that may be encountered during the site work and the particular hazards attached to their own function within the operation. The training shall cover the contents as given in the General Instruction PMRP/SHE/GI/004.	PART I SHE Management Clause 8.0 and its subsections	Corporate SHE Head/Project Manager/SHE Head
8	The Contractor shall organize SHE training to engage managers, supervisors and other personnel in behavioral change and improve safety performance. The environmental	PART I SHE Management Clause 9.0	Corporate SHE Head/Project Manager/SHE Head
9	The Contractor shall evolve and administer a system of conducting environmental inspections twice in a month. Contractor key personnel including the project manager shall attend the site environmental inspections and necessary compliance shall be arranged for	PART I SHE Management Clause 10 and its subsections	Project Manager/SHE Head
10	Monthly environmental report shall be submitted by the contractor to GC/PMRP on or before 10th of day of every month. The report shall Track the progress in brief, compliance status of observations given by GC/PMRP during site visits, general compliance with ESMP/EMP, monitoring records and other notable environmental issues related to site. The report shall include the demonstrative site photographs	PART I SHE Management Clause 11 and its subsections	Project Manager/SHE Head
11	Contractor shall develop the work permit system such that it considers the environmental aspects of major activities carried on site.	PART I SHE Management Clause 11 and its subsections	Project Manager/SHE Head

Sr. No.	General Condition	Reference from SHE manual of	Responsibility
12	<p>The Contractor shall take every effort to communicate the Environment management measures through posters campaigns / billboards / banners / glow signs being displayed around the work site as part of the effort to raise environmental/social awareness amongst the work force. Posters should be in Hindi, English, and other suitable language as deemed appropriate. Posters / billboards / banners/ glow signs should be changed at least once in a month to maintain the impact. The Contractor shall also observe important days as listed in General Instruction</p> <p>PMRP/SHE/GI/008 and printing and displaying safety</p> <p>Signage and posters as listed in General Instruction PMRP/SHE/GI/009</p>	PART I SHE Management Clause 11 and its subsections	Project Manager/SHE Head
13	<p>Contractor shall report significant environmental incidents to PMRP/GC within 8hrs of event and shall necessary measures to rectify it as soon as possible. The environmental incident shall include but not limited to excessive road soiling, excessive oil spills, excessive dust generation etc.</p>	PART I SHE Management Clause 14 and its subsections	

Annexure 1 - Guidelines for Waste Management

	Waste Type	Example of Waste Items	Storage Methods	Disposal Method
Solid Waste	Hazardous Solid Waste	Waste Oil, Used Batteries, Oil Contaminated Clothes	Dedicated storage area as per provisions of Hazardous Waste Handling and	To be disposed with the help of authorized by MPCB) recyclers.
	Non-Hazardous Solid Waste	Scrap Steel, Wooden Material Steel Material etc.	Earmarked open storage within site boundaries	Disposed to recyclers.
	Construction and Demolition	Concrete Debris, broken bricks etc.	Earmarked open storage within site boundaries	To be disposed as per PMC guidelines.
	Domestic Waste	Tea Cups, Refreshment packets, biomass	Color Coded waste bins to be provided for storage Biomass could be stored at earmarked open/shaded storage within site boundaries	Domestic waste to be disposed with help of PMC approved waste disposal agency Biomass to be delivered free of cost to user operated by PMCs
Liquid Waste	Process Water	Wash water, curing water, seepage from muck	Should be collected through a suitable drainage system within site boundaries. Reuse after primary treatment, if possible	Could be disposed to public drain only if, after primary treatment water complies with municipal standards of disposal to public
	Surface Runoff	Wash water, seepage from muck,	Should be collected and disposed after sedimentation.	Could be disposed to sewers if it complies with
	Domestic Liquid Effluent	Domestic Waste generated from urinals and toilet boxes.	Should be collected through a suitable drainage system within site boundaries. Reuse after primary treatment, if possible.	Could be disposed to public rain only if, after primary treatment water complies with municipal standards of disposal to public drains.
Biomedical Wastes	First Aid Wastes	Chemically contaminated cottons, syringes, bandages etc.	Should be stored in colour coded storage bin at first aid facility.	Could be disposed with the help of hospitals who have tied up with authorized biomedical wastes disposers.

Maharashtra Metro Rail Corporation Limited

(A Joint Venture of Government of India and Government of Maharashtra)

PUNE METRO RAIL PROJECT

Design of Graphics, Fabrication, Supply, Installation, Testing and Commissioning of Signage of 4 stations viz. Dapodi, Bopodi, Khadki & Range Hill of Reach 01 and 4 stations viz. Deccan Gymkhana, Sambhaji Park, PMC & Civil Court Elevated of Reach 02 of Pune Metro Rail Project.

TENDER NO.

P1 Misc-28/2022

PART- IV

TENDER DRAWINGS

MMRCL EIR (Employers Information Requirements)



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3	PAS 1192-2:2013 Specification for information management for the capital/delivery phase of construction projects using building information modelling		2013
4	MMRCL CAD Standard	V1.0	20-April-2017
5	MMRCL - Engineering Assurance File Naming Convention	V1.0	20-April-2017
6	MMRCL Design Review and Acceptance Procedure		
7	MMRCL Master Information Delivery Plan Template (MIDPT)	V1.0	20-April-2017
8	MMRCL Master Delivery List	V1.0	20-April-2017
9	MMRCL Master Production Delivery Table	V1.0	20-April-2017
10	MMRCL Level 2 BIM E2E Workflow Process	V1.0	20-April-2017
11	MMRCL Level 3 Drawing Process	V1.0	20-April-2017
12	MMRCL Level 3 Model Process	V1.0	20-April-2017

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1. PURPOSE

The purpose of this Employer Information Requirements (EIR) document (as a part of “**Business Requirement Document**”) is to provide specific details and instructions relating to Production Information and Handover Information [**Information Artefacts**] about the engineering solution of the MMRCL (Maha Metro Rail Corporation Ltd) asset and how these shall be captured, authored, managed and submitted to MMRCL or its agent [**the Employer**] by the Supplier / Detailed Design Consultant / Contractor [**the Supplier**].

The EIR sets out MMRCLs EIR standards, methods and procedures to be used for producing and managing Information Artefacts during each project phase, to make sure that the developed engineering solution meets project objectives and desired outcomes and benefits.

As such, it is incumbent on the Supplier to explain:

Pre-contract (if applicable):

As part of the Supplier tender submission and scope of services, and specifically within the pre-contract BEP (BIM Execution Plan):

- how the Supplier intends complying with the MMRCL Design, Review and Acceptance procedure
- how the Supplier intends complying with MMRCL EIR SMP (Standards, Methods and Procedures)
- how the Supplier will help MMRCL achieve its BIM objectives in a manner which helps eliminate risk from the project and which promotes collaboration, innovation and right first time design
- how the Supplier intends producing and delivering Information Artefacts in compliance with MMRCL standards

Post Contract:

As part of the Supplier post-contract BEP (BIM Execution Plan) and in addition to the pre-contract points listed above:

- how the Supplier intends developing the scope and delivery schedule for the MIDP (Master Information Delivery Plan) for agreement with MMRCL
- how the supplier intends to make sure that Information Artefacts are submitted in accordance with the MIDP, to the required schedule, LOD and quality
- how the Supplier intends publishing Drawing information to support Design Reviews, costing or any other identified purpose
- how the Supplier intends sharing and publishing Modelling information for Coordination and Collaboration purposes
- how the Supplier intends working collaboratively with interfacing disciplines and contracts in order to eliminate coordination issues, design clashes and constructability issues
- how the Supplier intends satisfying the Level of Definition (LOD) requirements

The EIR sets out Level of Definition requirements. This is a collective term used to describe both the '**Level of Model Detail**' and the '**Level of Information Detail**' to be authored and issued to the Employer by the Supplier.

The '**Level of Model Detail**' is the description of **graphical** content of models which is required during each (applicable) project phase (for example during CONCEPT DESIGN, PRELIMINARY DESIGN, DETAILED DESIGN etc)

The '**Level of Model Information**' is the description of **non-graphical** content of models which is required during each project phase.

The LOD principles and requirements are set out in sections 3.4 and 3.5 respectively.

Note that this EIR document has been produced in alignment with BS1192 [Ref 2] and PAS 1192:2-2013 [Ref 3] and uses terminology consistent with this standard including:

- Task Team
- Master Information Delivery Plan (MIDP)
- Master Production Delivery Table (MPDT)
- BIM Execution Plan (BEP)

A glossary of key terms used in this EIR can be found in section 8 Definitions.

The following sections of this EIR document describe the Employers Objectives, the EIR Standards Methods and Protocols and Supplier obligations in more detail.

2. THE EMPLOYERS 5D BIM OBJECTIVES

It is MMRCL's objective to have a common strategy for the adoption of 5D BIM. The strategy includes an approach to describing information requirements across all aspects of the asset lifecycle with the Information Requirements (EIR) for such, being described in this document.

2.1 The Employer's Objectives

- To achieve a world-class quality of service, achieve efficiency and practice better control over the financial transactions and project activities
- Establish uniform standards for excellence in operations, project management, human resource management, financial management and performance reporting
- To drive efficiencies in the production, modification, operation and decommissioning of its engineered assets through data driven information, improving decision making and delivering best value to its stakeholders
- To institutionalise the use of the 5D BIM processes and solutions with the expectation that the solutions to become the backbone of the project during the design and build phase and subsequently for operations upon go-live of the project; with no change in the platforms envisaged unless the technology solution is declared obsolete and out of support

- To make sure that project execution stays within the defined timelines and budgets with the best of quality resulting from world-class practices on scheduling, estimation and engineering
- To institute good practise, collaborative techniques and behaviours which results in on-time and within budget project execution as follows:
 - A focus on design beyond 2D drafting and 3D modelling
 - Early visualisation and comprehension by MMRCL – enabling faster approval cycles
 - Ease of coordination between construction documents
 - Spatial Coordination between disciplines
 - Clash detection and conflict resolution limiting issues on-site and during construction.
 - Extraction of intelligent data and automated schedules
 - Ability to take-off materials and quantities
 - Ability to link Models, Projects Schedules and Construction Sequencing
 - Projecting future construction sequence conflicts
 - Tracking and identifying location of material and pieces on-site in a simulated environment
 - Transparent and realistic picture of the actual activities in the Project
 - Visualisation of construction-sites for contractors, sub-contractors and clients onsite
 - Integration of BIM with mobile-devices for managing construction and commissioning / hand-over.
 - View the current cost and compare it to the estimated total target cost of projects as well as interim costs against design during design phases
 - Effective strategic and operational setup right from the beginning of the Project
 - Implementation of an effective Operational Excellence in Initialisation & Execution
 - True and fair view on financials, reliable forecast and what-if-scenarios
 - Cost and Time optimised Program Management with early warning system in place for on-time management action
- To procure / produce, manage and maintain data and information about the MMRCL engineered assets that is complete, consistent and can be trusted and re-used for operational purposes and for future business intelligence

2.2 Project Objectives

The Employer's 5D BIM objectives for the Pune Metro Project / Contracts are to:

- achieve target capital delivery cost
- deliver best value through innovation
- obtain digital assurance and evidence, through the use of Information Artefacts, verifying the integrity and completeness of the design of the engineered solution at each stage of the Project / Contract
- obtain digital assurance and evidence, through the use of Information Artefacts, validating the buildability of the engineered solution

- obtain digital assurance and evidence, through the use of Information Artefacts, verifying that (and how) the asset(s) can be efficiently constructed / installed
- obtain digital assurance and evidence, through the use of Information Artefacts that health and safety and CDM requirements have been identified and met
- obtain digital assurance and evidence, validating the integrity and completeness of the (Handover) Information Artefacts
- obtain structured (Asset) data to populate Asset Management Information Systems

3. INFORMATION UTILISATION AND PLANNING

3.1 Primary Uses of Data and Information

The Employer's primary uses for the Information Artefacts, throughout the lifecycle of the asset(s), are as detailed in Table 3-1.

Table 3.1 – Primary Use	
Reference	Description
PU01	Assurance To verify that MMRCL assurance requirements are satisfied and evidenced
PU02	Project Coordination To verify coordination and integration between disciplines and with adjacent works / contracts
PU03	Business Case and Whole Life Cost To validate the business case and whole life cost forecasts, making sure they are robust and outcomes and benefits can be / will be achieved.
PU04	Cost Facilitate the population of the cost and estimating systems
PU05	Operations and Maintenance To validate that the assets will meet the operational and maintenance requirements as set out in the (Asset sections of the) Model Production and Delivery Table (MPDT)
PU06	Asset Registration To facilitate the asset registration process and subsequently populate the Asset Management Information Systems
PU07	Benefits Management To help verify that the project outcomes and benefits have been achieved

3.2 Stage Gate Digital Assurance

All Information Artefacts, as explicitly defined in the MIDP, shall be submitted to MMRCL using the MMRCL Common Data Environment (CDE), in order to:

- provide the requisite level of assurances in accordance with the Employers Requirements
- inform stage gate decisions, as defined below to enable Stage Gate sign-off:
 - **Stage 1: INITIATION**

Have business outcomes and benefits (that the projects must deliver) been established?
 - **Stage 2: CONCEPT DESIGN**

Are the business outcomes and benefits achievable?

Is there an option that delivers optimum value?
 - **Stage 3: PRELIMINARY DESIGN**

Have the design principles been defined?

Can the scope of the project be frozen?
 - **Stage 4: DETAILED DESIGN**

Will the designed solution deliver the required outcomes?

Can the detailed design be used for contracting delivery of the works?
 - **Stage 5: CONSTRUCTION (INSTALLATION)**

Have all (Production) Information Artefacts been provided and verified?
 - **Stage 6: HANDOVER**

Have all (Handover) Information Artefacts been provided and verified?

Have the assets been accepted by the end user?
 - **Stage 6: OPERATIONS**

Note: the table below provides a cross-reference between the generic project stages listed above and contract specific project stages

	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7
	INITIATION	CONCEPT DESIGN	PRELIMINARY DESIGN	DETAILED DESIGN	CONSTRUCTION (INSTALLATION)	HANDOVER	OPERATIONS
Viaduct	Initiation	Concept Design	Preliminary Design	Detailed Design	Construction	Commissioning & Handover	Operation & Maintenance
Station	Initiation	Concept Design	Preliminary Design	Detailed Design	Construction	Commissioning & Handover	Operation & Maintenance
Traction	Initiation		Preliminary	Detailing	Material/ Equipment Procurement	Commission	Operations & Maintenance
					Installation & Testing		
Electrical & Mechanical	Initiation		Preliminary	Detailed	Procurement (Manufacturing & Inspection)	Testing & Commissioning	Operations & Maintenance
					Supply	Integrated Testing	
					Installation	Handing Over	
Telecom	Initiation	Concept	Preliminary	Detailed	Delivery	Interface test & Configuration	Revenue Operations Date
					Installation Test Procedures		
					Own Commissioning & Configuration	ITC (Final Testing)	
					Partial Acceptance		
					System Configuration	Trail Runs	
System Acceptance Test							
Rolling Stocks	Initiation	Preliminary	Pre-final	Detail	Mock	Integrated Testing & Commissioning	Operations
					Production		
					Testing & Commissioning	Trail Run	
Signalling	Initiation		Preliminary	Detail	FAT	Testing & Commissiong	Operations
					Delivery		
					Installation	As-Built	
Depot							
Track							

- facilitate the primary uses as set out in Table 3-1
- deliver the required types of documentation as part of the (Handover) Information Artefacts, as defined in the MIDP (Master Information Delivery Plan).

NOTE: The Supplier shall identify and capture within the MIDP, the Information Artefacts that will be delivered to support and inform the stage decisions and assurances, as set out within the **MMRCL Design Review and Acceptance Procedure** [Ref 6].

For details of the required types of documents to be delivered as part of the Handover Information, refer to the Operations and Maintenance section of the MIDP.

3.3 Technical and Design Reviews

All Technical and Design Reviews are to be undertaken in accordance with the **MMRCL Design, Review and Acceptance procedure** [Ref 6]. This procedure specifically identifies the types, frequency and events at which reviews will be undertaken.

The **MMRCL Design, Review and Acceptance procedure** [Ref 6] provides a comprehensive list of questions which are to be answered at each Design Review. The Supplier shall provide the agreed Information Artefacts needed to adequately answer all design review questions and provide the requisite evidence of assurance.

All Information Artefacts for Technical and Design Reviews shall be submitted by the Supplier through the CDE in accordance with the relevant **MMRCL EIR Standards, Methods and Procedures** [Ref 1]

3.4 LOD (Level of Definition) - Principles and Requirements

3.4.1 Purpose and Scope

The purpose of this section is to define the LOD principles and requirements for each of the primary systems and components within each Discipline for each project stage.

The Employer's LOD requirements are specified in the Employer's MDPT (Master Delivery Plan Table) – which is provided as a referenced document to this EIR document. The Employers MDPT declares:

- The list of systems for which models are required
- The project stage or stages (eg DETAILED DESIGN) at which models are to be developed by the Supplier

NOTE: see section 3.5 Master Production and Delivery Table (MPDT): The Employers Requirement, for the stages at which models are to be developed by the Supplier

- the required LOD for each of the systems models
- the intended purpose of the models
- the native and deliverable formats in which the models are to be issued to the CDE

NOTE: The Supplier shall develop the MIDP and BEP to provide assurances and evidence as to how the points above will be addressed

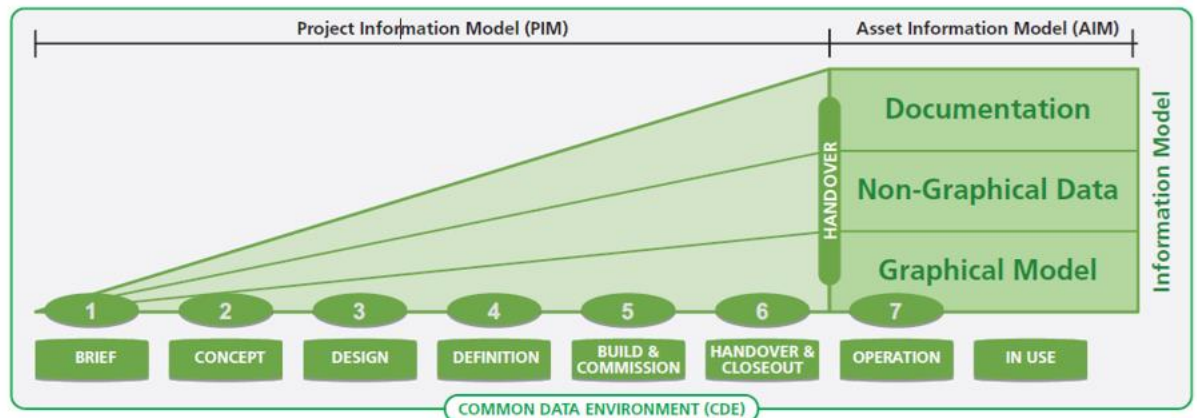
3.4.2 LOD Principles

The Level of Definition is a collective term used to describe both the '**Level of Model Detail**' [LOD] and the '**Level of Information Detail**' [LOI] to be authored and issued to the Employer by the Supplier.

The '**Level of Model Detail**' is the description of **graphical** content of models which is required during each (applicable) project stage (for example during DETAILED DESIGN etc)

The '**Level of Model Information**' is the description of **non-graphical** content of models which is required during each project phase.

These principles are based on PAS1192-2 [Ref 3] as illustrated below:



In principle, the LOD and LOI and matures progressively throughout the project lifecycle as illustrated in the diagram below.

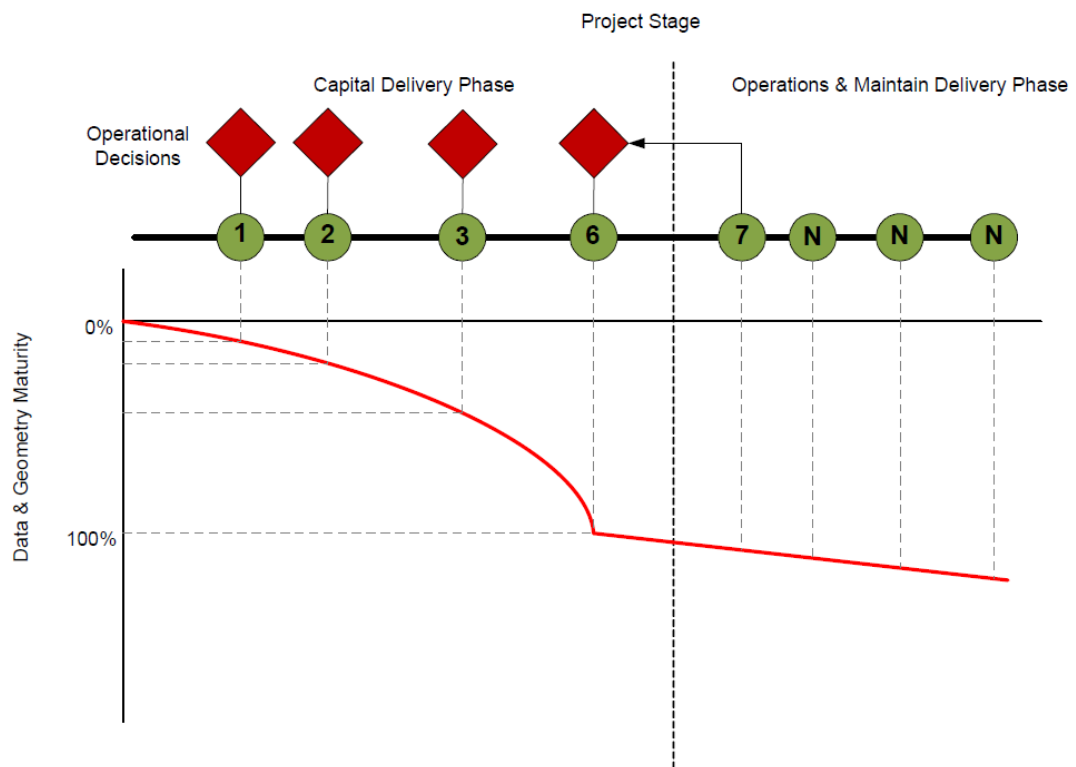


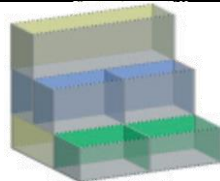

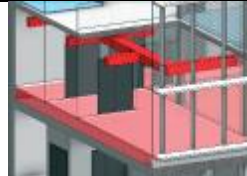



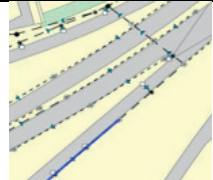

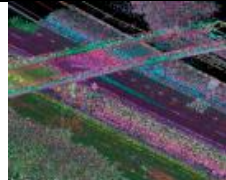


Figure 1. Plan of Work and the progressive Level of Definition.

Table 3.4.1 below declares MMRCL's overall vision and principles for modelling, LOD and LOI across the project lifecycle.

Table 3.4.1 - Generic principles of Levels of Model definition for building and infrastructure projects							
Stage Number	1	2	3	4	5	6	7
Model Number	INITIATION	CONCEPT DESIGN	PRELIMINARY DESIGN	DETAIL DESIGN	CONSTRUCTION	HANDOVER	OPERATIONS
Systems to be covered	N/A	As per MPDT requirements	As per MPDT requirements	As per MPDT requirements	As per MPDT requirements	As per MPDT requirements	As per MPDT requirements
Graphical Illustration (Building Project)							
Graphical Illustration (Infrastructure Project)							
What the model can be relied upon for	Model information communicating the brief, performance requirements, performance benchmarks and site constraints	Models which communicate the initial response to the brief, aesthetic intent and outline performance requirements. The model can be used for early design development, analysis and co-ordination. Model content is not fixed and may be subject to further design development. The model can be used for co-ordination, sequencing and estimating purposes.	A dimensionally correct and coordinated model which communicates the response to the brief, aesthetic intent and some performance information that can be used for analysis, design development and early contractor engagement. The model can be used for co-ordination, sequencing and estimating purposes including the agreement of a first stage target price	A dimensionally correct and model that can be used to verify compliance with regulatory requirements. The model can be used as the start point for the incorporation of specialist contractor design models and can include information that can be used for fabrication, co-ordination, sequencing and estimating purposes, including the agreement of a target price/guaranteed maximum price.	An accurate model of the asset before and during construction incorporating coordinated specialist subcontract design models and associated model attributes. The model can be used for sequencing of installation and capture of as installed information	An accurate record of the asset as a constructed at handover, including all information required for operation and maintenance.	An updated record of the asset at a fixed point in time incorporating any major changes made since handover, including performance and condition data and all information required for operation and maintenance.
Output	Project brief and procurement strategy	Refined project brief and concept approval	Approval of coordinated developed design		Integrated production information. Complete fabrication and manufacturing details, system and element verification, operation and maintenance information. Modify to represent as installed model with all associated references.	As constructed systems, operation and maintenance information. Agreed final account Building Log Book Information gathered as key elements are completed to feed installation information for the later packages.	Agreed final account. In use performance compared against Project Brief. Project process feedback: risk; procurement information management, soft landings

Stage Number	1	2	3	4	5	6	7
Model Number	INITIATION	CONCEPT DESIGN	PRELIMINARY DESIGN	DETAIL DESIGN	CONSTRUCTION	HANDOVER	OPERATIONS
Parametric Information	<p>Project needs update: definition of function(s), operation, quality and time.</p> <p>Benchmarking updated: capital cost, maintenance cost, time, health & safety, risk procurement contract.</p> <p>Performance requirements: Priorities and aspirations for: function, mix of uses, scale, location, quality, performance in use, cost (CAPEX & OPEX), value, time, health & safety, embodied and in use carbon, energy and resources needs, standard designs. Site constraints: geo-spatial, available site information.</p>	<p>Sufficient data to estimate per square metre rates and other similar metrics.</p> <p>Wireframe for surfaces/solids.</p> <p>Concepts, site context placeholder/ volumes/ package volumes, system routings, site selection, datum points & levels. Integrated concept for the project setting scope, scale, form and primary design criteria: architectural form and spatial arrangements, services philosophy and special arrangements preliminary assessment of energy use and embodied/in-use carbon, incorporation of standard systems</p>	<p>Co-ordinated Developed Design for the project setting: generic systems, objects, or assemblies represented with, detailed form, function, cost, defining all components in terms of overall size, typical detail, performance and outline specification, primary geometry frozen, integration of standard designs and systems, builders work strategy for significant interfaces, energy use, embodied and in use carbon.</p> <p>Maintenance plan Detailed design and construction program.</p>	<p>Production information for the project: Specific systems, objects and assemblies accurate in terms of specification, size, form, function and location. Critical interfaces flagged Fixing Methodology Confirmed clash free detailed production program sequence. Updated: energy use and embodied and in use carbon, detailed design and construction program</p>	<p>Production record for the project: Specific systems, objects and assemblies accurate in terms of specification, size, form, function and location with detailing, fabrication, assembly, and installation information Detailed routing of system Fixings and interfaces details to be used. Updated: energy use and embodied and in use carbon, detailed design and construction program.</p>	<p>Updated: Geometry and installed product information, "as constructed"</p> <p>Accuracy/resolution of information. Commissioned performance for: OPEX, energy, and carbon Detailed maintenance methodology. Snagging action status.</p>	<p>Revisions for modifications to the facility during its life.</p>
Employer activities							

Stage Number	1	2	3	4	5	6	7
Model Number	INITIATION	CONCEPT DESIGN	PRELIMINARY DESIGN	DETAIL DESIGN	CONSTRUCTION	HANDOVER	OPERATIONS
Critical Interfaces and logic	N/A	Environmental control philosophy and special allocations for ventilation; Availability of the site and outline construction methodology assumptions; Services capacity for the site Permitted working hours on site	Assumed procurement package performance ad spatial boundaries; Other relationships between procurement packages; Assumed design codes regarding dimensional tolerances of related systems; Foundation tolerances for use of off-site modular system; Assessment of predicted movements (thermal, loading, creep, shrinkage etc.)	Allocated procurement package relationships, performance and special boundaries; Actual dimensional interface requirements; Records of any derogations approved; Actual on-site to offsite interface specifications.	Progressive capture of actual dimensional data for critical interface dimensions. Progressive capture of information for calculating material requirements for follow on packages. Capture of object status for progress reporting and collaborative planning.	As constructed 3D scan Element performance test results. System Commissioning status.	As modified survey data.
Construction requirements (Examples)	N/A	Crane use zones; Traffic diversions	Confirmed crane (or other lifting system) zones framework details. Traffic diversion details.	Actual crane (or other lifting system) zones and movement sequences. Construction methodology, sequence and movements, critical to how the production design is developed.	Status of construction requirements. Safety briefing information. Construction methodology, sequence and movements, critical to installation. Formwork details including install and removal sequence. Actual traffic diversion details.	Confirmed status that the construction aids have been removed.	Design of any construction requirements, eg: temporary safety supports or restraint supports or restraint systems if structural defects have been discovered.
Project Costs	Initial project budget. Order of cost estimate.	Feasibility cost plan. Feasibility life cost plan.	Commitment Cost Plan. Contractor's first stage bid submission. Detailed whole life cost plan.	Contract Sum/Target price/ Agreed Maximum Price. Pre-construction whole life cost plan	Contract Sum/ Target Price/ Agreed Maximum Price. Pre-construction whole life cost plan.	Final account.	Actual in-use costs. Asset replacement sinking fund.
Project Logistics and off site activities (examples)	Client requirements, eg to avoid impact on other operations.	Assumed access and egress points; Potential delivery and lay down zones.	A feasible logistics sequence for the construction sequence; Confirmed modular strategy (volumetric, panelised, hybrid or other)	Finalised logistics sequences. Details of actual off-site system to be used.	Object status progress recording to initiate demand pull signals for deliveries.	Remote monitoring systems status.	Remote monitoring systems status.

Stage Number	1	2	3	4	5	6	7
Model Number	INITIATION	CONCEPT DESIGN	PRELIMINARY DESIGN	DETAIL DESIGN	CONSTRUCTION	HANDOVER	OPERATIONS
Project facilities (Welfare, IT Infrastructure, security etc) onsite and offsite (examples)	Collaboration tools; Data standards	Assumed access and welfare zones; Design team collocation.	Confirmed access zones and design team collocation.	Finalized, costed plan, Critical lead times confirmed. Off-site manufacturing capacity reserved.	Recording status of security critical areas (EG unchecked, sweep in progress, screened and secured)	Security system operational, potentially using model information for lines of sight from cameras, PAVA zone controls, etc.	Security system operational. Facilities management systems running on model generated information Geometry for letting activities accessed from "as constructed" model
Notes and associated project documents, based on model information	Management systems for information and decision making Approval policies.	Technical strategy studies. Commissioning philosophy NRM1 capital cost plan NRM3 maintenance cost plan	Provides the basis for Integrated Production Information to be produced on a package basis with limited risk of changes to primary coordination Room Information sheets, Detailed construction methodology NRM2 and NRM3 cost plans Health and safety risk management Risk Management plan.	Updated: maintenance plan, risk management plan, detailed construction methodology, NRM2 procurement pricing schedule, NRM3 maintenance cost an, health and safety risk management plan, risk management plan.	Detailed construction methodology, Updated health and safety risk management plan NRM3 maintenance cost plan	Approximate final account Maintenance procurement pricing Remedial works, handover and maintenance program.	N/A (project closed)

3.5 Master Production and Delivery Table (MPDT): The Employers Requirement

The Employers MPDT Requirements define the minimum LOD and LOI required for each System. These are explicitly defined in the Employers MDPT, which are referenced by to this EIR document.

NOTE: It is MMRCL's requirement that **model** Information Artefacts should be developed from the start of **DETAILED DESIGN** stage of the project. 2D drawings approved at the end of the preliminary stage should be used for developing the 3D Model which is only to be submitted for Review. On Final approval (Level A or Level B) of the 3D Model, 2D drawings are extracted and submitted for review with 3D drawings for Construction certification.

The Supplier shall develop the MIDP and BEP to provide assurances and evidence as to how the points below will be addressed:

- How models shall be developed to the required LOD/LOI.
- How models (and 2D drawings) shall be developed and issued to the CDE in the identified native and deliverable formats
-
- How the Supplier intends working collaboratively with interfacing disciplines and contracts in order to eliminate coordination issues, interface and design clashes and constructability and construction sequencing issues
- How all information artefacts (both models and drawings) shall comply with the **MMRCL - Engineering Assurance File Naming Convention** [Ref 5]
- How all information artefacts (both models and drawings) shall comply with the **MMRCL CAD Standard** [Ref 4]

3.6 Value Engineering

NOTE: The Supplier shall provide details of how Information Artefacts will be used to show the effectiveness (and provide assurance and evidence) of value engineering.

Value engineering must be integrated into the Design Review procedure. An MMRCL Operations Representative must have access to all relevant Information Artefacts and attend all value engineering reviews.

NOTE: The Supplier shall provide details of how Information Artefacts will be presented and approved during the review process.

3.7 Health and Safety and Construction Design Management (CDM)

NOTE: The Supplier shall provide details of how Information Artefacts will be utilised to support health and safety and CDM obligations; identifying, eliminating and reducing hazards and risks and providing better safety management.

Where the Supplier is contracted to carry out Detailed Design they shall provide details of process for integrating the construction plan with other components of the Production Information. Details shall include how safety measurements will be validated and how compliance with safety regulations will be checked.

3.8 Asset Information

Table 3-5 provides details of the Employer's corporate solutions for the management of Asset Information and the vehicle for delivery of the required information.

Table 3.5 – Asset Information		
Description		
System	Data / Information	Information Exchange Format
Bentley AssetWise	Documentation	Word/Excel/PDF
Bentley ProjectWise	Graphical Data	Refer to Table 6.2
	Non-Graphical Data	Excel

Note: Where the MMRCL MPDT Requirements extend to the CONSTRUCTION, HANDOVER or OPERATIONS phases, the Supplier shall develop and include a MDPT response within the Suppliers BEP providing assurances and evidence as to how the points below will be addressed:

- How Asset Information Artefacts shall be developed to the required LOD/LOI for each of the listed systems and project stages
- How Asset Information Artefacts (and 2D drawings) shall be developed and issued to the CDE in the identified native and deliverable formats
- How Asset Information Artefacts shall comply with the **MMRCL - Engineering Assurance File Naming Convention** [Ref 5]
- How Asset Information Artefacts (drawings) shall comply with the **MMRCL CAD Standard** [Ref 4]

3.9 Training Arrangements

The Supplier is responsible for making sure that their staff (and that of their Sub-contractors of any tier) are adequately briefed and trained to undertake the Information Management and Information Modelling aspects of the project.

The Supplier shall provide details of how they will make sure (and manage and maintain) their staff (and that of their Sub-contractors) have the capability and competency to provide verified and coordinated Information Artefacts in accordance with these EIRs.

4. STANDARDS, METHODS AND PROCEDURES

4.1 Standards

All Information Artefacts, as specified in the MPDT and as defined and agreed in the MIDP, shall be produced, managed and submitted into the CDE in accordance with the standards and procedures listed below and in any case in compliance with the **MMRCL EIR Standards, Methods and Procedures** [Ref 1].

Table 4.1 – Industry Standards		
Standard Ref	Title	Revision

BS 1192:2007+A2:2016	Collaborative production of architectural, engineering and construction information. Code of practice	N/A
BIP2207	Standard Framework and Guide to BS1192:2007	
PAS 1192-2:2013	Specification for information management for the capital/delivery phase of construction projects using building information modelling	
Digital Plan of Work (NBS Toolkit)	https://toolkit.thenbs.com/	
CIC BIM Protocol 2013		
Table 4.1 – Project Standards & Procedures		
Standard Ref	Title	Revision
MMRCL CAD Standard	MMRCL CAD Standard	V1.0

4.2 Security

NOTE: The Supplier shall provide details and assurances within the BEP of how the following potential security concerns will be addressed:

Note: that the scope and context of these security concerns relates to the Suppliers production and management of Information Artefacts, in particular when working outside of the MMRCL CDE

- How the Supplier will comply with all relevant MMRCL security policies
- How the Supplier will protect MMRCL IP (Intellectual Property)
- How the Supplier will make sure that access to Information Artefacts will be restricted only to the relevant, authorised personnel
- How the Supplier will protect Information Artefacts against malicious attack

4.3 Roles and Responsibilities

The role of a Project Information Manager shall be appointed by the Supplier.

The responsibilities of the Project Information Manager include:

- making sure that the BEP has been completed and agreed with the Employer and (where appropriate) briefed to Sub-contractors or suppliers of the Supplier and the relevant the Project / Task Team members
- making sure that the BEP is updated as works progress, in compliance with project change control procedures
- making sure that all Employer standards, methods and procedures are fully complied with
- promoting collaborative behaviours
- providing the focal point for all Information Artefact management issues on the project

-
- making sure that all Information Artefacts are compliant with the requirements of the contract and all relevant Employer standards
 - making sure that all Information Artefacts are managed and submitted through the CDE and that all mandatory meta-data has been populated
 - making sure that the Supplier, Sub-contractors or suppliers of the Contractor / Consultant, and the relevant the Project / Task Team members (as applicable) have continued and appropriate access to the Project Data Environment
 - providing clear instructions, including on the following areas:
 - which Information Artefacts are required, by whom and for what purpose;
 - who will generate the Information Artefacts and maintain them;
 - how Information Artefacts will be sorted and distributed;
 - how frequently Information Artefacts will be shared (for example for inter-disciplinary coordination purpose); and
 - what actions should be taken on receipt of Information Artefacts

The Roles and Responsibilities relating to the authoring, checking, sharing, publishing and management of the Information Artefacts can be found in the **MMRCL EIR Standards, Methods and Procedures** [Ref 1].

The Supplier shall assure MMRCL that that responsibilities have been adequately allocated and that a contact list of those assigned to the project, including Curriculum Vitaes (CV) is maintained for assurance purposes.

4.4 Naming Conventions

The Supplier shall make sure that a single File Naming convention is used for all Information Artefacts and that File Names are unique across the Project.

The File Naming Convention is defined in **MMRCL EIR Standards, Methods and Procedures** document [Ref 1].

4.5 Classification

The Supplier shall structure all Information Artefacts; categorising the functional and physical characteristics of the assets such that they can be efficiently identified, grouped and utilised

5. INFORMATION MANAGEMENT

5.1 System Performance and Constraints

The Supplier shall provide details of any limitations / restrictions of all IT systems; this should as a minimum determine limitations on files size and any restrictions on the use of the MMRCL recommended software platforms.

The Supplier is responsible for procuring, testing and implementing any required IT infrastructure, hardware and software in advance of project mobilisation and on-boarding.

5.2 Planning and Work Segregation

Zoning and Volume Strategy

The Contractor / Consultant shall provide details of their massing strategy in accordance with Section 3.4 **Level of Definition – Principles and Requirements** which shall define the extents of the proposed design, including:

- shape
- general size
- location
- orientation.

Modelling Strategy

The Supplier shall provide details of their modelling strategy, which must explicitly define how Information Artefacts will be developed to allow;

- parallel working across discipline / Task Teams
- coordination within (and across) interfacing disciplines / Task Teams and all adjacent works /contracts
- efficient Information Artefact exchange through the CDE
- delivery of graphical information in accordance with the **MMRCL CAD Standard** [Ref 4]

Volume Strategy

The Supplier shall provide details of their volume strategy, which must explicitly define how the extents of the massing strategy are sub-divided into spaces within which discipline / Task Teams can effectively coordinate their designs (i.e. rooms, horizontal and vertical circulation, structures, service routes).

The Supplier shall provide details of their processes for utilising the volume strategy to:

- federate models
- provide assurances and evidence of coordination between interfacing disciplines / Task Teams and all adjacent works / contracts
- design within each volume
- provide assurances and evidence of the coordination and integration between the volumes

Please refer to Section 3.4 **Level of Definition – Principles and Requirements** for more details.

5.3 Common Data Environment (CDE)

All Information Artefacts shall be authored, checked, shared, published and managed through the CDE, in accordance with **MMRCL EIR Standards, Methods and Procedures** [Ref 1] – but see qualifying notes below with respect to authoring and checking.

The CDE comprises:

- **A Project Data Environment**

MMRCL will provide a designated system accessible to all Task Teams and other relevant stakeholders (as authorised by MMRCL), which shall be used as a managed 'single source of truth' for all Information Artefacts **shared** for (non-contractual) coordination and collaboration purposes and for all Information Artefacts **published** for (contractual) MMRCL Design Review and Acceptance purposes

- **Task Team Data Environment(s)**

MMRCL will provide each Task Team with a dedicated, secure working area (the Task Team Data Environment) where Information Artefacts shall be Shared and Published, in accordance with the Master Information Delivery Plan (MIDP).

All Shared and Published Information Artefacts shall first be approved by the Task Team Manager before issue to the relevant Shared or Published Area of the Project Data Environment

All Shared and Published Information Artefacts shall first be approved by the Task Team Manager before issue to the relevant Shared or Published Area of the Project Data Environment

MMRCL shall provide the Project Data Environment as described in **MMRCL EIR Standards, Methods and Procedures** [Ref 1]. All other details relating to the Collaboration Tools used to support the CDE are documented below.

The Employer Collaboration tool is declared in Table 6.1a. Details of how the Supplier (and their Sub-contractors) shall access and interact with the system, including the security model, access rights and training and support to be provided is documented in the **MMRCL EIR Standards, Methods and Procedures** [Ref 1].

5.3.1 Task WIP (Work in Progress) Team Data Environment

Note that Suppliers may optionally choose to develop WIP Information Artefacts within the MMRCL Task Team Data Environment.

On request, MMRCL shall provide each Task Team with a secure WIP (Work in Progress) working area, where the Supplier can author and check Information Artefacts in advance of issuing to the relevant Shared or Published Area of the Project Data Environment should the Supplier choose to work this way – the Supplier shall notify and document this intent within the Suppliers BEP response

5.4 Collaboration Process

The Supplier shall make sure that all Information Artefacts are checked, approved and verified as Information Artefacts are issued to or are passed through the CDE.

The types of checks and approvals shall be determined by the purpose for which the Information Artefacts is being shared (refer to Section 8 of the SMP for further details).

The Supplier shall provide the following details:

- processes for checking, approving and verifying Information Artefacts within the CDE
- triggers for sharing / exchanging Information Artefacts
- purposes of sharing / exchanging Information Artefacts
- assurances of compliance against the prescribed information exchange format
- frequency and purpose of each design review / coordination workshop

5.5 Compliance Plan

The Supplier shall provide details and evidence of how Information Artefacts, delivered through the CDE, are:

- verified against Project Requirements (including the EIR)
- compliant with the standards set out in section 4.1,
- progressed to the agreed LOD as set out in the MIDPs and BEP
- spatially coordinated in relation to the assets physical space, operational space and maintenance space
- useable by the software platforms identified in Table 6-1
- in the information exchange formats identified in Table 6-2; and
- checked and approved for technical content, in accordance with the MMRCL Design, Review and Acceptance Procedure [Ref 6]

6. DIGITAL ENGINEERING

6.1 Software Platforms

6.1.1 Collaboration Platforms

The Employers Collaboration Platforms are listed in Table 6-1.

Table 6.1 – Employer Collaboration Platforms		
Use	Platform	Version
CDE: Project Data Environment – Collaboration Tool	Bentley ProjectWise	
CDE: Project Data Environment – DMS (Document Management System)	Bentley AssetWise	
3D/4D/5D integration	RIBiTwo	
Project Scheduling	Primavera	
Enterprise Reporting	SAP	

6.1.2 Content Development and Analysis Platforms

The Employer shall not place any restrictions on the content development or analysis tools to be used by the Supplier.

However, in order to minimise compatibility and interoperability issues, the Employers mandates that any DWG format which is issued to the CDE is published using AutoCAD version 14 or higher.

The Supplier shall document assurances to this affect through the BEP response.

6.2 Information Exchange Formats

The Supplier shall deliver Information Artefacts (issued through the CDE), in accordance with the MIDP and in the exchange formats declared in Table 6-2 and where appropriate in accordance with ***NRMCL CAD Standard*** [Ref 4].

Data/Information	Exchange Format
Documentation	PDF, DOC, XLS
2D Drawings (Design & Construction)	DGN, PDF
2D Drawings (As Built & Operations & Maintenance)	DGN, PDF
Native 3D discipline based models (Graphical Data)	DGN
Deliverable 3D models (Graphical Data)	iModel
4D Simulation (Graphical Data and Non-Graphical Data)	iModel, DGN
Survey data (for Design & Engineering context)	3MX, CSV, SHP
Cost Data (Non-Graphical Data)	XLS
Programs	XER, PLF, MPP, PDF, XLS

If necessary, the Supplier shall provide details of how interoperability issues will be addressed to make sure that Information Artefacts are delivered in the formats prescribed above.

6.3 Coordinates

All geographical Information Artefacts shall be exchanged, through the CDE, in compliance with the MMRCL Project Grid:

- Survey information, including mapping
- All Information Artefacts which represent the fixed geographical location of an asset or assets.

Details relating to the MMRCL Project Grid are listed below:

Geographic Coordinate System Properties	
Coordinate System	
Name	UTM84-44N
Description	UTM-WGS 1984 datum, Zone 44 North, Meter, Cent. I
Projection	Universal Transverse Mercator
Source	Snyder, J.P. 1987, Map Projections - A Working Man
Units	Meter
UTM Zone	44
Hemisphere	Northern
Minimum Longitude	77°30'00.0000"E
Maximum Longitude	84°30'00.0000"E
Minimum Latitude	01°00'00.0000"S
Maximum Latitude	84°00'00.0000"N
Datum	
Name	WGS84
Description	World Geodetic System of 1984
Source	US Defense Mapping Agency, TR-8350.2-B, Deceml
Conversion Method	WGS84 - no shift required
Ellipsoid	
Name	WGS84
Description	World Geodetic System of 1984, GEM 10C
Equatorial Radius	6378137
Polar Radius	6356752.3142
Eccentricity	0.081819190928906743
Source	US Defense Mapping Agency, TR-8350.2-B, Deceml
Coordinate System Modifiers	
Vertical Datum	Matches Datum
Local Transform Type	No Transform

Details relating to the dimensional consistency / units of measure are found in the **MMRCL CAD Standard** [Ref 4].

7. COMMERCIAL REQUIREMENTS

The Supplier shall respond to this EIR in the form of a BIM Execution Plan (BEP); the template for which shall be provided by MMRCL.

8. DEFINITIONS

Table 8 – Definitions	
Term	Definition
Asset Management Information System	Systems used to store and manage data about assets.
BEP (BIM Execution Plan)	A document within which the proposed approach, capability, capacity and competencies of the prospective or selected Contractor / Consultant sets out the response to the EIRs
CDE (Common Data Environment)	The agreed solution for the production, use and management of Model File(s), Composite Model(s), Non-Graphical Data, Document Definition(s) and Document Rendition(s), as set out in the SMP, BEP and MIDP(s)
Composite Model	Computer Aided Design (CAD) file(s) displaying one or more Model Files (attached as references), for the purpose of performing coordination activities and / or compiling Document Definitions.
Data Authoring	Creation of Production Information and Handover Information
Data Capture	Collecting, from various sources, Graphical Data and Non-Graphical Data relating to asset(s)
Data Coordination	Use of Graphical Data and Non-Graphical Data, about the asset(s), to virtually assure and evidence coordination across all task teams, existing infrastructure and adjacent works
Data Simulation	Use of Graphical Data and Non-Graphical Data to virtually test the design, construction, operation and maintenance of the asset(s)
Data Validation	Rule based tools used to validate and check all Production Information and Handover Information against the EIR and Standards
Data Visualisation	Visually representing Graphical Data and Non-Graphical Data to support decision making.
Document Definition	Data file produced, containing a view of the Non-Graphical Data and / or Model File(s) and / or Composite Model(s), to derive meaning for a specific purpose
Document Rendition	A data file in an immutable format, derived from a Document Definition
Handover Information	Model File(s), Composite Model(s), Non-Graphical Data, Document Definition(s) and Document Rendition(s) which have been agreed between the Parties to be produced, updated, maintained and delivered as set out in the Master Information Delivery Plan(s) in accordance with the Employers requirements
Information Artefacts	The collective term for Production Information, Handover Information and any other model or drawing deliverables identified in the within the MIDP and MPDT – all Information Artefacts shall be authored, shared, published and archived within the CDE

MIDP (Master Information Delivery Plan)	A forward looking schedule of the Model File(s), Composite Model(s), Non-Graphical Data, Document Definition(s) and Document Rendition(s) which are to be produced, maintained and delivered as Information Artefacts
Model File	Computer Aided Design (CAD) file(s) containing shape(s) with defined origin, orientation and dimensions, communicating the physical characteristic of the assets. A Model File may also include Non-Graphical Data, associate to the CAD file(s) and / or shape(s), identifying the functional characteristics of the asset(s)
Non-Graphical Data	Data file containing alphanumeric characters, communicating the physical and functional characteristics of the asset(s)
Primavera	MMRCL Project Planning Tool
Production Information	<p>The Model File(s), Composite Model(s), Non-Graphical Data, Document Definition(s) and Document Rendition(s), including Engineering Information which have been agreed between the Parties to be produced, updated and maintained in order to provide the Works and be delivered during the design and construction stages of the Project, as set out in the MIDP(s).</p> <p>Referred to within PAS1192-2 as the PIM (Project Information Model).</p>

MMRCL EIR Standards, Methods and Procedures



Document Status	
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1	MMRCL-Pune Metro-EIR V1.0	2007 + A2	20-April-2017
2	BS1192:2007+A2:2016 Collaborative production of architectural, engineering and construction information. Code of practice		2016
3	PAS 1192-2:2013 Specification for information management for the capital/delivery phase of construction projects using building information modelling		2013
4	MMRCL CAD Standard	V1.0	20-April-2017
5	MMRCL - Engineering Assurance File Naming Convention	V1.0	20-April-2017
6	MMRCL Design Review and Acceptance Procedure		20-April-2017
7	MMRCL Master Information Delivery Plan Template (MIDP)	V1.0	20-April-2017
8	MMRCL Master Delivery List (MDL)	V1.0	20-April-2017
9	MMRCL Master Production Delivery Table (MPDT)	V1.0	20-April-2017
10	MMRCL Level 2 BIM E2E Workflow Process	V1.0	20-April-2017
11	MMRCL Level 3 Drawing Process	V1.0	20-April-2017
12	MMRCL Level 3 Model Process	V1.0	20-April-2017

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1. PURPOSE

The purpose of this document is to set out the MMRCL SMP (**Standards, Methods and Procedures**), for the Pune Metro Project, including those relating to the MMRCL CDE (Common Data Environment), the means by which Information Artefacts, as set out in the MIDPs (Master Information Delivery Plans), are to be produced, used and managed.

The intent is to provide a common set of processes (including those in relation to the Common Data Environment) for the production, use and management of the Model Files, Composite Models, Non-Graphical Data and Document / Drawing Renditions.

This document shall be read in conjunction with **MMRCL-Pune Metro-EIR V1.0** [Ref 1], **BS1192:2007+A2:2016** [Ref 2] and **PAS 1192-2:2013** [Ref 3].

2. SCOPE

This SMP applies to all parties (including the Employer) involved in the Pune Metro Project, who are engaged in the production, use and management of Information Artefacts as set out and agreed in the MIDP(s).

3. PROJECT DOCUMENTS

See Appendix A: Document Map for the relationship between this and other EIR related documentation.

4. MASTER INFORMATION DELIVERY PLAN

The Supplier / Detailed Design Consultant / Contractor [**the Supplier**] shall provide one MIDP per organisation, per organisational role (as applicable).

The MIDP shall be populated and agreed and included as part of the Suppliers BEP response, during the mobilisation period, prior to commencement of any production information.

Note that all updates to the MIDP shall follow project change control procedures.

5. COMMON DATA ENVIRONMENT (CDE) PROCEDURES

5.1 General

The Supplier shall produce, use and manage all Information Artefacts in accordance with the procedures set out in Section 5.2 below.

The CDE comprises:

- **A Project Data Environment**

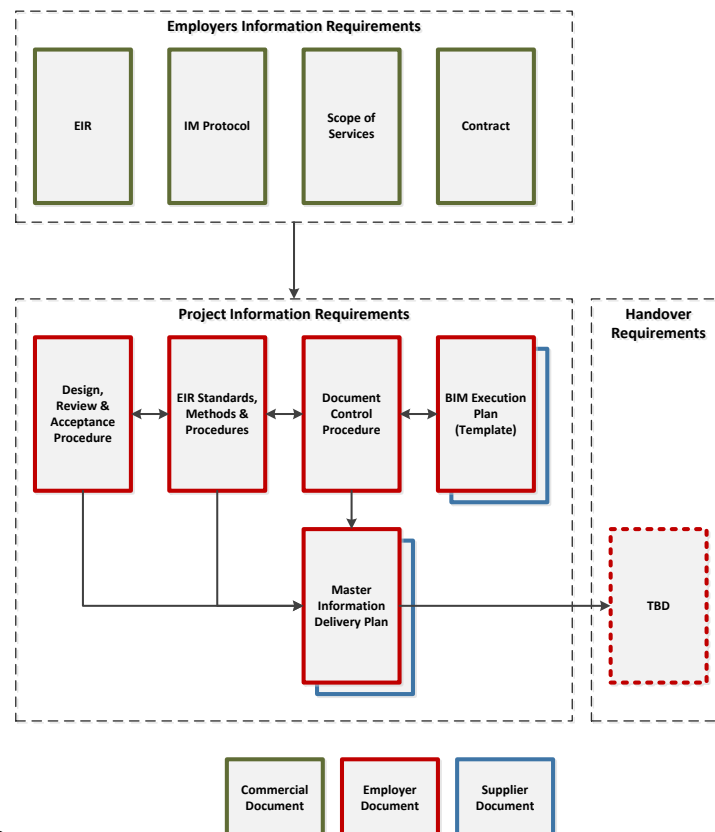
MMRCL will provide a designated system accessible to all Task Teams and other relevant stakeholders (as authorised by MMRCL), which shall be used as a managed 'single source of truth' for all Information Artefacts **shared** for (non-contractual) coordination and collaboration purposes and for all Information Artefacts **published** for (contractual) MMRCL Design Review and Acceptance purposes

- **Task Team Data Environment(s)**

MMRCL will provide each Task Team with a dedicated, secure working area (the Task Team Data Environment) where Information Artefacts shall be Shared and Published, in accordance with the Master Information Delivery Plan (MIDP).

All Shared and Published Information Artefacts shall first be approved by the Task Team Manager before issue to the relevant Shared or Published Area of the Project Data Environment

Note that on request, MMRCL will provide each Task Team with a secure WIP (Work in Progress) working area, where the Supplier can author and check Information Artefacts in advance of issuing to the relevant Shared or Published Area of the Project Data Environment should the Supplier choose to work this way – the Supplier shall notify and document this intent within the Suppliers BEP response.



Please refer to

5.2 CDE Procedure

5.2.1 Task Team WIP (Work in Progress) Area (Optional)

Note that Suppliers may optionally choose to develop WIP Information Artefacts within the MMRCL Task Team Data Environment.

On request, MMRCL shall provide each Task Team with a secure WIP (Work in Progress) working area, where the Supplier can author and check Information Artefacts in advance of issuing to the relevant Shared or Published Area of the Project Data Environment should the Supplier choose to work this way

The Task Team WIP Area of the CDE is where a Task Team can develop content using their organisations systems and tools. This is the only area of the CDE where Information Artefacts are to be produced and / or edited.

Access to each Task Team's WIP Area shall be restricted to those Task Team members who are authorised (by the Task Team Manager) to author Information Artefacts. Information Artefacts within this area of the CDE are not to be disseminated or used by other Task Teams, or the Employer, for any purpose.

All WIP Information Artefacts shall carry a preliminary revision that includes the major revision and minor version and the suitability 'S0 – Non Verified Data' (refer to Appendix D: CDE – High Level Workflow).

Before Information Artefacts are shared with other Task Teams and other parties including the Employer, the Task Team Manager shall make sure that all checks and reviews, as applicable for the purpose for which the Information Artefact is being shared (as set out in Section 8), have been carried out. The Task Team Manager shall then approve the Information Artefacts for issuing to the Project Shared Area (forming part of the Project Data Environment).

Before issuing Information Artefacts to the Project Shared Area, the Task Team Manager shall make sure that the applicable suitability code and revision have been designated (refer to Section 8).

5.2.2 Project Shared Area

The purpose of the Project Shared Area (of the Project Data Environment), is to serve as a 'single source of truth' for each Task Team's issued Information Artefacts. Only Information Artefacts within this area of the CDE are to be referenced by other Task Teams and other parties including the Employer. The Information Artefacts are to be used in accordance with assigned suitability codes. Refer to **MMRCL CAD Standard** [Ref 4] for a list of suitability codes.

Only Information Artefacts with applicable suitability code and revision, refer to **MMRCL CAD Standard** [Ref 4], that have been approved by the applicable Task Team Manager are to be held within the Project Shared Area of the CDE.

All Information Artefacts in the Project Shared Area of the CDE shall be read-only and shall not to be edited by any Task Team or any other party (including the Employer).

Where changes to the Information Artefacts are required, a new version shall be created and the revision incremented, '+1' and the minor version reinstated. Refer to **MMRCL CAD Standard** [Ref 4]. The new version shall be placed in the Task Team WIP Area and the old version retained in the Project Archive Area of the CDE.

Before accepting the Information Artefacts and issuing to the Project Published Area, the Project Manager shall make sure that:

- all relevant approvals are in place and the acceptance criteria have been met
- the applicable suitability code and revision have been assigned

5.2.3 Project Published Area

As part of the Project Data Environment, the Project Published Area of the CDE holds all the Information Artefacts which have been accepted by the Project Manager.

Only Information Artefacts that have been accepted, meet the acceptance criteria and have been assigned an applicable suitability code and revision (refer to **MMRCL CAD Standard** [Ref4]) are to be held within the Project Published Area.

All Information Artefacts in this area of the CDE shall be read-only and shall not to be edited by any Task Team, or any other party (including the Employer).

Where changes to the Information Artefacts are required a new version of the file shall be:

- created, its revision incremented, '+1' from its previous revision and the minor version reinstated (refer to **MMRCL CAD Standard** [Ref 4])
- placed in the WIP Area and the old version retained in the Archive area of the CDE

5.2.4 Archive

The Archive area of the CDE (within both the Task Team Data Environment and Project Data Environment) shall hold inactive and / or superseded Information Artefacts.

Information Artefacts in the Archive area are not to be amended or updated.

5.3 Information Security and Access

5.3.1 General

Security and access to the data and information held in each area of the CDE shall be assigned according to CDE Roles and Competencies.

5.3.2 CDE Roles and CDE Competencies

All Task Team members and other parties including the Employer's team shall be assigned to a CDE Role as defined in Section 7. Access to the Area(s) of the CDE shall be determined by these Roles.

Persons who are required to perform specific tasks (create, edit, approve, or accept) in a given area of the CDE shall be assigned the appropriate CDE Role.

Note: Although a project team member can be assigned one or more Competency, they shall not approve Information Artefacts that they have authored.

6. INFORMATION EXCHANGES

6.1 Task Team Data Environment

When Information Artefacts to be shared with others shall be:

- approved by the Task Team Manager
- issued to the Project Data Environment and a version retained in the Task Team Shared Area

6.2 Project Data Environment

Information Artefacts shall only to be shared with other Task Teams or other parties include the Employer, through the Project Data Environment.

Information Artefacts to be shared, can be copied from the Project Data Environment to the Task Team's Shared Area for (read-only) use, in accordance with the assigned suitability.

The MMRCL CDE is to be used as the Project Data Environment. The Project Data Environment has been configured to allow all Task Team Managers and the Employer to issue Information Artefacts, approved by the Task Team Manager, to the Project Shared Area; all other Task Team members have read-only access to the Project Shared Area.

Information Artefacts shall be shared, as a minimum:

- when a change to the design occurs which may impact another Task Team
- when a Task Team needs more space than that which has been allocated in order to meet design requirements and / or connection points / location of integration changes
- for design review meetings
- at each of the agreed project stages (in line with the Accepted Programme), at which time the Production Information and / or Handover Information shall be in accordance with MMRCL Standards (see Section 12.1).

Details of information exchanges between the Supplier and Sub-contractor(s) are to be included within the BIM Execution Plan, to be provided by the Supplier.

6.3 Supplier Responsibility

Before publishing Information Artefacts to the Project Shared Area Task Team Managers shall:

- make sure that Information Artefacts are review and checked in accordance with the suitability code for which Artefact is being shared
- make sure that the appropriate suitability code is assigned
- make sure that the appropriate revision code is assigned
- make sure that all mandatory metadata is assigned

In addition to the above, the Supplier shall make sure that all Information Artefacts, to be shared for Employer review and acceptance are:

- developed to a level of detail, as agreed within the MDPT and in accordance with agreed acceptance criteria
- checked, reviewed and approved in accordance with all relevant standards
- delivered in accordance with agreed project dates, the MIDP(s), MDPT, SMP and BEP

6.4 Site Information (including Survey)

6.4.1 Site Information

If Site Information is to be provided to the Supplier then this shall be documented within the MIDP and issued as part of the tender documents.

A list of the available Site Information to be provided by the Employer, along with its suitability for purpose, shall be documented in the MIDP by the Employer.

All Site Information shall be distributed through the Employer's Project Data Environment.

6.5 Employer Document Control (Employer use only)

The following systems are the Employer's internal solutions for the management of Information Artefacts.

Table 6.1 – Data / Information Systems		
System	Data	Contact
Bentley AssetWise	Non-Graphical Data and Document renditions	OSO
Bentley ProjectWise	CAD data	OSO
CMS (TBD)	Non-Graphical Data	OSO

All Information Artefacts, as per the agreed MIDP shall be distributed, by the Employer's Document Controller, through the applicable system (as per Table 6-1).

7. ROLES AND RESPONSIBILITIES (for Information Artefacts)

The purpose of this section is to define the roles and responsibilities anticipated to be required in order to produce and manage Information Artefacts. The emphasis is on ownership, responsibility and authority. These are in addition to roles and responsibilities already defined within the contract.

The Supplier shall maintain a list of persons assigned to each of these roles. It should be noted that project team members can be allocated one or more of these responsibilities as necessary.

7.1 Design Coordination Manager (appointed by the Supplier)

The Design Coordination Manager (also known as the Design Manager on some contracts) responsibilities include:

- providing the single point of contact for all communications between the design and construction teams
- making sure that all design deliverables, including that of sub-contractors, designers and specialist designers are integrate with the construction programme

-
- making sure that that design deliverables are delivered in accordance with the agreed programme and MIDP(s).

7.2 Lead Designer (appointed by the Supplier)

The Lead Designer responsibilities include:

- making sure that all Information Artefacts have been listed in the MIDP(s) and agreed by all parties
- making sure that the project Zones (used to segment the project into manageable subdivisions) are defined and maintained for the duration of the works (it is anticipated that a shared Zone Model File shall be maintained for this purpose)
- managing coordination and integration of the design, including the development and approvals of the Information Artefacts
- making sure the design is fully co-ordinated and integrated across all disciplines, existing infrastructure and any adjacent works
- Make sure all Information Artefacts are strictly controlled and shared through the Project Data Environment

7.3 Task Team Managers (appointed by the Supplier)

The Task Team Manager responsibilities include:

- the production of the design output for a particular task, or set of tasks allocated to the Task Team
- making sure that all checks and reviews, as applicable for the purpose for which the Information Artefact is to be shared (refer to Section 8), have been carried out
- approving of the Task Team Information Artefacts for issuing to the Project Shared Area
- providing authorisation for access to the Task Team WIP Area

7.4 Interface Manager (appointed by the Supplier)

The Interface Manager responsibilities include:

- as part of the Task Team, managing the spatial interface with other Tasks (the volume strategy determines the spatial allocation for each Task Team)
- proactively proposing resolutions to co-ordination clashes

For example: If a task requires additional space (i.e. the mechanical task team need to increase the area required for ventilation units) the interface manager for that task will discuss the impact of making additional space available with interface managers whose tasks are/or maybe affected

7.5 Project Information Manager (appointed by the Supplier)

The Project Information Manager responsibilities include:

- making sure that the BEP:
 - has been completed
 - is agreed with the Employer
 - is briefed to all Task Teams and other Parties including the Employer
 - is managed through the project change control procedures
- making sure that project processes are fully complied with and that collaborative behaviours pervade across the project
- providing the focal point for all Information Artefacts management issues on the project
- making sure that all Information Artefacts are compliant with the requirements of the contract and all applicable MMRCL Standards
- making sure that all Information Artefacts are managed through the CDE including that all mandatory meta-data have been captured and populated
- making sure that the Supplier, sub-contractors or supplier of the Supplier and others (as applicable) have continued and appropriate access to the Project Data Environment
- providing clear instructions to the Project Team including on the following areas:
 - what Information Artefacts are required, by whom and for what purpose
 - who will generate the Information Artefacts and maintain them
 - how it will be sorted and distributed
 - how frequently it is shared
 - what actions should be taken on receipt of the Information Artefacts

7.6 CAD Coordinator (appointed by the Supplier)

The CAD Coordinator responsibilities include:

- making sure that there is a consistent approach to modelling assets physical and functional characteristics across the project
- coordinating the project needs for IT solutions
- responsibility to the Task Team Managers and the Project Information Manager

7.7 CAD Manager (appointed by the Supplier)

CAD Manager responsibilities include:

- making sure that CAD Information Artefacts are compliant with agreed standards
- making sure that all CAD files are shared using the agreed IT solutions

7.8 Project Manager (appointed by the Employer)

The Project Manager responsibilities include:

- Making sure that that only compliant Information Artefacts are accepted and if applicable, making sure that any concessions required are in place before hand

7.9 Designated Technical Lead / Manager (appointed by the Employer)

The Designated Technical Lead / Manager responsibilities include:

- Registration of notifications and submittals
- Making sure that the Information Delivery Plan (comprising the Task Information Delivery Plan and Modelling Information Delivery Plan) covering submittals from the Supplier has been prepared
- Distributing within GC and MMRCL as appropriate
- Distributing to internal parties including Operations and Maintenance and external parties through MMRCL as required
- Collating comments and responses and convening working group meetings with the Supplier to resolve issues in presence of MMRCL representatives wherever required and receive resubmissions as required
- Convening technical, cost, value management and programming meetings within GC and MMRCL to properly review the content of deliverables
- Preparing reports on submissions, summarizing key issues, cost variations and programming impacts with associated recommendations

7.10 Lead Reviewer (appointed by the Employer)

The Lead Reviewer responsibilities include:

- Preparing a check list of reviewable data and inputs required by/from other disciplines
- Responding to the deliverables by the stipulated deadlines, and signing off as acceptable or otherwise each aspect of the design submission
- Delegating responsibility for acceptance and sign-off in cases of leave or other absence
- Identifying other parties or reviewers that require to have input into the review
- Reviewing comments provided by reviewers before issuing to back to the Supplier

7.11 Employer Information Manager (appointed by the Employer)

The Employer Information Manager responsibilities include:

- Completing, maintaining and implementing this document and making sure that it is available to all Task Teams and other Parties including the Employer
- managing the processes for information exchanges between the Supplier and Employer
- making sure that project processes are being followed by all Task Teams and other Parties, including the Employer
- providing the focal point for Information Modelling and Management issues

-
- making sure that collaborative behaviours are embraced

7.12 Document Controller (appointed by the Employer)

The Document Controller responsibilities include:

- making sure that project document control procedures are being followed by all Task Teams members and any other relevant Parties
- making sure that all Information Artefacts are delivered using the agreed IT solutions
- making sure that only Information Artefacts listed and agreed to be delivered in the MIDP(s), are delivered and accepted
- making sure all Information Artefacts, accepted by, or on behalf of the Project Manager, are distributed to the applicable MMRCL system (refer to Section 6.5)

8. INFORMATION ARTEFACTS: CHECKS, APPROVALS & ACCEPTANCE

8.1 Checks and Approvals

Before any Information Artefact is issued to the Project Shared Area, it shall first be checked and approved by the Task Team Manager. The level of checking and approval required will depend on the purpose for which the Information Artefact is being shared.

See Appendix D: High Level Workflow

- **Sharing for Coordination**

Information Artefacts shall be shared for coordination purposes (with the suitability, S1 – Issued for Coordination) in accordance with the MIDPs.

Before being issued to the Project Shared Area, all Information Artefacts to be shared for coordination purposes shall be:

- checked and verified against all applicable data and information standards (including the SMP and BEP)
- checked for technical content (in accordance with the Design Management Plan)
- approved for issue by the Task Team Manager

Information Artefacts, which have been shared for coordination, shall be used by other Task Teams and / or stakeholders to coordinate their design

- **Sharing for Review and Comment**

Information Artefacts shall be shared for review and comment purposes (with the suitability 'S3 - For Review and Comment') in accordance with the MIDPs.

The Circumstances under which Information Artefacts are issued for review and comments shall be specifically identified within the MIDPs but these may include:

-
- If there is a change to a Task Team's design which potentially impacts on other Task Teams and / or stakeholders
 - the Task Team requires additional space than that already allocated and / or connection points
 - The Task Team requires location integration changes

Where Information Artefacts are to be used, for example in Design Reviews, Coordination meetings, Inter-Disciplinary Design Review, Inter-Disciplinary Design Checks, they shall be shared for comment.

Before being issued to the Project Shared Area, all Information Artefacts to be shared for review and comment purposes shall be:

- checked and verified against all applicable data and information standards (including the SMP and BEP)
- checked for technical content (in accordance with the Design Management Plan)
- approved for issue by the Task Team Manager

Task Teams and / or other Parties, including the Employer, shall comment as applicable to make sure issues are identified and resolved.

Note that, Task Teams and / or other Parties, including the Employer, shall not change or coordinate their design based on Information Artefacts which have been issued for Review and Comment.

- **Sharing for Employer Review and Acceptance**

Information Artefacts shall be shared for Employer Review and Approval (S4 – Issued for Approval) in accordance with the MIDPs.

At the agreed project stages, as captured in the MIDP(s) and aligned with the accepted programme, Information Artefacts shall be shared using the suitability, S4 – Issued for Approval.

Before being approved, by the Task Team Manager and published to the Project Shared Area for Employer Review and Acceptance, the Supplier shall make sure that all Information Artefacts:

- are checked and verified against all applicable data and information standards (including the SMP and BEP)
- have the technical content checked (in accordance with the agreed DMP)
- meet design requirements (appropriate for the stage of the project at which it is being accepted)
- comply with all applicable MMRCL Standards
- are developed to the Level of Development, agreed within the MIDP(s)
- are approved by the Lead Designer as a coordinated and complete dataset; CAD files, Non-Graphical Data and Documentation cross-referenced and aligned
- all Model File content is approved by the Lead Designer as being spatially coordinated

8.2 Employer Acceptance

Prior to Information Artefacts being accepted by the Project Manager and moved to the Project Published Area (of the Project Data Environment), all acceptance criteria shall be in place; and any comments returned to the Supplier for incorporation prior to acceptance.

When accepted, the Employer shall move the Information Artefacts to the Project Published Area, in accordance with the Document Control procedure.

Document Renditions are **NOT** to be accepted until the Model File(s), Composite Model(s), Non-Graphical Data and Document Definition(s) used to produce them have first been accepted.

9. UNIQUE FILE IDENTIFICATION

All Information Artefacts shall be allocated a unique file identifier (file ID).

The file ID shall be composed of joining the fields (metadata) as defined in compliance with the **MMRCL - Engineering Assurance File Naming Convention** [Ref 5]

10. METADATA

In addition to the metadata required for the unique file ID, all Information Artefacts shall be attributed the metadata shown in Table 10-1.

Table 10.1 – Mandatory Metadata	
Field	Example
Unique File Identification	See Section 9 Unique File Identification
Revision	P04
Suitability	S3 (For Comment)
Title	Station Lift Shaft 1
Created (Author)	
Approved	
Authorised	
Grid Reference System	MMRCL Project Grid
Security Classification	MMRCL Restricted

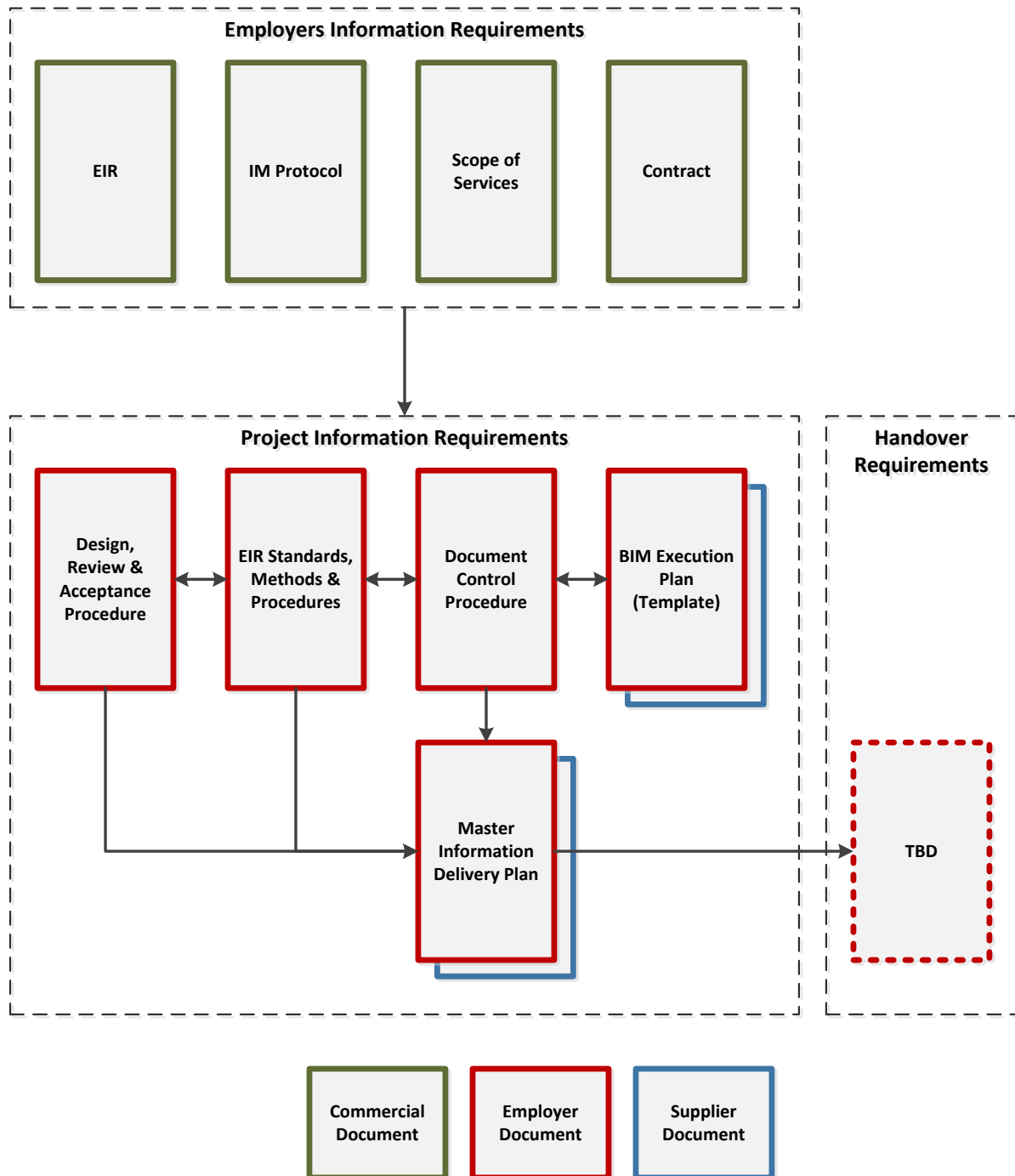
Lifecycle Stage	Detailed Design
Project / Contract	

11. DEFINITIONS

Table 12.1 – Definitions	
Term	Definition
BIM Execution Plan (BEP)	A document within which the proposed approach, capability, capacity and competencies of the prospective or selected Supplier sets out the response to the EIRs
CAD (Computer Aided Design) File	Electronic file produced using a CAD application (such as MicroStation or AutoCAD)
CDE (Common Data Environment)	The environment, which encapsulates the processes set out in SMP and BIM Execution Plan, for the production, use and management of Model File(s), Composite Model(s), Non-Graphical Data, Document Definition(s) and Document Rendition(s) as agreed between the Parties and set out in the MIDP(s)
Composite Model	Computer Aided Design (CAD) file(s) displaying one or more Model Files (attached as references), for the purpose of performing coordination activities and / or compiling Document Definitions
Documentation	A collection of Document Renditions
Document Definition	Data File produced, containing a view of the Non-Graphical Data and / or Model File(s) and / or Composite Model(s), to derive meaning for a specific purpose
Document Rendition	A data file in an immutable format, derived from a Document Definition
Handover Information	Model File(s), Composite Model(s), Non-Graphical Data, Document Definition(s) and Document Rendition(s) which have been agreed between the Parties to be produced, updated, maintained and delivered as set out in the MIDP(s) until the Defects Certificate has been issued
Information Artefacts	The collective term for Production Information, Handover Information and any other model or drawing deliverables identified in the within the MIDP and IMPDT – all Information Artefacts shall be authored, shared, published and archived within the CDE
MIDP (Master Information Delivery Plan)	A forward looking schedule of the Model File(s), Composite Model(s), Non-Graphical Data, Document Definition(s) and Document Rendition(s) which are to be produced, updated, maintained and delivered as Information Artefacts by the Supplier
Model File	Computer Aided Design (CAD) file(s) containing shape(s) with defined origin, orientation and dimensions, communicating the physical characteristics of the works. A Model File may also include Non-Graphical Data, associated to the CAD file(s) and / or shape(s), identifying the functional characteristics of the works
Non-Graphical Data	Data file containing alphanumeric characters, communicating the physical and functional characteristics of the works

Production Information	<p>The Model File(s), Composite Model(s), Non-Graphical Data, Document Definition(s) and Document Rendition(s) which have been agreed between the Parties to be produced, updated and maintained in order to provide the Works and be delivered, during the design and construction stages of the Project, as set out in the MIDP(s).</p> <p>Referred to within PAS1192-2 as the PIM (Project Information Model).</p>
Task Team	<p>Any team assembled to complete a task, which is typically discipline based (e.g. architectural task team, structural task team, bridge task team, track task team etc.)</p>

APPENDIX A: DOCUMENT MAP

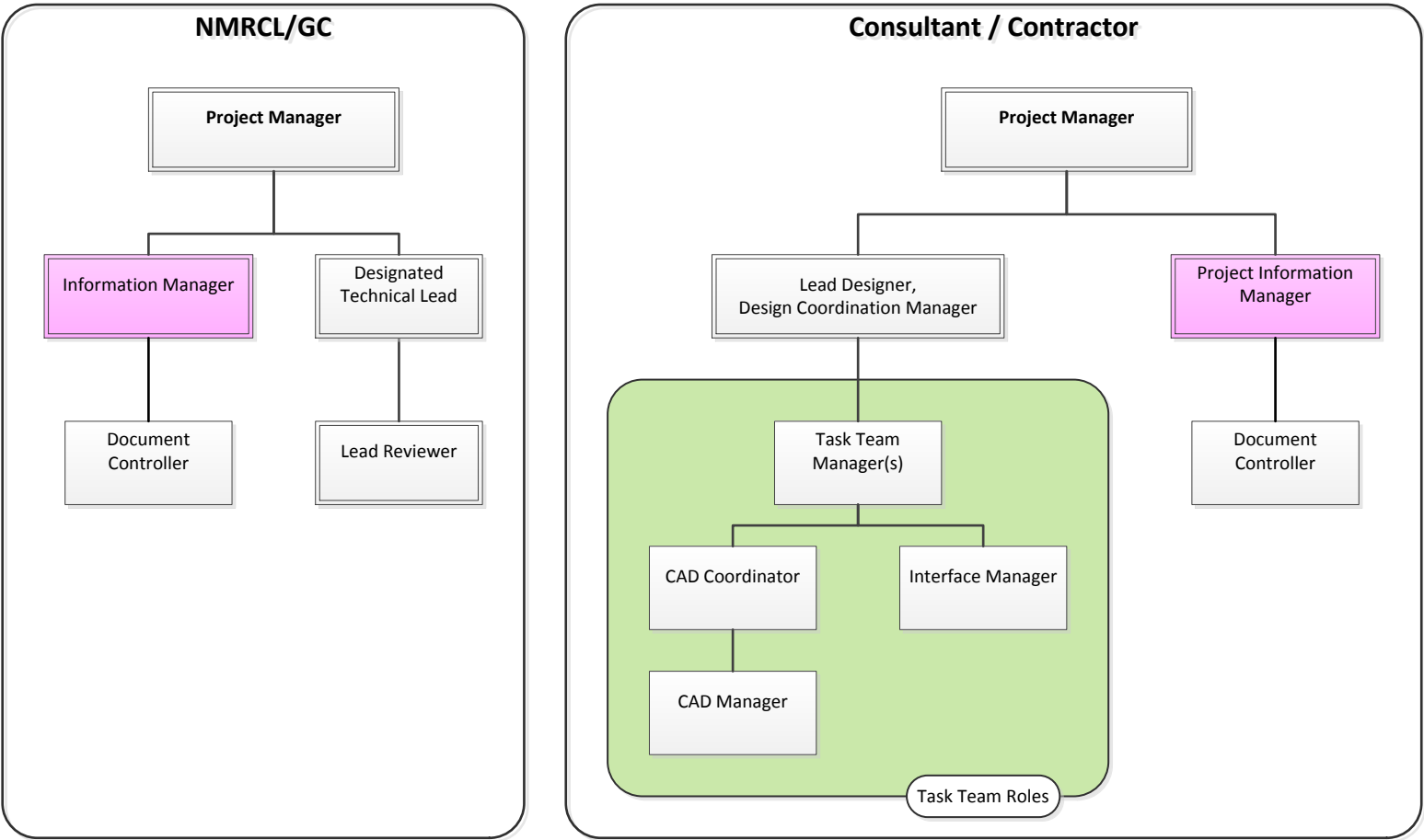


APPENDIX B: CDE (COMMON DATA ENVIRONMENT)

For the CDE End to End Process please refer to the following procedure:

- ***MMRCL Level 2 BIM E2E Workflow Process*** [Ref 10]

APPENDIX C: INFORMATION ROLES AND RESPONSIBILITIES



Notes:

The purpose of this diagram is only to illustrate the primary information management roles
Lines of authority may vary
An individual may undertake one or more roles

APPENDIX D: CDE – HIGH LEVEL WORKFLOW

For the CDE High Level Workflows please refer to the following procedures:

- Drawing Information Artefacts: **MMRCL Level 3 Drawing Process** [Ref 11]
- Model Information Artefacts: **MMRCL Level 3 Model Process** [Ref 13]

1.1 IT Requirement of Employer - MMRCL Digital Project management platform to be used for PMRCL

1.1.1 Employer's Enterprise wide IT system i.e. "Digital Project Management Platform" will be the working environment that enables higher efficiency and effectiveness, not only in internal functions, but also across the entire ecosystem of the Employer including Contractors and DDC's. The digital platform has following application stack:

- (a) Collaborative drawing, transmittals and related document control and management services (using Bentley ProjectWise and AssetWise solution)
- (b) Scheduling services (using Oracle Primavera P6 Enterprise Project Portfolio Management (EPPM))
- (c) Project Management with progress and performance reporting (using Primavera P6 & Unifier solution)
- (d) Progress and performance reporting with visualization (using RIB iTWO)
- (e) RFI's RA Bills, document submissions to GC and PMRCL (letters , daks, files etc.) using Enterprise wide ERP SAP implementation
- (f) Asset Information management in O&M phase

1.1.2 The proposed IT system has been conceptualized for facilitating preservation of important artifacts (3D virtual construction federated BIM Models in line with "Modelling guidelines", drawings, notes, documents, plans, reports etc.) in a secure and manageable environment in digitized format. Appropriate triggers shall generate dashboards and management reports every time an event causes a substantial shift in the project risk or a deviation in processes is developed. The envisaged system would expedite decision-making, ensure better planning and coordination between different functions, better data management, effective reporting, knowledge management etc. Program management shall provide senior management with critical information related to various contracts, activities and funds in the form of management dashboards with inbuilt triggers to ensure timely decision-making. Clause 1.1.6 details out the bidder's expected involvement on PMRCL's Digital platform

1.1.3 The effective use of such IT platform requires availability of system at all requisite locations i.e. with Employers' various offices, Engineer's offices, Contractors' end, major sub-contractors' end, design consultant ends etc. with certain definite users' rights. Data uploading by various authorized and trained users is key to effective use of the IT system. Employer has recognized this aspect, and the Contractors are required to consider in their proposal the cost of PMRCL's software usage as 'IT administrative charge's.

1.1.4 In view of the above, the Contractor (or it's approved sub-vendor) shall be required to:

- (a) Follow and comply the system guidelines to be issued by Employer
- (b) Comply all the software system and required BIM competency which include appropriate BIM technology, BIM enabled resources & BIM process as per BS 11922007+A2:2016 (shall have to submit pre-contract "BIM Execution Plan"; BEP in prescribed format and be subjected to precontract BIM assessment process to be qualified for bidding) requirement by taking training from Employer and/or Employer's recommended Agency .
- (c) Upload f Project Plans as per the template and using software defined by the Employer;
- (d) Maintenance and updating of uploaded Project Plans in software used by the Employer;
- (e) Upload models, drawings / designs created by the Contractor as per the classification and on the software platform defined by the Employer;
- (f) Key contract related communication and progress related data as per processes defined on the software platform deployed by the Employer
- (g) Asset creation and tagging to be done in the BIM models in line with Employer's "Asset Strategy/Asset Information Requirement" & "Modelling guidelines" along with details need to be updated in the system in the format prescribed by the Employer;

Bidder is expected to review section 1.1.6 for more details for bidder's expected involvement on Employer's Digital platform

- 1.1.5 Employer, his IT Project Team and IT Implementation Agency shall render necessary assistance for the training of contractor staff.
- 1.1.6 Bidder will need to be accessing Employer's digital platform for at least the mentioned functions as applicable as per bidder's respective scope of work. However the function list is indicative and precise activities from bidder on Employer's digital platform will be updated and communicated to bidder on time to time basis.

Following are the deliverables in form of collaboration with 5D BIM by Bidder:

- 1.1.6.1 Creation of 3D engineered intelligent Models using discipline specific modeling/engineering applications.
- 1.1.6.2 Creating 2D drawings extracted from 3D engineered intelligent Models, in CAD – plan, section, elevation and other relevant details (based on specific engineering disciplines) to be accessed by the contractors for construction.
- 1.1.6.3 Bidder need to comply with the following requirements in regards to the production of all the CAD (3D/2D) data files and building information modeling (BIM) work.

1.1.6.3.1 Model file production principles

- 1) Bidder need to follow British Standard BS 1192:2007+A2:2016 for Collaborative production of architectural, engineering and construction information - Code of practice as a guide for drawing practice, convention, CAD data structure and translation.
- 2) Bidder need to model all design and construction information as an individual discipline model and then collaborate it in single master 3D composite model (free from any clashes both soft & hard), using object based software, allowing for 2D models to be extracted as required.
- 3) Bidder need to create and share details of individual components of 3D models for each discipline involved.
- 4) Bidder need to share all individual discipline models as well the collaborated single master model through the Engineering Information & Collaborative document control and management services (using Bentley ProjectWise and AssetWise solution) in specified file format (Refer "Employer's Information Requirement"; EIR) System for review by GC/PMRCL. Clash detection and resolution process will run in this composite area. All 3D model data together with all 2D drawing extractions needs to be spatially coordinated with the Geospatial System.WGS84/UTM Zone 43N coordinate system (refer "Employer's Information Requirement"; EIR) needs to be followed for proper geo-referencing of all the engineered 3D models that will be created.

1.1.6.3.2 Model file composition

- 1) Bidder need to generate model files using seed files/template (2D and 3D) in line with Employer's "modelling guidelines". Seed files/template will standardize all the new drawings that one creates. It will standardize the same global origin, color table, cell library attachments, working units, views etc.
- 2) All graphical elements need to be placed in the model view
- 3) Model files need to have a title box placed in the sheet view
- 4) All model files need to be created at 1:1 scale

1.1.6.3.3 Model Outputs

- 1) Within the engineering collaboration system the central premise is that only approved data is

shared. Each discipline WIP area can only reference data from the shared area i.e. approved data. When this data comes together in the composite model it can be fully coordinated and composite renditions can be produced in 3D.

1.1.6.3.4 Model Reviews

- 1) Bidder needs to ensure that the level of complexity and granularity for each discipline CAD model is appropriate for the stage of Works.
- 2) DDC's/D&C's needs to ensure that all disciplines integrate and coordinate their outputs in terms of both spatial and functional provision. This shall be demonstrated through the extensive use of coordinated design review sessions which shall include for the coming together of all relevant discipline models into a common master model (model composite) where engineering assurance and coordination checks shall take place.

1.1.6.3.5 Existing Infrastructure data sets

- 1) Bidder need to model existing infrastructure and systems in sufficient detail as to provide integration with the works under contract
- 2) Bidder need to clearly highlight the unresolved areas of non-coordination in structure/services/finishes/clashes on the drawings and the model at all times in case of existing infrastructure data sets
- 3) Bidder need to report back to the owner any discrepancy with the existing data for their action

1.1.6.3.6 Coordination and integration – Drawing Packages

- 1 Within the BIM environment each of the disciplines need to reference other models in a timely manner for coordination purposes. The head of each discipline group shall decide the extent and nature of supporting discipline data that shall be displayed in each of their own discipline drawing submissions. Clash detection software routines needs to be run on the multi-discipline model and on combined master models and any clashes resolved. The reports of which will be submitted on request of the Engineer
- 2 Specific drawing packages are required from each discipline. The drawings need to comprise of 2D extractions of the 3D models from the engineering collaboration system.
- 3 All CAD drawings need to be comprised of 2D models extracted from the 3D master model. Any subsequent design scheme changes that are required to be fully coordinated shall be modelled in 3D and the drawing extraction re-run to produce revised plots.
- 4 All plot composition files need to be checked as prescribed by the workflow setup in the engineering collaboration system before submission to the Engineer.

1.1.6.4 The bidder shall take full advantage of the 3D object attributes available in the BIM environment to prove cost, constructional logic, fabrication, and program as required by the PMRCL/GC. Engagement modality expected for Project Management works including 4D & 5D BIM requirements: -

1. Bidder will access Project Monitoring application (Primavera) of PMRCL
2. Bidder will have to create Work Breakdown Structure (WBS) for its scope of work in the master project prepared and released by PMRCL on Primavera.
3. Bidder will have to create all the relationships between various activities to generate a Critical Path Network on Primavera.
 - The project plan will be detailed to reflect the planned construction progress as per the elements defined in the 3D BIM model. Primavera plan will get linked to 3D BIM collaborated intelligent model to reflect and review time based planned progress of project on a BIM model. Bidder's project plan on PMRCL Primavera platform will be required at this level.
4. Once the network has been scheduled and baseline by PMRCL, the Project Coordinator will

have to provide periodical updates for various activities.

5. Bidder will also be required to furnish key cost / budget details along with resources on PMRCL's Primavera platform. Level of details for time plan, cost, and resources from bidder will be communicated to bidder at appropriate stage.
6. During the execution stage bidder will be required to operate on PMRCL's Primavera platform to reflect details towards work performed, progress achieved, resources consumed, forecast dates, forecast resources, remaining work along with any other key details as required by PMRCL / GC. PMRCL will be communicating on level of details as well frequency of such interactions at appropriate stage.
7. Bidder shall update and revise their work program on the integrated master schedule of the project subject to directions & approval from PMRCL.
8. Bidder will be required to periodically capture actual progress visualization of respective package work using suitable technology which can be updated in 5D BIM platform.

1.1.6.5 In order to adopt 5D BIM platform bidder need to follow Employer's Information Requirement (EIR), Standards Methods & Procedures (SMP), BIM Execution stage Plan (BEP) template, CAD standards, BIM Assessment Form and Asset Information Requirement (AIR) Documents. prepared Bidder has to collect and comply with all these requirements while bidding. The EIR will enlist the standards, methods and procedures that one has to follow in order to be BIM Compliant. EIR will have details such as file naming convention, CAD file transfer format, geo-coordinate system, Common Data Environment (CDE) process, Roles & Responsibilities, Level Of Definition (LOD) requirements etc. along with other artefacts e.g. Document Review & Acceptance (DRA) process, CAD standards along with layer naming convention, Attribute Standards, etc., BIM standards, modelling guidelines, Asset Information Requirement (AIR) along with asset data Dictionary, Asset Classes, etc.

1.1.6.6 Bidder shall access the enterprise wide Maha metro's SAP system to create/provide/ submit the data and documents for RFI, Billing, Quality inspection records, safety compliance, & communications with PMRCL & GC like file, dak, letter etc.

1.1.6.7 Bidder shall comply to the requirements in case of changes to the digital platform done to towards process improvements and statutory compliances.

1.1.6.8 Minimum login credentials (as decided by PMRCL) per bidder will be provided by PMRCL to the bidder to access PMRCL digital platform as per against 'IT administrative charges' as mentioned in clause 1.1.3. In case, bidder envisages more user licenses for their internal data preparation through their internal user (like detailed drawing or project plan preparation by multiple users) which is required for finalizing data to be entered in PMRCL's digital platform, then it will be bidder's responsibility to ensure own licenses. However the access to PMRCL's digital platform will be through provided user credential only.

1.1.6.9 Penalty of 0.5% from the bills will be levied in case of non compliance of the process & data on the MMRCL Digital platform .

1.1.6.10 The engineering collaboration platform will be provided by PMRCL and is mandated for the structure and the controlled sharing of the information created during the process

- | | |
|------------|--|
| 1.1.6.11 | Reference documents : |
| 1.1.6.11.1 | EIR (Employers Information Requirement) including SMP |
| 1.1.6.11.2 | CAD Standards template |
| 1.1.6.11.3 | BEP (BIM Execution Plan) including BIM assessment form |
| 1.1.6.11.4 | Model Guidelines |



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Category 1 Standard Computer Aided Design (CAD) Data

Issue No.: A0

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1 Purpose

- 1.1 The purpose of this standard is to define requirements for data contained within, and Meta-data associated with, Computer Aided Design (CAD) files.

2 Scope

- 2.1 This standard applies to CAD data and meta-data captured, created or generated by MMRCL or on behalf of MMRCL by its Suppliers.

3 Requirements

3.1 General requirements

- 3.1.1 CAD files shall be delivered in Bentley's v8i DGN / DWG (Acad 2014 or Newer) file format.
- 3.1.2 Designs that have been developed using other CAD file formats, shall:
- a) Have layers, line-types, line-weights, fonts and colors mapped to those fully Compatible with Bentley's v8i DGN / DWG (Acad 2014 or Newer) file format; and
- 3.1.3 Ownership of the data contained within CAD files shall be clear. (As per EIR)
- 3.1.4 CAD files meta-data, defined within 3.2.9 shall be displayed in both electronic and printed form.
- 3.1.5 Where CAD layers (see 3.10) are required, but not supplied by MMRCL, these shall be added to the contracted organization's library.
- 3.1.6 Each contracted organization is responsible for the entire content of their CAD files.
- 3.1.7 Each contracted organization is responsible for ensuring their CAD files are compliant with this standard.

3.2 CAD File requirements

- 3.2.1 CAD file requirements shall apply to model files, composite models and drawing Definition files.
- 3.2.2 Document numbers shall be assigned following the CAD file naming convention (see 3.9). (See EIR)
- 3.2.3 CAD files shall carry the meta-data, 'Created', to identify the author at each revision.
- 3.2.4 CAD files shall carry the meta-data, 'Approved', to identify the approver at each revision.
- 3.2.5 CAD files shall carry the meta-data, 'Authorised', to identify who has accepted each revision, on behalf of MMRCL.
- 3.2.6 Custom line styles shall use a scale factor of 1 (one) and be delivered to MMRCL within a



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design library file.

3.2.7 A tag shall be placed in each CAD file containing the following mandatory file meta-data:

	Field	Clause
a)	Project	As per Naming Convention in EIR
b)	Owner Organization	As per Naming Convention in EIR
c)	Asset Class	As per Naming Convention in EIR
d)	Location (LCS Level 1) / Level	As per Naming Convention in EIR
e)	Suitability	3.7.2
f)	Revision	3.7.3
g)	Drawing Number	3.2.2
h)	Created (Author)	3.2.3/4.1
i)	Approved	3.2.4/4.2
j)	Authorized	3.2.5/4.3
k)	Title	3.3.1/3.4.1

Notes: Tags containing fields for the mandatory file meta-data will be supplied by the Client.

3.2.8 Additional mandatory meta-data shall be captured against the CAD file (but not placed within the file), as shown in the table below:

	Field	Clause
a)	Level	As per Naming Convention in EIR
b)	Type (of information)	As per Naming Convention in EIR
c)	Organizational Role	As per Naming Convention in EIR
d)	Number	As per Naming Convention in EIR
e)	Pathway Project Code (supplied by Client)	N/A
f)	Lifecycle Stage	3.6

3.2.9 Should CAD files pass through an environment that cannot track meta-data (MS Windows, CD, email etc.) then the mandatory file meta-data shall be delivered with the associated CAD files, within an approved import / export spread sheet.



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3.2.10 CAD files shall have file settings set to the values shown below:

	Setting	Value
a)	2D Global Origin offset from Design Plane Centre (excludes Drawing Definition files (DR))	-214748.3648, -214748.3648
b)	3D Global Origin offset from Design Plane Centre (excludes Drawing Definition files (DR))	-214748.3648, -214748.3648, 0
c)	Resolution	10000 per Distance Meter
d)	Working units - Accuracy	0.1234
	Spatial Data	
e)	Working units - Master units	Meters (label m)
f)	Working units - Sub units	Millimeters (label mm)
	Non-Spatial Data	
g)	Working units - Master units	Millimeters (label mm)

3.3 Model files requirements (Please also see detailed EIR)

- 3.3.1 All model files (including Composite Models) shall be given a title to identify the contents, captured as file meta-data.
- 3.3.2 Model files (including Composite Models) shall contain a single model design only.
- 3.3.3 Elements shall be placed in the model file at a scale of 1:1.
- 3.3.4 All references within Model Files shall have display turned off when issued to MMRCL.

3.4 Drawing definition requirements

- 3.4.1 All drawing definition files shall be given a title to identify the contents, captured as file meta-data.
- 3.4.2 Drawings shall be composed through the use of a 'Drawing Definition File', which contains only the relevant annotation, dimensions etc. with all design information attached as reference file(s), via a composite model (with the exception of schematics and details) (see 7.1).
- 3.4.3 Drawing definition CAD files shall contain a single drawing definition only.
- 3.4.4 Drawing borders shall be referenced in the sheet model at a scale of 1:1.



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- 3.4.5 Annotation, dimensioning etc. shall be placed on presentational CAD layers as defined in 3.13.8.
- 3.4.6 Dimensions shall be associative for all 'drawn to scale'.
- 3.4.7 Non-displaying references shall be detached prior to being issued to MMRCL.

Note: i. Wherever possible (e.g. for 'drawn to scale' design drawings), dimensioning should be associative. Indicative or not to scale dimensions should have, 'NTS' placed next to them

3.5 Presentational requirements

- 3.5.1 Fonts for texts : ISOCP and ARIAL
The texts width factor cannot be changed. Italics not to be used
The texts must be in « TEXT » layer

- 3.5.2 Text shall be written in sentence case.

- 3.5.3 Text height shall conform to BS EN ISO 3098.

- Text heights (For A1 sheet)
2.0mm, 2.5 mm and 3.5 mm: Dimensional text & General text, Notes.

5.0 mm: Normal titles

7.0 mm: Major titles

The recommended minimum text height is 2.5mm or 3.5mm for A1 drawings in case these need to be printed in A3 size also.

- Text heights (For A3 sheet)
1.8mm, Dimensional text & General text, Notes.

2.5 mm: Normal titles

3.5 mm: Major titles

- 3.5.4 All measurements (dimensions, volumes, weights etc.) shall be expressed using units based on the metric system (international system of units, SI).

Dimensions

- All dimensions shall be associative.
- Unit is millimeter
- The styles are the styles defined in the template file and shall not be modified.
- The dimensions must be in layer « DIM »
- The dimensions with forced values are not allowed.

- 3.5.5 Scales used on drawings shall confirm to BS EN ISO 5455, preferred scales shown below:



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Recommended Metric Scales		
1:2	1:5	1:10
1:20	1:50	1:100
1:200	1:500	1:1000
1:250	1:5000	1:1250
1:2000		1:10000
1:2500		

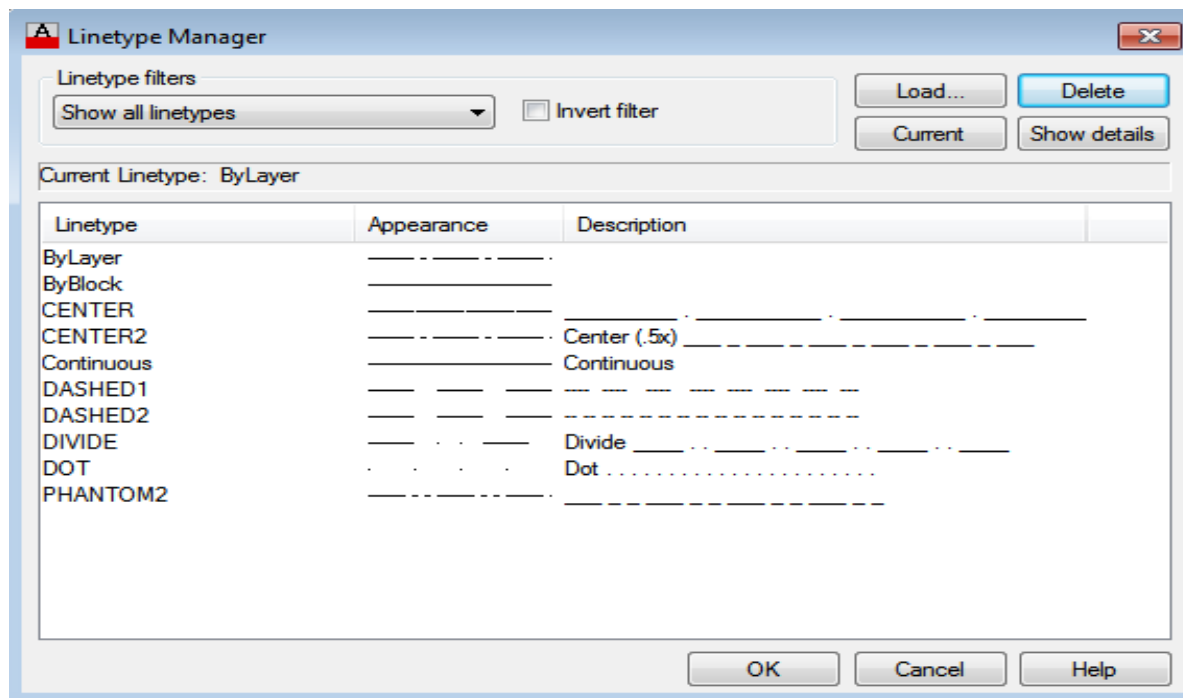


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3.5.6 Terms and abbreviations not defined shall be clearly defined on the associated drawing sheet.

3.5.7 Line types

- They shall conform to the file of line types located in Support directory of the project
- The scale of the line types shall be 1 whatever paper space scale is used
- Line Styles will be accordance with the style defined in the CAD Modele.dwt file.the for example :



3.5.8 Frame and title Block

- Layout will be composed of two parts.

First, a block containing the attributes of the drawing: Titles, numbers, dates ...and a table with the list of all Xref used to produce the drawing.

The second part will be a reference file containing the non-amendable objects of the drawing: Frame, logos, Project name

- These two parts will be set in the paper space, at scale 1=1 mm.
- The block will not be split.
- The reference file of the Title Block will not be merged.
- Only one title block in one file is permitted.
- One File = One Paper space drawing = One Title block



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3.5.9 Drawing sheets shall state clearly the following information:

- | | |
|-------------------------|---------------------|
| a) Asset Classification | g) Purpose of Issue |
| b) Drawing number | h) Revision |
| c) File name | i) Scale(s) |
| d) Location | j) Suitability |
| e) Originator | k) Title |
| f) Project | |

3.5.10 Drawing definitions shall be presented to allow drawing renditions and printed drawings to be derived as an exact copy.

Note: i. If drawing renditions / printed drawings are intended to be displayed as monochrome, the drawing definition shall be presented in monochrome, not color.

3.6 Lifecycle stages

3.6.1 CAD files shall carry the meta-data of 'Lifecycle Stage', to indicate the stage within the Project that the contained information has been approved for use.

3.6.2 One of the following Lifecycle Stages shall be used:

- Initiation
- Concept Stage
- Preliminary Stage
- Detailed Design Stage
- Construction (Installation)
- Handover
- Operations and Maintenance

3.7 Status

3.7.1 CAD files shall be assigned a status, consisting of:

- a) Suitability (see 3.7.2); and
- b) Revision (see 0).



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3.7.2 Suitability Status

3.7.2.1 CAD files shall carry the meta-data of 'suitability', to indicate the approved use of the contained information.

3.7.2.2 Suitability codes shall be one or two alpha-numeric and shall be reserved for use with a specific phase of the collaboration process, as defined in the table below:

	Code	Description	Model Files	Drawing Renditions
Work in Progress (Non-Contractual)				
	S0	Non Verified Design The File is in Work in Progress, not be shared with others	yes	yes
Shared (Non-Contractual)				
	S01	Coordination (for Use) The file is shared and can be used by others for the purpose of design coordination and / or MMRCL acceptance	yes	yes
	S02	For Comment The file is shared and is to only be used, by others, to identify and communicate potential impacts of the change to the design	yes	yes
Published (Contractual)				
	GFC	Good for Construction The file contents has been accepted and verified by MMRCL for construction purposes.	yes	yes
	AB	As Built The file contents have been accepted by MMRCL, as being verified as to what has been built/ installed.	yes	yes

Note: i. 'As Surveyed' and 'As Designed' are additional to the requirements of BS1192. 'For Information' has been removed to prevent ambiguity around the suitability of use of that data / information.



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3.7.3 Revision

- 3.7.3.1 CAD files shall carry the meta-data of 'revision', indicating the issue sequence of the contained information.
- 3.7.3.2 as with suitability codes, different sets of revision codes shall be reserved for use within each section of the defined Common Data Environment (CDE) process.
- 3.7.3.3 Within 'Work in Progress', preliminary revisions shall be 1.1, 1.2, or 2.1, 2.2, etc. The suffix (.1, .2 etc.) is known as a 'minor version' and shall be used to track the iterative progress of the file prior to being approved for sharing.
- 3.7.3.4 CAD files approved for sharing shall carry a preliminary revision, 1.0, 2.0, 3.0, etc.

3.8 CAD File & layer naming

- 3.8.1 Names assigned with CAD files and layers within the CAD file shall be created by joining together codes in the specified fields, in the specified order, using only the "-" Hyphen character, which is therefore not allowed in any code.
- 3.8.2 The only exceptions to 3.10.1 shall be the codes for 'level' and 'description' which are appended following an underscore "_".
- 3.8.3 Codes shall be selected from field codes (defined within 3.13).
- 3.8.4 Codes shall not imply meaning that may be duplicated in other fields.
- 3.8.5 Characters shall be uppercase.
- 3.8.6 Codes shall be generated and governed by the MMRCL CAD Support Team.

Notes: i. CAD files and layer naming is compliant with BS1192.
See 3.9 and 3.10.

3.8 CAD File naming convention

Please refer to EIR Documents for File Naming Convention.



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3.10 CAD Layer naming convention

- 3.10.1 Layer names within CAD files shall be composed by joining the fields shown in the table below:



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3.10.1 Examples of CAD Layers Discipline-wise (Final shall be as per Project requirement) :- CAD layers (Architecture)

LAYER NAME	LINE & COLOUR	PEN LINE WEIGHT (CTB)	DESCRIPTION	LAYER NAME	LINE & COLOUR	PEN LINE WEIGHT (CTB)	DESCRIPTION
C_SOUTH_X	7	0.1		ARC_FLOORING	50	0.13	flooring
ARC_ARCIVE	8	0.10	above	ARC_FURNITURE	152	0.09	furniture
ARC_BELOW	60	0.13	below	ARC_GLASS	142	0.13	glass
ARC_COLUMN	151	0.30	column	ARC_GRASS	100	0.15	grass
ARC_CON-CH_S	90	0.15	concrete height	ARC_GRID	240	0.10	grid
ARC_CON-CUT_S	130	0.3	concrete cut	ARC_GRID 100	255	0.1	grid dimensioning in scale 1:100
ARC_CON-VIEW_S	180	0.2	concrete view	ARC_GRID 200	255	0.1	grid dimensioning in scale 1:200
ARC_CUTOUT	100	0.15	slab cutout	ARC_GRID 25	255	0.1	grid dimensioning in scale 1:25
ARC_D-WALL	4	0.30	wall	ARC_GRID 50	255	0.1	grid dimensioning in scale 1:50
ARC_DOOR	140	0.25	door view	ARC_GRID TAG	255	0.1	grid tags
ARC_DOOR TAG	255	0.1	door tag	ARC_HIDDEN	255	0.1	hidden
ARC_ELEV 1	251	0.4	elevations	ARC_LANDSCAPE	250	0.05	landscape
ARC_ELEV 2	131	0.35	elevations	ARC_LEVEL	255	0.1	level symbol
ARC_ELEV 3	52	0.05	elevations	ARC_MELT-CUT_S	42	0.3	metal sectional structure
ARC_ELEV 4	51	0.15	elevations	ARC_MELT-PROJECT_S	31	0.15	metal structure projection
ARC_ELEV 5	53	0.13	elevations	ARC_MELT-VIEW_S	21	0.13	metal structure with a view
ARC_ELEV 6	255	0.05	elevations	ARC_PARKING	9	0.13	parking
ARC_ELEVATION	90	0.15	elevations	ARC_PEDESTRIAN	91	0.15	pedestrian
ARC_ESCALATOR	1	0.25	escalator equipments	ARC_RAILING	230	0.13	railing
ARC_FINISHES	201	0.13	finishes	ARC_RAMP	MEGENTA	0.13	ramp
ARC_FITURES	152	0.05	fitures	ARC_ROC WALL	4	0.30	roc wall
LAYER NAME	LINE & COLOUR	PEN LINE WEIGHT (CTB)	DESCRIPTION	LAYER NAME	LINE & COLOUR	PEN LINE WEIGHT (CTB)	DESCRIPTION
ARC_REVISION CLOUD	255	0.1	revision cloud	HATCH 3_ARC	41	0.05	hatching equipment room
ARC_ROOM	255	0.1	room	INSERT	5	0.01	insert
ARC_ROOF	90	0.15	roof	MARK1	10	0.05	marking
ARC_ROOM TAG	255	0.1	tag	THE_RWS	90	0.15	
ARC_RWP	153	0.13	rain water pipe	TEXT 100_ARC	255	0.1	text in scale 1:100
ARC_SERVICES	BLUE	0.13	services	TEXT 200_ARC	255	0.1	text in scale 1:200
ARC_SITE	YELLOW	0.15	site	TEXT 25_ARC	255	0.1	text in scale 1:25
ARC_STAIRCASE	100	0.15	staircase view	TEXT 50_ARC	255	0.1	text in scale 1:50
ARC_TAG	255	0.1	tag	TEXT 500_ARC	255	0.1	text in scale 1:500
ARC_TREE1	100	0.15	trees above 3m. ht.	TITLE_BLOCK	7	0.35	title block
ARC_TREE2	100	0.15	trees below 3m. ht.				
ARC_WALL	34	0.30	wall	XREFS	7	0.25	xrefs
ARC_WIND TAG	255	0.1	window tag	ARC_CLNG	251	0.25	ceiling information
ARC_WIND_S	151	0.1	window	ARC_CLNG_GRID	255	0.1	ceiling grid
DM 100_ARC	255	0.1	dimension in scale 1:100	ARC_CLNG_OPEN	5	0.25	ceiling/roofs penetrations
DM 200_ARC	255	0.1	dimension in scale 1:200	ARC_CLNG_PATT	201	0.13	ceiling patterns
DM 25_ARC	255	0.1	dimension in scale 1:25	ARC_CLNG_LITE	152	0.05	light fixtures
DM 50_ARC	255	0.1	dimension in scale 1:50	ARC_CLNG_MECH	152	0.05	supply/return diffusers
DM 500_ARC	255	0.1	dimension in scale 1:500	ARC_CLNG_SYMB	255	0.1	symbols
HATCH 1_ARC	255	0.05	hatching trade zone				
HATCH 2_ARC	51	0.05	hatching trade zone				



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3.10.2 CAD layers (Architecture Landscaping)

LAYER NAME	LINE & COLOUR	PPM LINE WEIGHT (CTR)	LAYER NAME	LINE & COLOUR	PPM LINE WEIGHT (CTR)
LW_DOLLARD LIGHT-1	212	0.15	LW_ARROW-1	32	0.15
LW_DOLLARD LIGHT-2	215	0.15	LW_ARROW-2	32	0.15
LW_DOLLARD LIGHT-3	214	0.15	LW_ARROW-3	30	0.15
LW_FLOOD LIGHT-1	220	0.15	LW_ARROW-4	40	0.15
LW_FLOOD LIGHT-2	223	0.15	LW_ARROW-5	34	0.15
LW_FOUNTAIN LIGHT-1	222	0.15	LW_ARROW-6	34	0.15
LW_FOUNTAIN LIGHT-2	224	0.15	LW_ARROW-7	245	0.15
LW_STREET LIGHT-1	190	0.15	LW_ARROW-8	225	0.15
LW_STREET LIGHT-2	228	0.15	LW_ARROW-9	30	0.15
LW_SHRUB-1	82	0.05	LW_ARROW-10	30	0.15
LW_SHRUB-2	82	0.05	LW_ARROW-11	201	0.15
LW_SHRUB-3	82	0.05	LW_ARROW-12	201	0.15
LW_SHRUB-4	82	0.05	LW_ARROW-13	201	0.15
LW_TICTORIAL PLANT-1	80	0.05	LW_ARROW-14	201	0.15
LW_TICTORIAL PLANT-2	80	0.05	LW_ARROW-15	165	0.15
LW_WIND BREAK HEDGES-1	80	0.05	LW_ARROW-16	1	0.15
LW_WIND BREAK HEDGES-2	82	0.05	LW_ARROW-17	180	0.15
LW_WIND BREAK HEDGES-3	88	0.05	LW_ARROW-18	180	0.15
LW_BUSHES-1	82	0.05	LW_ARROW-19	180	0.15
LW_BUSHES-2	82	0.05	LW_ARROW-20	201	0.15
LW_BUSHES-3	82	0.05	LW_ARROW-21	1	0.15
LW_TREE-1	84	0.05	LW_ARROW-22	155	0.15
LW_TREE-2	88	0.05	LW_ARROW-23	167	0.15
LW_FIXED PLANTERS-1	24	0.05	LW_ARROW-24	1	0.15
LW_FIXED PLANTERS-2	20	0.05	LW_ARROW-25	40	0.15
LW_WOOD WORK-1	34	0.15	LW_ARROW-26	44	0.15
LW_WOOD WORK-2	34	0.15	LW_ARROW-27	38	0.15
LW_WOOD WORK-3	28	0.15	LW_ARROW-28	40	0.15
LW_STONE WORK-1	14	0.15	LW_ARROW-29	44	0.15
LW_STONE WORK-2	18	0.15	LW_ARROW-30	1	0.15
LW_METAL WORK-1	181	0.15	LW_ARROW-31	1	0.15
LW_METAL WORK-2	200	0.15	LW_ARROW-32	1	0.15
LW_SEATING-1	241	0.15	LW_ARROW-33	1	0.15
LW_SEATING-2	221	0.15	LW_ARROW-34	1	0.15
LW_SEATING-3	181	0.15	LW_ARROW-35	1	0.15
LW_PVC WORK	160	0.15	LW_ARROW-36	1	0.15
LW_CURBED BLOCK	21	0.25	LW_ARROW-37	1	0.15
LW_PANDOLA	21	0.15	LW_ARROW-38	1	0.15
LW_TRELLIS	213	0.05	LW_ARROW-39	1	0.15
LW_CONCRETE WORK	80	0.15	LW_ARROW-40	1	0.15
LW_KINGDO LUMBELLA	18	0.15	LW_ARROW-41	1	0.15
LW_RCC WORK-1	171	0.20	LW_ARROW-42	1	0.15
LW_RCC WORK-2	175	0.20	LW_ARROW-43	1	0.15
LW_RCC WORK-3	186	0.20	LW_ARROW-44	1	0.15
LW_EMBANKMENT WORK_1	24	0.15	LW_ARROW-45	1	0.15
LW_EMBANKMENT WORK_2	32	0.15	LW_ARROW-46	1	0.15
LW_EMBANKMENT WORK_3	14	0.15	LW_ARROW-47	1	0.15
LW_DRAINAGE-1	211	0.15	LW_ARROW-48	1	0.15
LW_DRAINAGE-2	203	0.15	LW_ARROW-49	1	0.15
LW_VEHICLE GATE	1	0.05	LW_ARROW-50	1	0.15
LW_FOOTPATH GATE	1	0.05	LW_ARROW-51	1	0.15
LW_ROAD BARRIERS	162	0.15	LW_ARROW-52	1	0.15
LW_BOUNDARY	12	0.30	LW_ARROW-53	1	0.15
LW_SIGNAGE-1	201	0.15	LW_ARROW-54	1	0.15
LW_SIGNAGE-2	181	0.15	LW_ARROW-55	1	0.15
LW_RAMP	32	0.15	LW_ARROW-56	1	0.15
LW_WALKWAY-1	30	0.15	LW_ARROW-57	1	0.15
LW_WALKWAY-2	30	0.15	LW_ARROW-58	1	0.15
LW_WALKWAY-3	34	0.15	LW_ARROW-59	1	0.15
LW_AREA1	1	0.20	LW_ARROW-60	1	0.15
LW_AREA2	2	0.20	LW_ARROW-61	1	0.15
LW_AREA3	3	0.20	LW_ARROW-62	1	0.15
LW_GRASS-1	83	0.15	LW_ARROW-63	1	0.15
LW_GRASS-2	83	0.15	LW_ARROW-64	1	0.15
TEXT1_LW	7	0.25	LW_ARROW-65	1	0.15
TEXT2_LW	7	0.25	LW_ARROW-66	1	0.15
TEXT300_LW	7	0.25	LW_ARROW-67	1	0.15
TEXT350_LW	7	0.25	LW_ARROW-68	1	0.15
TEXT380_LW	7	0.25	LW_ARROW-69	1	0.15
TEXT390_LW	7	0.25	LW_ARROW-70	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-71	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-72	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-73	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-74	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-75	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-76	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-77	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-78	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-79	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-80	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-81	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-82	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-83	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-84	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-85	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-86	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-87	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-88	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-89	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-90	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-91	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-92	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-93	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-94	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-95	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-96	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-97	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-98	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-99	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-100	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-101	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-102	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-103	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-104	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-105	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-106	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-107	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-108	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-109	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-110	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-111	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-112	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-113	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-114	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-115	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-116	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-117	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-118	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-119	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-120	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-121	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-122	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-123	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-124	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-125	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-126	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-127	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-128	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-129	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-130	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-131	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-132	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-133	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-134	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-135	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-136	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-137	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-138	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-139	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-140	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-141	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-142	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-143	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-144	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-145	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-146	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-147	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-148	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-149	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-150	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-151	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-152	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-153	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-154	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-155	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-156	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-157	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-158	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-159	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-160	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-161	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-162	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-163	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-164	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-165	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-166	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-167	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-168	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-169	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-170	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-171	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-172	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-173	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-174	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-175	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-176	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-177	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-178	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-179	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-180	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-181	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-182	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-183	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-184	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-185	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-186	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-187	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-188	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-189	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-190	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-191	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-192	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-193	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-194	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-195	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-196	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-197	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-198	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-199	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-200	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-201	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-202	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-203	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-204	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-205	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-206	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-207	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-208	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-209	1	0.15
TEXT3900_LW	7	0.25	LW_ARROW-210	1	0.15



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3.10.3 CAD layers (Electrical)

LAYER NAME	LINE & COLOUR	LINE WEIGHT	LAYER NAME	LINE & COLOUR	LINE WEIGHT
0_BDORTH0_X	WHITE	0.15	EL_S&T TRENCH (2)	240	0.05
DIM_EL	WHITE	0.15	EL_SB NO.	175	0.13
EL_ARROW	9	0.13	EL_SECTION	252	0.05
EL_BMS TRAY	172	0.20	EL_SKT-E	80	0.13
EL_BMS TRAY HATCH	172	0.20	EL_SKT H-N	140	0.13
EL_BUS DUCT	RED	0.20	EL_SKT L-N	200	0.13
EL_CABLE ROUTE	226	0.13	EL_SKT M-N	30	0.13
EL_CIRCUIT	200	0.13	EL_SLD	80	0.13
EL_CIRCUIT-B	BLUE	0.13	EL_SLD FEEDER	10	0.15
EL_CIRCUIT-E	100	0.13	EL_SLD LOAD SHEET	9	0.13
EL_CIRCUIT-R	20	0.13	EL_SWITCH BOARD	WHITE	0.15
EL_CIRCUIT-Y	30	0.13	EL_SYMBOL	153	0.09
EL_CONDUIT	11	0.13	EL_TRAY DATA	CYAN	0.20
EL_CONDUIT-E	MEGENTA	0.15	EL_TRAY DATA (1)	150	0.20
EL_CUTOUT	210	0.18	EL_TRAY DATA (2)	152	0.05
EL_EARTH-B	40	0.13	EL_TRAY LADDER (1)	42	0.05
EL_EARTH-N	BLUE	0.20	EL_TRAY LADDER (2)	43	0.05
EL_EARTH-STRIP	150	0.13	EL_TRAY LAYOUT	RED	0.20
EL_EARTH MAT	70	0.20	EL_TRAY LT (1)	44	0.20
EL_EARTH ELECTRODE	54	0.20	EL_TRAY LT (2)	42	0.05
EL_ECS TRAY	118	0.20	EL_TRAY S&T POWER (1)	14	0.20
EL_EQUIPMENT	RED	0.20	EL_TRAY S&T POWER (2)	12	0.05
EL_EXT-LTG POLE	180	0.20	EL_TRAY SUPPORT	45	0.13
EL_FUTURE	WHITE	0.15	EL_TRENCH	202	0.20
EL_GRID	8	0.05	EL_TV5 TRAY	46	0.20
EL_HT TRAY	GREEN	0.20	HATCH-ECS TRAY_EL	8	0.05
EL_HUME PIPE	24	0.15	HATCH-HT TRAY_EL	8	0.05
EL_LIGHT-E	GREEN	0.20	HATCH-POWER TRAY_EL	8	0.05
EL_LIGHT-N	GREEN	0.20	HATCH-S&T TRAY_EL	8	0.05
EL_LIGHT FIXT-E	RED	0.20	HATCH-S&T TRAY_EL	8	0.05
EL_LIGHT FIXT-N	BLUE	0.20	HATCH BMS TRAY_EL	8	0.05
EL_LIGHT FIXT-U	70	0.13	HATCH TRAY DATA_EL	8	0.05
EL_LIGHT FIXTURE	180	0.20	HATCH TV5 TRAY_EL	8	0.05
EL_LTNG ARSTR	130	0.18	INSERT	8	0.05
EL_N-CIRCUIT	200	0.13	TEXT-ARCH_EL	8	0.05
EL_N-CONDUIT	11	0.15	TEXT-TRAY_EL	WHITE	0.15
EL_N-EXT-CIRCUIT	200	0.13	TEXT CUTOUT_EL	WHITE	0.15
EL_NOTE	WHITE	0.15	TEXT EARTH STRIP_EL	WHITE	0.15
EL_PANELS	RED	0.20	TEXT EARTH_EL	WHITE	0.15
EL_POWER TRAY	RED	0.20	TEXT EQUIPMENT_EL	WHITE	0.15
EL_POWER CKT	140	0.20	TEXT GENERAL_EL	WHITE	0.15
EL_POWER SOCKET	CYAN	0.13	TEXT PANEL_EL	WHITE	0.15
EL_RACEWAY(1)	22	0.20	TEXT SLD_EL	WHITE	0.15
EL_RACEWAY(2)	21	0.18	TEXT_EL	WHITE	0.15
EL_S&T TRAY	MAGENTA	0.05	TITLE_BLOCK	WHITE	0.15
EL_S&T TRENCH (1)	242	0.18			
		0.20	XREFS	WHITE	0.15

Electrical CAD Laying System



Maha Metro Rail Project

3.10.4 CAD layers (Fire Detection)

FIRE-FIGHTING LAYING SYSTEM

LAYER NAME	LINE & COLOUR	LINE WEIGHT
0_BDORTHO_X	WHITE	default
ARCH-XREF_FA	8	0.00
DIM_FA	WHITE	0.25
DIM_FF	WHITE	0.25
FA_ALARM CONDUIT	92	0.20
FA_CLOUD	WHITE	0.25
FA_DETECTOR	141	0.20
FA_EQUIPMENT	160	0.18
FA_HOOTER CABLE	BLUE	0.20
FA_POWER CABLE	20	0.20
FA_RI	81	0.20
FA_SKETCH	215	0.13
FA_SYMBOL	173	0.15
FA_ZONE	WHITE	0.25
FF_CENTER LINE	9	0.09
FF_CLOUD	WHITE	0.25
FF_CUT OUT	30	0.15
FF_GRID	8	0.09
FF_HYDRANT PIPE	20	0.15
FF_HYDRANT PIPE-PD	142	0.15
FF_PUMPS	173	0.20
FF_SKETCH	215	0.15
FF_SRINKLER PIPE	160	0.15
FF_SRINKLER PIPE-PD	21	0.15
HATCH_FA	160	0.09
HATCH_FF	20	0.09
INSERT	8	0.09
TEXT_FA	WHITE	0.25
TEXT_FF	WHITE	0.25
TITLE_BLOCK	WHITE	0.25
XREFS	255	0.09

Fire Detection CAD Laying System



Maha Metro Rail Project

3.10.4 CAD layers (HVAC)

LAYER NAME	LINE & COLOUR	LINE WEIGHT	LAYER NAME	LINE & COLOUR	LINE WEIGHT
0_BDORTHO_X	WHITE	0.2500	VAC-GRID	8	0.0000
DIM-VAC	255	0.1500	VAC-PUMP	RED	0.1500
HATCH-RAD-VAC	31	0.0000	VAC-RA DIFFUSER	RED	0.1500
HATCH-SAD-VAC	70	0.0000	VAC-RA DUCT	32	0.2000
HATCH-SED-VAC	231	0.0000	VAC-REFRIGERANT PIPE (CKT-1)	180	0.1500
INSERT	253	0.0000	VAC-REFRIGERANT PIPE (CKT-2)	210	0.1500
TEXT-ARCH-VAC	252	0.0500	VAC-REFRIGERANT PIPE (CKT-3)	60	0.1500
TEXT-FCU-VAC	WHITE	0.2500	VAC-SA DIFFUSER	GREEN	0.1500
TEXT-GENERAL-VAC	WHITE	0.2500	VAC-SA DUCT	GREEN	0.1500
TEXT-RA-VAC	WHITE	0.2500	VAC-SE DUCT	241	0.1500
TEXT-SA-VAC	WHITE	0.2500	VAC-SEF-FAN	241	0.1500
TEXT-SE-VAC	WHITE	0.2500	VAC-SPLIT UNIT	RED	0.1500
TEXT-VAC	WHITE	0.2500	VAC-VALVE	RED	0.1500
TEXT-VE-VAC	WHITE	0.2500	VAC-VE-FAN	213	0.1300
TEXT-VS-VAC	WHITE	0.2500	VAC-VE-DUCT	213	0.1300
TITLE_BLOCK	WHITE	0.2500	VAC-VE-FAN	87	0.1300
VAC-AHU	BLUE	0.1500	VAC-VS DIFFUSER	87	0.1300
VAC-ARROW	20	0.0000	VAC-VS DUCT	87	0.1300
VAC-CHILLER	RED	0.1500	VAC-WALL-OPENING	BLUE	0.1500
VAC-CHWR-PIPE	RED	0.1500	VS-VE DIFFUSER	213	0.1300
VAC-CHWS-PIPE	GREEN	0.1500			
VAC-COOLING TOWER	RED	0.1500	XREFS	255	0.1500
VAC-CUTOUT	BLUE	0.1500			
VAC-CWR-PIPE	MAGENTA	0.1000			
VAC-CWS-PIPE	142	0.1300			
VAC-DAMPER	RED	0.1500			
VAC-DRAIN PIPE	130	0.1000			
VAC-EQUIPMENT	RED	0.1500			
VAC-FA-FAN	GREEN	0.1500			
VAC-FCU	RED	0.1500			
VAC-FCU DUCT	GREEN	0.1500			
VAC-GENERAL	116	0.1000			

HVAC CAD Laying System



Maha Metro Rail Project

3.10.5 CAD layers (Plumbing)

PLUMBING LAYING SYSTEM

LAYER NAME	LINE & COLOUR	LINE WEIGHT	LAYER NAME	LINE & COLOUR	LINE WEIGHT
0_BDORTHQ_X	WHITE	0.15	TEXT	50	0.18
DIM_PHE	WHITE	0.15	TEXT DR_PHE	WHITE	0.15
HATCH	8	0.05	TEXT WS_PHE	WHITE	0.15
HATCH_PHE	8	0.05	TEXT_PHE	WHITE	0.15
INCH_PT	200	0.05	TITLE_BLOCK	WHITE	0.15
PHE_AC CENTRE LINE	45	0.09	XREFS	WHITE	0.15
PHE_AC DRAINAGE	84	0.18			
PHE_ACCESS	140	0.18			
PHE_ARROW	15	0.13			
PHE_CLOUD	WHITE	0.15			
PHE_CLOUD REVISION	WHITE	0.15			
PHE_COVERED DRAIN CHANNEL	160	0.18			
PHE_CWS	130	0.18			
PHE_CWS CENTRE LINE	45	0.09			
PHE_DRAIN CHANNEL	142	0.18			
PHE_DRAIN PIPE	170	0.18			
PHE_DRAIN PIPE CENTRE LINE	45	0.09			
PHE_EQUIPMENT	96	0.18			
PHE_GI PIPE	WHITE	0.15			
PHE_GRATING	162	0.18			
PHE_GUTTER	210	0.18			
PHE_HWS	12	0.18			
PHE_HWS CENTRE LINE	45	0.09			
PHE_PT	204	0.18			
PHE_PUMP DR	30	0.18			
PHE_PUMP WS	90	0.18			
PHE_RWP	210	0.18			
PHE_RWP CENTRE LINE	45	0.09			
PHE_RWS	90	0.18			
PHE_RWS CENTRE LINE	45	0.09			
PHE_SAUCER CENTRE LINE	45	0.09			
PHE_SAUCER DRAIN	30	0.18			
PHE_SAUCER DRAIN PIPE	30	0.18			
PHE_SEEPAGE CENTRE LINE	45	0.09			
PHE_SEEPAGE PIPE	180	0.18			
PHE_SEWAGE CENTRE LINE	180	0.09			
PHE_SEWAGE PIPE	20	0.18			
PHE_SEWER CENTRE LINE	45	0.09			
PHE_SEWER DRAINAGE	22	0.18			
PHE_SLEEVE	132	0.18			
PHE_SOIL CENTRE LINE	45	0.09			
PHE_SOIL PIPE	45	0.18			
PHE_STORM CENTRE LINE	45	0.09			
PHE_STORM DRAINAGE	45	0.18			
PHE_VENT CENTRE LINE	45	0.09			
PHE_VENT PIPE	92	0.18			
PHE_WASTE CENTRE LINE	45	0.09			
PHE_WASTE PIPE	180	0.18			
SYMBOL	153	0.18			

Plumbing CAD Laying System

Maha Metro Rail Project

3.10.6 CAD layers (Highways)

SL NO.	LAYER NAME	LINE & COLOUR	LINE WEIGHT	SL NO.	LAYER NAME	LINE & COLOUR	LINE WEIGHT	SL NO.	LAYER NAME	LINE & COLOUR	LINE WEIGHT
1	DEM (RAW)	BROWN	0.50x0.7	10	DEMOT	RED	0.50	39	HL (DE, JONKORT) 1A	RED	0.50
2	DEM (C)	RED	0.50	11	HL (DE)	RED	0.50	40	HL (DE, JONKORT) 1B	RED	0.50
3	DEM (DE, LA)	RED	0.50	12	HL (DE, JONKORT) 1C	WHITE/BLACK	0.50x0.7	41	HL (DE, JONKORT) 1D	RED	0.50
4	DEM (DE, FINE)	RED	0.50x0.7	13	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50x0.7	42	HL (DE, JONKORT) 1E	RED	0.50
5	DEM (DE, FINE)	RED	0.50	14	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50x0.7	43	HL (DE, JONKORT) 1F	RED	0.50
6	DEM (DE, FINE)	WHITE/BLACK	0.50	15	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50x0.7	44	HL (DE, JONKORT) 1G	RED	0.50
7	DEM (DE, FINE)	RED	0.50x0.7	16	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	45	HL (DE, JONKORT) 1H	RED	0.50
8	DEM (DE, FINE)	RED	0.50x0.7	17	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	46	HL (DE, JONKORT) 1I	RED	0.50
9	DEM (DE, FINE)	RED	0.50x0.7	18	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	47	HL (DE, JONKORT) 1J	RED	0.50
10	DEM (DE, FINE)	RED	0.50	19	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	48	HL (DE, JONKORT) 1K	RED	0.50
11	DEM (DE, FINE)	RED	0.50	20	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	49	HL (DE, JONKORT) 1L	RED	0.50
12	DEM (DE, FINE)	RED	0.50	21	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	50	HL (DE, JONKORT) 1M	RED	0.50
13	DEM (DE, FINE)	RED	0.50	22	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	51	HL (DE, JONKORT) 1N	RED	0.50
14	DEM (DE, FINE)	RED	0.50	23	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	52	HL (DE, JONKORT) 1O	RED	0.50
15	DEM (DE, FINE)	RED	0.50	24	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	53	HL (DE, JONKORT) 1P	RED	0.50
16	DEM (DE, FINE)	RED	0.50	25	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	54	HL (DE, JONKORT) 1Q	RED	0.50
17	DEM (DE, FINE)	RED	0.50	26	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	55	HL (DE, JONKORT) 1R	RED	0.50
18	DEM (DE, FINE)	RED	0.50	27	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	56	HL (DE, JONKORT) 1S	RED	0.50
19	DEM (DE, FINE)	RED	0.50	28	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	57	HL (DE, JONKORT) 1T	RED	0.50
20	DEM (DE, FINE)	RED	0.50	29	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	58	HL (DE, JONKORT) 1U	RED	0.50
21	DEM (DE, FINE)	RED	0.50	30	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	59	HL (DE, JONKORT) 1V	RED	0.50
22	DEM (DE, FINE)	RED	0.50	31	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	60	HL (DE, JONKORT) 1W	RED	0.50
23	DEM (DE, FINE)	RED	0.50	32	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	61	HL (DE, JONKORT) 1X	RED	0.50
24	DEM (DE, FINE)	RED	0.50	33	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	62	HL (DE, JONKORT) 1Y	RED	0.50
25	DEM (DE, FINE)	RED	0.50	34	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	63	HL (DE, JONKORT) 1Z	RED	0.50
26	DEM (DE, FINE)	RED	0.50	35	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	64	HL (DE, JONKORT) 1A	RED	0.50
27	DEM (DE, FINE)	RED	0.50	36	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	65	HL (DE, JONKORT) 1B	RED	0.50
28	DEM (DE, FINE)	RED	0.50	37	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	66	HL (DE, JONKORT) 1C	RED	0.50
29	DEM (DE, FINE)	RED	0.50	38	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	67	HL (DE, JONKORT) 1D	RED	0.50
30	DEM (DE, FINE)	RED	0.50	39	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	68	HL (DE, JONKORT) 1E	RED	0.50
31	DEM (DE, FINE)	RED	0.50	40	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	69	HL (DE, JONKORT) 1F	RED	0.50
32	DEM (DE, FINE)	RED	0.50	41	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	70	HL (DE, JONKORT) 1G	RED	0.50
33	DEM (DE, FINE)	RED	0.50	42	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	71	HL (DE, JONKORT) 1H	RED	0.50
34	DEM (DE, FINE)	RED	0.50	43	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	72	HL (DE, JONKORT) 1I	RED	0.50
35	DEM (DE, FINE)	RED	0.50	44	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	73	HL (DE, JONKORT) 1J	RED	0.50
36	DEM (DE, FINE)	RED	0.50	45	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	74	HL (DE, JONKORT) 1K	RED	0.50
37	DEM (DE, FINE)	RED	0.50	46	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	75	HL (DE, JONKORT) 1L	RED	0.50
38	DEM (DE, FINE)	RED	0.50	47	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	76	HL (DE, JONKORT) 1M	RED	0.50
39	DEM (DE, FINE)	RED	0.50	48	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	77	HL (DE, JONKORT) 1N	RED	0.50
40	DEM (DE, FINE)	RED	0.50	49	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	78	HL (DE, JONKORT) 1O	RED	0.50
41	DEM (DE, FINE)	RED	0.50	50	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	79	HL (DE, JONKORT) 1P	RED	0.50
42	DEM (DE, FINE)	RED	0.50	51	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	80	HL (DE, JONKORT) 1Q	RED	0.50
43	DEM (DE, FINE)	RED	0.50	52	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	81	HL (DE, JONKORT) 1R	RED	0.50
44	DEM (DE, FINE)	RED	0.50	53	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	82	HL (DE, JONKORT) 1S	RED	0.50
45	DEM (DE, FINE)	RED	0.50	54	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	83	HL (DE, JONKORT) 1T	RED	0.50
46	DEM (DE, FINE)	RED	0.50	55	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	84	HL (DE, JONKORT) 1U	RED	0.50
47	DEM (DE, FINE)	RED	0.50	56	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	85	HL (DE, JONKORT) 1V	RED	0.50
48	DEM (DE, FINE)	RED	0.50	57	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	86	HL (DE, JONKORT) 1W	RED	0.50
49	DEM (DE, FINE)	RED	0.50	58	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	87	HL (DE, JONKORT) 1X	RED	0.50
50	DEM (DE, FINE)	RED	0.50	59	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	88	HL (DE, JONKORT) 1Y	RED	0.50
51	DEM (DE, FINE)	RED	0.50	60	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	89	HL (DE, JONKORT) 1Z	RED	0.50
52	DEM (DE, FINE)	RED	0.50	61	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	90	HL (DE, JONKORT) 1A	RED	0.50
53	DEM (DE, FINE)	RED	0.50	62	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	91	HL (DE, JONKORT) 1B	RED	0.50
54	DEM (DE, FINE)	RED	0.50	63	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	92	HL (DE, JONKORT) 1C	RED	0.50
55	DEM (DE, FINE)	RED	0.50	64	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	93	HL (DE, JONKORT) 1D	RED	0.50
56	DEM (DE, FINE)	RED	0.50	65	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	94	HL (DE, JONKORT) 1E	RED	0.50
57	DEM (DE, FINE)	RED	0.50	66	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	95	HL (DE, JONKORT) 1F	RED	0.50
58	DEM (DE, FINE)	RED	0.50	67	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	96	HL (DE, JONKORT) 1G	RED	0.50
59	DEM (DE, FINE)	RED	0.50	68	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	97	HL (DE, JONKORT) 1H	RED	0.50
60	DEM (DE, FINE)	RED	0.50	69	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	98	HL (DE, JONKORT) 1I	RED	0.50
61	DEM (DE, FINE)	RED	0.50	70	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	99	HL (DE, JONKORT) 1J	RED	0.50
62	DEM (DE, FINE)	RED	0.50	71	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	100	HL (DE, JONKORT) 1K	RED	0.50
63	DEM (DE, FINE)	RED	0.50	72	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	101	HL (DE, JONKORT) 1L	RED	0.50
64	DEM (DE, FINE)	RED	0.50	73	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	102	HL (DE, JONKORT) 1M	RED	0.50
65	DEM (DE, FINE)	RED	0.50	74	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	103	HL (DE, JONKORT) 1N	RED	0.50
66	DEM (DE, FINE)	RED	0.50	75	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	104	HL (DE, JONKORT) 1O	RED	0.50
67	DEM (DE, FINE)	RED	0.50	76	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	105	HL (DE, JONKORT) 1P	RED	0.50
68	DEM (DE, FINE)	RED	0.50	77	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	106	HL (DE, JONKORT) 1Q	RED	0.50
69	DEM (DE, FINE)	RED	0.50	78	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	107	HL (DE, JONKORT) 1R	RED	0.50
70	DEM (DE, FINE)	RED	0.50	79	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	108	HL (DE, JONKORT) 1S	RED	0.50
71	DEM (DE, FINE)	RED	0.50	80	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	109	HL (DE, JONKORT) 1T	RED	0.50
72	DEM (DE, FINE)	RED	0.50	81	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	110	HL (DE, JONKORT) 1U	RED	0.50
73	DEM (DE, FINE)	RED	0.50	82	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	111	HL (DE, JONKORT) 1V	RED	0.50
74	DEM (DE, FINE)	RED	0.50	83	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	112	HL (DE, JONKORT) 1W	RED	0.50
75	DEM (DE, FINE)	RED	0.50	84	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	113	HL (DE, JONKORT) 1X	RED	0.50
76	DEM (DE, FINE)	RED	0.50	85	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	114	HL (DE, JONKORT) 1Y	RED	0.50
77	DEM (DE, FINE)	RED	0.50	86	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	115	HL (DE, JONKORT) 1Z	RED	0.50
78	DEM (DE, FINE)	RED	0.50	87	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	116	HL (DE, JONKORT) 1A	RED	0.50
79	DEM (DE, FINE)	RED	0.50	88	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	117	HL (DE, JONKORT) 1B	RED	0.50
80	DEM (DE, FINE)	RED	0.50	89	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	118	HL (DE, JONKORT) 1C	RED	0.50
81	DEM (DE, FINE)	RED	0.50	90	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	119	HL (DE, JONKORT) 1D	RED	0.50
82	DEM (DE, FINE)	RED	0.50	91	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	120	HL (DE, JONKORT) 1E	RED	0.50
83	DEM (DE, FINE)	RED	0.50	92	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	121	HL (DE, JONKORT) 1F	RED	0.50
84	DEM (DE, FINE)	RED	0.50	93	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	122	HL (DE, JONKORT) 1G	RED	0.50
85	DEM (DE, FINE)	RED	0.50	94	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	123	HL (DE, JONKORT) 1H	RED	0.50
86	DEM (DE, FINE)	RED	0.50	95	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	124	HL (DE, JONKORT) 1I	RED	0.50
87	DEM (DE, FINE)	RED	0.50	96	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	125	HL (DE, JONKORT) 1J	RED	0.50
88	DEM (DE, FINE)	RED	0.50	97	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	126	HL (DE, JONKORT) 1K	RED	0.50
89	DEM (DE, FINE)	RED	0.50	98	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	127	HL (DE, JONKORT) 1L	RED	0.50
90	DEM (DE, FINE)	RED	0.50	99	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	128	HL (DE, JONKORT) 1M	RED	0.50
91	DEM (DE, FINE)	RED	0.50	100	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	129	HL (DE, JONKORT) 1N	RED	0.50
92	DEM (DE, FINE)	RED	0.50	101	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	130	HL (DE, JONKORT) 1O	RED	0.50
93	DEM (DE, FINE)	RED	0.50	102	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	131	HL (DE, JONKORT) 1P	RED	0.50
94	DEM (DE, FINE)	RED	0.50	103	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	132	HL (DE, JONKORT) 1Q	RED	0.50
95	DEM (DE, FINE)	RED	0.50	104	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	133	HL (DE, JONKORT) 1R	RED	0.50
96	DEM (DE, FINE)	RED	0.50	105	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	134	HL (DE, JONKORT) 1S	RED	0.50
97	DEM (DE, FINE)	RED	0.50	106	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	135	HL (DE, JONKORT) 1T	RED	0.50
98	DEM (DE, FINE)	RED	0.50	107	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	136	HL (DE, JONKORT) 1U	RED	0.50
99	DEM (DE, FINE)	RED	0.50	108	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	137	HL (DE, JONKORT) 1V	RED	0.50
100	DEM (DE, FINE)	RED	0.50	109	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	138	HL (DE, JONKORT) 1W	RED	0.50
101	DEM (DE, FINE)	RED	0.50	110	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	139	HL (DE, JONKORT) 1X	RED	0.50
102	DEM (DE, FINE)	RED	0.50	111	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	140	HL (DE, JONKORT) 1Y	RED	0.50
103	DEM (DE, FINE)	RED	0.50	112	HL (DE, JONKORT) 1D (C)	WHITE/BLACK	0.50	141	HL (DE, J		

Highway CAD Laying System



Maha Metro Rail Project

3.10.7 CAD layers (Structure)

LAYER NAME	LINE & COLOUR	LINE WEIGHT	LAYER NAME	LINE & COLOUR	LINE WEIGHT
AXIS	10	0.05	TRACK		0.25
BARLIST	255	0.25	TRACK-AXIS		0.09
BEARING	153	0.09	TRACK-RAILS		0.13
BLD	magenta	DEFAULT	UT_DRAIN		0.15
CON-CUT	130	0.30	UT_POWER		0.15
CON-HIDE	50	0.20	UT_SEWER		0.15
CON-VIEW	90	0.25	UT_SUI		0.15
CULVERT	154	DEFAULT	UT_TELECOM		0.15
CURB STONE	141	DEFAULT	UT_WATER SUPPLY		0.15
			WALL		DEFAULT
DIM	255	0.15	XREF		DEFAULT
EL_TRAY LADDER (1)	40	0.20			
EP	blue	DEFAULT			
FOUNDATION	52	DEFAULT			
GAS_LINE	45	DEFAULT			
GASE POINT	34	DEFAULT			
GATE	90	DEFAULT			
GREEN BELT	94	DEFAULT			
GROUND-BIG	130	0.30			
GROUND-HIDE	50	0.15			
GROUND-SMALL	90	0.25			
HATCH		0.09			
INSERT		0.09			
INSERT-HIDE		0.09			
JACKING		0.09			
LP		DEFAULT			
MARK1		0.09			
MARK2		0.25			
OIL TANK		DEFAULT			
PATROL PUMP		DEFAULT			
PNTDES		DEFAULT			
PNTLV		DEFAULT			
PNTNO		DEFAULT			
POINTS		DEFAULT			
PRECAST-CUT		0.30			
PRECAST-HIDE		0.15			
PRECAST-VIEW		0.25			
PYLON		DEFAULT			
REV		0.25			
ROAD		DEFAULT			
SOLING		DEFAULT			
STEEL-CUT		0.30			
STEEL-HIDE		0.18			
STEEL-VIEW		0.20			
SYMBOL		0.09			
TENDON		0.20			
TEXT		0.15			
TITLE_BLOCK		DEFAULT			
TOWER		DEFAULT			
TP		DEFAULT			

Structure CAD Laying System



Maha Metro Rail Project

3.11 APPENDIX 1 – CAD Symbols & Blocks

3.11.1 ARCHITECTURE SYMBOLS & ABBREVIATIONS

ARCHITECTURE SYMBOLS				ARCHITECTURE SYMBOLS	
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	COLUMN GRID		LEVEL		W.C.
	BUILDING SECTION		FINISH ROAD LVL.		URNAL
	WALL SECTION		FINISH PAVING LVL.		URNAL IN SECTION
	ELEVATION		FINISH CEILING LVL.		WASH BASIN
	INTERIOR ELEVATION		FINISH FLOOR LVL.		DOOR
	CALLOUTS FOR ENLARGED PLAN/ELEVATION / SECTION		STRUCTURAL SLAB TOP LVL.		WINDOW
	GLASS TYPE		TOP OF PARAPET		NORTH ARROW
	FALSE CEILING SOFFIT HEIGHT		RIDGE LVL.		
	MATCH LINE		EAVES LVL.		
	KEY NOTE		LEVEL		
	EQUIPMENT REFERENCE		FLOOR DRAIN		
	REVISION		FLOOR TRAP		
	WALL PARTITION TYPE		FLOOR CLEANOUT		
	230 THK HOLLOW BLOCK WORK WALL		ALUMINUM		
	150 THK CONC. FILLED HOLLOW BLOCK WORK WALL		BRASS/BRONZE		
	100 THK CONC. FILLED HOLLOW BLOCK WORK WALL		STEEL		
	R.C.C. WALLS & COL. (IN PLANS AND SECTIONS)		BLOCKING		
	ACOUSTICAL CEILING PANEL		CONTINUOUS WOOD		
	GYPSUM BOARD		PLYWOOD		
	INSULATION (BATT)		FINISH WOOD		
	INSULATION (RIGID)		CONCRETE		
	WATER PROOFING		CRUSHED ROCK/ GRAVEL		
	CERAMIC TILE		DOOR TAG		
	SAND FILL		WINDOW TAG		

Architecture Symbols & Abbreviation



Maha Metro Rail Project

3.11.2 ELECTRICAL SYMBOLS & ABBREVIATIONS (SH-1)

ELECTRICAL			
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	8A SINGLE POLE SWITCH		AIR CIRCUIT BREAKER
	15A SINGLE POLE SWITCH		MOULDED CASE CIRCUIT BREAKER
	2x20W FLUORESCENT FIXTURE RECESS TYPE		MINIATURE CIRCUIT BREAKER
	2x20W FLUORESCENT FIXTURE SURFACE MOUNTED		EARTH LEAKAGE CIRCUIT BREAKER
	2x18W LED FLUORESCENT FIXTURE SURFACE		RESIDUAL CURRENT CIRCUIT BREAKER
	1x10W CFL FIXTURE SURFACE MOUNTED		CURRENT TRANSFORMER
	1x200W MH FIXTURE SURFACE MOUNTED		STAR-DELTA STARTER
	1x100W MH FIXTURE SURFACE MOUNTED		DIGITAL AMMETER
	1x10W MH FIXTURE SURFACE MOUNTED		DIGITAL VOLTMETER
	4x14W FLUORESCENT FIXTURE RECESS TYPE DIRECT / INDIRECT		INVERSE TIME OVER CURRENT RELAY
	4x14W FLUORESCENT FIXTURE RECESS TYPE WITH ACRYLIC COVER		INVERSE TIME EARTH FAULT RELAY
	LED FIXTURE RECESS TYPE		OVER LOAD RELAY
	20x18W FLUORESCENT FIXTURE RECESS TYPE		AUTOMATIC POWER FACTOR CORRECTION RELAY
	20x20W FLUORESCENT FIXTURE RECESS TYPE		EARTH BUS
	10x20W FLUORESCENT FIXTURE SURFACE MOUNTED		INDICATION LIGHT
	1x8W BULK HEAD LIGHT WALL MOUNTED		ON / OFF / TRIP
	BRACKET LIGHT		START / STOP
	MIRROR LIGHT		AUTOMATIC TRANSFER SWITCH
	WALL WASHER		DO SET
	LV DOWNLIGHT		PIPE EARTH ELECTRODE
	PICTURE LIGHT		G.L. PLATE ELECTRODE
	CHANDIELIER		G.U. PLATE ELECTRODE
	LIGHTING CONTROL MODULE		EARTH ELECTRODES
	LIGHTING CONTROL PANEL		SURGE PROTECTION DEVICE
	WALL MOUNTED ADJUSTABLE LIGHTING POINT		LIGHTNING ARRESTOR
	OVER DOOR WARNING LIGHT		EARTH BOND PIT
	WALL MOUNTED FLOODLIGHT		EARTH POINT
	POLE MOUNTED FLOODLIGHT		
	ROLLARD LIGHT		
	FIBRE OPTIC PROJECTOR & LENSE		
	LIGHTING TRACK		
	COLD CATHODE OR NEON LIGHTING		
	STRIP LIGHT		

ABBREVIATION	DESCRIPTION
LTC	LIGHTING
PWR	POWER
CT	CABLE TRAY
ELV	EXTRA LOW VOLTAGE










Electrical Symbols & Abbreviation (Sh-1)

Maha Metro Rail Project

3.11.3 ELECTRICAL SYMBOLS & ABBREVIATIONS (SH-2)

SYMBOL	DESCRIPTION
	15A 1W-SWITCHED FUSED CONNECTION UNIT & NEON IND
	20/30A DOUBLE POLE SWITCH
	20/30A DOUBLE POLE SWITCH & NEON INDICATOR
	15A SINGLE SWITCHED SOCKET OUTLET - UPS
	5A,10 240V SWITCHED SOCKET OUTLET
	15/15A 10 240V SOCKET OUTLET WITH SWITCH
	15A,10 240V WEATHER PROOF SOCKET OUTLET
	63A,30 WEATHER PROOF INDUSTRIAL SOCKET OUTLET
	ISOLATOR
	STARTER SWITCH
	CHANGEOVER SWITCH
	FAN ISOLATOR SWITCH
	FAN STOP/START CONTROLLER
	CONTACTOR
	BUS BAR TAP OFF UNIT
	ELECTRICITY METER
	FLOOR BOX
	DISTRIBUTION BOARD
	SUB MAIN DIST BOARD / MCC













































ABBREVIATION	DESCRIPTION
ACS	ACCESS CONTROL SYSTEM
HV	HIGH VOLTAGE
LV	LOW VOLTAGE
DB	DISTRIBUTION BOARD
SMDB	SUBMAIN DISTRIBUTION BOARD
TA	TO ABOVE
TB	TO BELOW
UPS	UNINTERRUPTIBLE POWER SUPPLY
WP	WEATHER PROOF
WH	WATER HEATER
HD	HAND DRYER
VCB	VACUUM CIRCUIT BREAKER
ACB	AIR CIRCUIT BREAKER
MCCB	MOULDED CASE CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTRE
MCB	MAIN DISTRIBUTION BOARD

SYMBOL LEGEND	
SYMBOL	DESCRIPTION
	FOR SYMMETRICAL
	FOR SECTION
	FOR UCS
	FOR TITLE
	FOR LEVEL
NOTES:-	(1) GENERAL NOTES (2) GENERAL NOTES (3) GENERAL NOTES
	NORTH DIRECTION
	DETAIL MARK
	DETAIL MARK - 1
	FOR DRAFT COPY

Electrical Symbols & Abbreviation (Sh-2)

Maha Metro Rail Project

3.11.4 FIRE DETECTION AND FIRE FIGHTING SYMBOLS & ABBREVIATIONS (SH-1)

FIRE-FIGHTING		FIRE-ALARAM SYSTEM	
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	SINGLE HYDRANT VALVE		MULTI SENSOR OPTICAL SMOKE THERMISTOR BASED CUM HEAT DETECTOR BELOW FALSE CEILING / SLAB
	BRANCH PIPE WITH NOZZLE		MULTI SENSOR OPTICAL SMOKE THERMISTOR BASED CUM HEAT DETECTOR ABOVE FALSE CEILING
	FIRST AID HOSE REEL (THERMOPLASTIC)		MULTI SENSOR OPTICAL SMOKE THERMISTOR BASED CUM HEAT DETECTOR BELOW FALSE FLOOR
	SYNTHETIC HOSE WITH STAINLESS STEEL COUPLING		HEAT DETECTOR ABOVE FALSE CEILING
	FIRE HOSE CABINET		HEAT DETECTOR BELOW FALSE CEILING
	FLOW SWITCH		MANUAL CALL BOX RECESSED IN WALL
	INSPECTION AND TEST CONTROL VALVE		HOOTER CUM STROBE
	SPRINKLER HEAD		RESPONSE INDICATOR WITH TWIN HIGH INTENSITY LEDS MOUNTED ABOVE DOORWAY AT CENTRE
	SIDE WALL SPRINKLER HEAD		OUT PUT MODULE
	UP-RIGHT SPRINKLER HEAD		IN PUT MODULE
	GATE VALVE		MANUAL GAS ABORT BUTTON
	BUTTERFLY VALVE		MANUAL GAS RELEASE BUTTON
	DOUBLE HYDRANT		HOOTER CUM SPEAKER
	FIRE EXTINGUISHER, DRY CHEMICAL		CONDUIT FOR FIRE ALARM
	FIRE EXTINGUISHER FOAM TYPE		CONDUIT FOR STROBE
	PRESSURE SWITCH		CONDUIT FOR HOOTER CUM SPEAKER
	PRESSURE GAUGE		FIRE ALARM PANEL
	FOUR WAY FIRE BRIGADE INLET		REPEATER PANEL
	DRAWOUT CONNECTION		1x240 WATT AMPLIFIER & SELECTOR SWITCH FOR PA SYSTEM
	EXPANSION BELLOW		FAULT ISOLATOR
	NON-RETURN VALVE		
	Y STRAINER		
	HYDRANT PIPE		
	SPRINKLER PIPE		
	FIRE WATER PIPE		
	ALARM VALVE		

FIRE-ALARAM SYSTEM	
ABBREVIATIONS	DESCRIPTION
FI	FAULT ISOLATOR
FACP	FIRE ALARM CONTROL PANEL
IM	INPUT MODULE
OM	OUTPUT MODULE
MC	MANUAL CALL POINT

Fire Detection & Fire Fighting Symbols & Abbreviation (Sh-1)



Maha Metro Rail Project

3.11.5 FIRE DETECTION AND FIRE FIGHTING SYMBOLS & ABBREVIATIONS (SH-2)

FIRE-FIGHTING	
ABBREVIATIONS	DESCRIPTION
FIA	FROM ABOVE
FIB	FROM BELOW
T/A	TO ABOVE
T/B	TO BELOW
UP	PIPE UP
DN	DROP DOWN
BOP	BOTTOM OF PIPE
BOS	BOTTOM OF SLEEVE
F/C	FALSE CEILING
FWP	FIRE WATER PIPE

UNIT ABBREVIATIONS	
UNIT	DESCRIPTION
mm	MILLIMETER
Mtr.	METER
KL	KILOLITER
Ltrs.	LITRE

SYMBOL LEGEND	
SYMBOL	DESCRIPTION
	FOR SYMMETRICAL
	FOR SECTION
	FOR UCS
PLAN VIEW SCALE: 1/1	FOR TITLE
0.000 m ▽	FOR LEVEL
NOTES:-	(1) GENERAL NOTES (2) GENERAL NOTES (3) GENERAL NOTES
	NORTH DIRECTION
	DETAIL MARK
	DETAIL MARK - 1
DRAFT COPY	FOR DRAFT COPY

Fire Detection & Fire Fighting Symbols & Abbreviation (Sh-2)



Maha Metro Rail Project

3.11.6 HVAC SYMBOLS & ABBREVIATIONS (SH-1)

LEGEND HVAC			
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	SUPPLY AIR DIFFUSER		FOR LWB
	RETURN AIR DIFFUSER		FOR TITLE
	SUPPLY AIR GRILLE		FOR LEVEL
	SLOT LINEAR DIFFUSER	NOTES:-	(1) GENERAL NOTES (2) GENERAL NOTES (3) GENERAL NOTES
	ISD VALVE SUPPLY		NORTH DIRECTION
	ISD VALVE EXHAUST		DETAIL MARK
	LINEAR BAR GRILLE		DETAIL MARK - 1
	SQUARE SUPPLY GRILLE		FOR DRAFT COPY
	SQUARE RETURN GRILLE		FOR SYMMETRICAL
	VOLUME CONTROL DAMPER		FOR SECTION
	FIRE DAMPER		
	NON RETURN DAMPER / BACKDRAFT DAMPER		
	SUPPLY AIR DUCT		
	FRESH AIR DUCT		
	KITCHEN EXHAUST DUCT		
	TOILET EXHAUST DUCT		
	VOLUME CONTROL DAMPER (SCHEMATIC)		
	BELL MOUTH WITH WIRE MESH & VOLUME CONTROL DAMPER		
	TURNING VANES		
	FLEXIBLE DUCT		
	DOOR UNDER GLT		
	EXHAUST AIR LOUVERS WITH SAND TRAP		
	EXHAUST LOUVERS		
	GRAVITY LOUVERS		
	SOUND ATTENUATOR		
	ACCESS PANEL		
	SUPPLY / RETURN FAN		
	REF-REFRIGERANT PIPE & CONNECTION		
	DRAIN PIPE		
	REMOTE BRANCHES		
	DUCTABLE INDOOR UNIT		
	FRESH AIR HANDLING UNIT		
	CASSETTE UNIT		
	PROPELLER FAN		
	VAV / VAV OUT DOOR UNIT		
	AXIAL FLOW FAN		
	DOOR TRANSFER GRILLE		

HVAC Symbols & Abbreviation (Sh-1)



Maha Metro Rail Project

3.11.7 HVAC SYMBOLS & ABBREVIATIONS (SH-2)






















ABBREVIATION	DESCRIPTION
DV	DISC VALVE
SD	SUPPLY DIFFUSER
RD	RETURN DIFFUSER
SQ	SUPPLY GRILLE
RG / EG	RETURN / EXHAUST GRILLE
FD	FIRE DAMPER
MSFD	MOTORISED SMOKE & FIRE DAMPER
MFD	MOTORISED FIRE DAMPER
MD	MOTORISED DAMPER
NRD	NON RETURN DAMPER
VCD	VOLUME CONTROL DAMPER
FAD	FRESH AIR DUCT
SAD	SUPPLY AIR DUCT
RAD	RETURN AIR DUCT
TED	TOILET EXTRACT / EXHAUST DUCT
KED	KITCHEN EXTRACT / EXHAUST DUCT
DUC	DOOR UNDER CUT
IL	INTAKE LOUVRE
EL	EXHAUST LOUVRE
ODU	OUT DOOR UNIT
IDU	INDOOR UNIT
FAHU	FRESH AIR HANDLING UNIT
KEF	KITCHEN EXHAUST FAN
TEF	TOILET EXHAUST FAN
AP	ACCESS PANEL
HL	HIGH LEVEL
LL	LOW LEVEL
T/A	TO ABOVE
T/B	TO BELOW
F/A	FROM ABOVE
F/B	FROM BELOW
L/S	LITER PER SECOND
m ³ /s	CUBIC METER PER SECOND
m/s	METER PER SECOND
Pa/kPa	PASCAL / KILO PASCAL
mm	MILLIMETER
m	METER
°C	DEGREE CELSIUS
DB	DRY BULB TEMPERATURE
WB	WET BULB TEMPERATURE
RH	RELATIVE HUMIDITY
NC	NOISE CRITERIA
dB	DECIBEL
RPM	REVOLUTION PER MINUTE
W/kW	WATTS/KILOWATTS
L	LITER
B.O.D	BOTTOM OF DUCT
B.O.U	BOTTOM OF UNIT
B.O.F/C	B.O.FALSE CEILING
B.O.DRAIN PIPE	BOTTOM OF DRAIN PIPE

LEGENDS	ABBREVIATIONS
RWP	RAIN WATER PIPE
SMWP	STORM WATER PIPE
F.F.L	FINISH FLOOR LEVEL
F.G.L	FINISH GROUND LEVEL
G.L	GROUND LEVEL
I.L	INVERT LEVEL
IC	INSPECTION CHAMBER
SWMH	STORM WATER MANHOLE

HVAC Symbols & Abbreviation (Sh-2)

Maha Metro Rail Project

3.11.8 PLUMBING SYMBOLS & ABBREVIATIONS (SH-1)

PLUMBING				(DRAINAGE)	
SYMBOL	DESCRIPTION	ABBREVIATIONS	DESCRIPTION		
	SOIL PIPE	SP	SOIL PIPE		
	WASTE PIPE	WP	WASTE PIPE		
	VENT PIPE	VP	VENT PIPE		
	RAIN WATER PIPE	RWP	RAIN WATER PIPE		
	SEWERAGE WATER PIPE	SWP	SEWERAGE WATER PIPE		
	STORM WATER PIPE	SWWP	STORM WATER PIPE		
	DROP DOWN	DD	DROP DOWN		
	DIRECTION OF FLOW				
	CLEAN OUT	CO	CLEAN OUT		
	FLOOR CLEAN OUT	FCO	FLOOR CLEAN OUT		
	FLOOR TRAP	FT	FLOOR TRAP		
	FLOOR DRAIN	FD	FLOOR DRAIN		
	ROOF DRAIN	RD	ROOF DRAIN		
	URINAL TRAP	UT	URINAL TRAP		
	GULLY TRAP (300x300)	GT	GULLY TRAP		
	INSPECTION CHAMBER (800x800mm)	IC	INSPECTION CHAMBER		
	SEWER MANHOLE	SMH	SEWER MANHOLE		
	SEWER CIRCULAR TYPE MANHOLE	SMH	SEWER CIRCULAR TYPE MANHOLE		
	STORM WATER MANHOLE	SWMH	STORM WATER MANHOLE		
	STORM WATER CIRCULAR TYPE MANHOLE	SWMH	STORM WATER CIRCULAR TYPE MANHOLE		
	GREASE TRAP				
		SP	SOIL PIPE		
		WP	WASTE PIPE		
		VP	VENT PIPE		
		SVP	SOIL VENT PIPE		
		WVP	WASTE VENT PIPE		
		RWP	RAIN WATER PIPE		
		SWP	SEWERAGE WATER PIPE		
		SWWP	STORM WATER PIPE		
		FA	FROM ABOVE		
		FB	FROM BELOW		
		TA	TO ABOVE		
		TB	TO BELOW		
		H/L	HIGH LEVEL		
		F.F.L	FINISH FLOOR LEVEL		
		F.G.L	FINISH GROUND LEVEL		
		G.L	GROUND LEVEL		
		I/L	INVERT LEVEL		
		FC	FALSE CEILING		
		FD	FLOOR DRAIN		
		FT	FLOOR TRAP		
		UT	URINAL TRAP		
		RD	ROOF DRAIN		
		CO	CLEAN OUT		
		FCO	FLOOR CLEAN OUT		
		WCO	WALL CLEAN OUT		
		DD	DROP DOWN		
		DP	DRAIN POINT		
		GT	GULLY TRAP		
		IC	INSPECTION CHAMBER		
		SMH	SEWER MANHOLE		
		SWMH	STORM WATER MANHOLE		
		ROP	BOTTOM OF PIPE		
		BOS	BOTTOM OF SLEEVE		
		UP	PIPE UP		
		CDP	CONDENSATE DRAIN PIPE		
		Ø	DIA		

Plumbing Symbols & Abbreviation (Sh-1)



Maha Metro Rail Project

3.11.9 PLUMBING SYMBOLS & ABBREVIATIONS (SH-2)

PLUMBING				(WATER SUPPLY)
SYMBOL	DESCRIPTION	ABBREVIATIONS	DESCRIPTION	
CWS	COLD WATER SUPPLY	CWS	COLD WATER SUPPLY	
HWS	HOT WATER SUPPLY	HWS	HOT WATER SUPPLY	
DN	DROP DOWN	FA	FROM ABOVE	
UP	RISE UP	FB	FROM BELOW	
IV	ISOLATING VALVE	TA	TO ABOVE	
GV	GATE VALVE	TB	TO BELOW	
NRV	NON RETURN VALVE	GV	GATE VALVE	
EWB	ELECTRIC WATER HEATER	NRV	NON RETURN VALVE	
		IV	ISOLATING VALVE	
		RV	BALL VALVE	
		FV	FLUSH VALVE	
		FS	HAND SPRAY	
		STR	STRAINER	
		HB	HOSE BIB	
		DN	DROP DOWN	
		EWB	ELECTRIC WATER HEATER	
		WHA	WATER HAMMER ARRESTOR	
		AAV	AUTOMATIC AIR VENT	
		BOP	BOTTOM OF PIPE	
		BOB	BOTTOM OF BLEEVE	
		UP	PIPE UP	
		AV	ANGLE VALVE	
		AT	ABLUTION TAP	
		Ø	DIA	

UNIT ABBREVIATIONS	
UNIT	DESCRIPTION
mm	MILLIMETER
Mt.	METER
KL	KILOLITER
Ltr.	LITRE

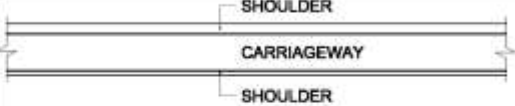










SYMBOL LEGEND	
SYMBOL	DESCRIPTION
	FOR SYMMETRICAL
	FOR SECTION
	FOR UCS
	FOR TITLE
	FOR LEVEL
NOTES:-	(1) GENERAL NOTES (2) GENERAL NOTES (3) GENERAL NOTES
	NORTH DIRECTION
	DETAIL MARK
	DETAIL MARK - 1
	FOR DRAFT COPY

Plumbing Symbols & Abbreviation (Sh-2)



Maha Metro Rail Project

3.11.10 HIGHWAYS LEGEND & ABBREVIATIONS

HIGHWAY ABBREVIATIONS		HIGHWAY LEGEND	
ABBREVIATIONS	DESCRIPTION		
AC	ASPHALTIC CONCRETE		SHOULDER
BC	BINDER/BASE COURSE		CARRIAGEWAY
B/L	BASE LINE		SHOULDER
C/C	CENTRE TO CENTRE OR CENTRE OF CIRCLE		BASELINE
CC	CURVE TO CURVE		RETAINING WALL/CONCRETE BARRIER
CW	CARRIAGEWAY		LANE MARKING
CH	CHAINAGE		LIMIT OF WORK
CL	CENTERLINE		EDGE OF RIGHT OF WAY
CS	CURVE TO SPIRAL		TRAFFIC DIRECTION
e	SUPERELEVATION		HORIZONTAL CURVE POINT
FGL	FINISHED GROUND LEVEL		VERTICAL CURVE POINT
FRL	FINISHED ROAD LEVEL		PROPOSED PIER
G	GRADE		PIER NUMBER
K	K-VALUE		
L	LENGTH		
LOW	LIMIT OF WORK		
LVL	LEVEL		
LM	LIGHTING MAST		
L.m	LINEAR METER		
ML	MAINLINE		
MHHW	MEAN HIGHER HIGH WATER		
MSL	MEAN SEA LEVEL		
N	NORTH/NORTHING		
NA	NOT APPLICABLE		
NB	NORTH BOUND		
NO.	NUMBER		
NTS	NOT TO SCALE		
PGL	PROFILE GRADE LINE		
PC	TANGENT TO CURVE		
PT	CURVE TO TANGENT		
R	RADIUS		
SB	SOUTH BOUND		
SC	SPIRAL TO CURVE		
ST	SPIRAL TO TANGENT		
SS	SPIRAL TO SPIRAL		
SH	SHOULDER		
TS	TANGENT TO SPIRAL		
WC	WEARING COURSE		

Highway Symbols & Abbreviation (Sh-1)



Maha Metro Rail Project

3.11.11 CIVIL (STRUCTURE) SYMBOLS

STRUCTURAL SYMBOLS			
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	FOR SYMMETRICAL		
	SLEEVE OR HOLE		
	SLAB THK		
	SUNK SHOWN IN PLAN		
	SUNK THK. SHOWN IN PLAN		
	CUTOUT		
	COLUMN GRID		
	SLAB LEVEL SHOWN IN PLAN		
	CL ALIGNMENT STYLE		
	NORTH DIRECTION		
	SECTION MARKED IN PLAN		
	REVISION		
	LEVEL		
	WATER PROOFING		
	FOR UCS		
	CONTINUE RETAINING WALL		
	CONTINUE COLUMN		
	COMPACTED DESERT SOIL		
	ROCK		
	EARTH/SAND FILLING		
	CONCRETE		



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4 Responsibilities

4.1 Author

- 4.1.1 Accuracy of graphical and non-graphical elements within a CAD file.
- 4.1.2 Compliance with this standard.

4.2 Approver

- 4.2.1 Approving CAD files to be shared and used for the suitability (see 3.7.2) indicated.
- 4.2.2 Maintaining an audit trail to capture the checks and reviews carried out to gain approvals.

4.3 Authorizer

- 4.3. 1 On behalf of MMRCL, authorizing (accept / reject) CAD files submitted to MMRCL for publishing for the suitability (see 3.7.2) indicated.

4.4 MMRCL CAD Support Team

- 4.4.1 Generation and governance of field codes.
- 4.4.2 Supply and management of MMRCL CAD data, resources and licensed mapping.

4.5 MMRCL Principal Infrastructure Protection Engineer

- 4.5.1 Approving external requests to MMRCL for CAD data, not originating from within an MMRCL project.

4.6 MMRCL Procurement Agent

- 4.6.1 The MMRCL Procurement Agent shall be responsible for incorporating the requirements of this engineering standard in any contract to which it is relevant and shall stipulate that a programme of audits is implemented by the contractor which ensures that these requirements are complied with.

5 Supporting information

5.1 Background

- 5.1.1 The requirements within this document shall be read in conjunction with the reference documents listed in 6.1.1.
- 5.1.2 If you need any technical assistance with any of the requirements within this document, you can contact the MMRCL CAD Support Team at



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6 References

6.1 References

6.1. Refer to EIR

6.1.2 Industry standards

Document no.	Title
BS 1192	Collaborative production of AEC information
BS 8888	Technical product specification - Specification
BS EN ISO 5455	Technical drawings - Scales
EN ISO 3098-5	CAD lettering of the Latin alphabet, numerals and marks
BS ISO 12006-2	Unified Classification for the construction industry (Uniclass)
BS EN ISO 5457	Sizes and layout of drawing sheets
PAS-1192(2)	Collaborative production of AEC information For BIM
PAS-1192(3)	Collaborative production of AEC information for Asset Information



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6.2 Abbreviations

The following abbreviations are created:

- a) Within MMRCL Glossary of Terms (a Category 1 Standard);
- b) From published sources that are clearly identified.

Abbreviation	Definition	Source
AEC	Architectural, Engineering and Construction	a
CAD	Computer Aided Design	a
MMRCL	Maha Metro Rail Corporation Limited	a
OS	Ordnance Survey	a

6.3 Definitions

Topic specific definitions

Term	Definition
Asset Class	Highest level of classification of London Underground's Engineering Assets, as defined in CAT 1 Standard S1041
CAD Computer Aided Design) File	Electronic file produced by a CAD application (such as MicroStation or AutoCAD). Examples of CAD files include Drawing Definitions and Model files.
Classification	Systematic arrangement of design and construction activities and assets, including construction elements, systems and products
Common Data Environment (CDE)	A designated environment with a defined process used to manage all relevant information. A CDE may comprise of one or more systems supporting a consistent collaborative approach.
Composite Model	Computer Aided Design (CAD) file that contains one or more Model Files, as references, for the purpose of spatial coordination; there is no 'live' geometry within the file. It may form part of a Drawing Definition.
Data	Set of digital values stored, but not yet interpreted or analysed (un-processed), in a form that is convenient to move or process. Data is generally represented in a structured and often tabulated form (rows and columns). 'Raw Data' is a relative term and therefore not used.
DGN	Proprietary Bentley Systems file format
Document	Information recorded for a specific purpose, providing a means to communicate the briefing, design, construction, operation, maintenance or decommissioning of an asset. This includes, but is not limited to, correspondence, Drawing Renditions, schedules, specifications, calculations, spreadsheets. Note: Documentation must either be in an immutable format or incorporate a means of controlling changes.



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Term	Definition
Drawing Definition	A CAD file created solely for the purpose of creating a Drawing Rendition or Printed Drawing. The graphical content of the drawing definition is contained in other CAD files (e.g. Model Files and/or Composite Models) which are attached as References. Only annotation and dimensions are 'live' within the Drawing Definition file. Examples may include As-built Drawing Definitions.
Drawing Rendition	Electronic file, in an immutable format such as PDF, derived from a Drawing Definition. Examples may include As-built Drawing Renditions.
Drawing Sheet	CAD file containing the graphics of a blank drawing border and title block, of Predefined paper sizes. Used as a reference by all drawing definitions.
Information	Data which has been interpreted and processed (such as formatting and printing) to take on meaning in some context for its intended receiver.
Layer	Synonymous with the level functionality in the DWG File format.
Level	Floor level within a building (refer to S0135, Location Coding System)
Meta-data	'Data about the data'. Information about one or more aspects of certain items content. For example: size of document, date created etc.
Model File	A Computer Aided Design (CAD) file which consists of geometry that represents the physical characteristics (may also include functional characteristics) of the works, produced at a scale of 1:1. It may form part of the Composite Model and/or Drawing Definition.
Model rendition	An immutable file, in a format such as PDF, which is derived from a Model File or Composite Model.
Newlyn	Mean sea level (MSL) calculated from observation taken at Newlyn, Cornwall and used as the official basis for height calculation.
Printed Drawing	Static, hard-copy document, derived from a Drawing Definition (as an exact copy) or Drawing Rendition.
Project	A unique set of co-ordinated activities, with definite starting and finishing points, undertaken by an individual or organization to meet specific objectives within defined schedule, cost and performance parameters.
Reference	An Auto Cad/Bentley MicroStation term meaning a CAD file attached to another CAD file such that all or part of its graphical content is visible but not editable in the file to which it is attached.
Status	Defines the suitability of information.
Spatial Data	Geometry aligned to the physical location of an asset, to a specified grid system.
Tag	An Auto Cad /Bentley MicroStation term meaning a non-graphical attribute attached to an element within a CAD file.



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6.4 Technical content manager

Paragraph number	Technical content manager
All	Head of Engineering Information

6.5 Document history

Issue no	Date	Changes	Author
A1	October 2016	Authorised for use	



Maha Metro Rail Project



Maha Metro Rail Corporation

Pune Metro

Post Contract-Award Building Information Modelling (BIM) Execution Plan (BEP)

Contract Name:

Contract Description:

Contract Address:

Contract Number:

Date:

Document No:

Date: **October 2016**

Revision: **R0**

Status: **Published**



Maha Metro Rail Project

Document Control Sheet

Rev.	Status	Page Nos.	Amendment	Date	By

Authored by:



The Post Contract-Award Building Information Modelling Execution Plan (BEP)

Preface

The BEP shall be prepared for each contract and shall be utilised by the supply chain within each contract for the Project Information Model authoring, coordination, quality assurance and sharing/publishing processes. The BEP shall list the supplier, Detailed design consultant, contractor [the supplier] agreed targets for responsibility, timely delivery, exchange, reuse and final handover to MMRCL or its agents [**the Employer**]. It will also list all agreed elements as outlined in MMRCL's Employers Information Requirements.

This BEP is structured in accordance with MMRCL EIR which is guided by PAS 1192-2-2013

Project Delivery Manager

This document is owned and maintained by the current Project Delivery Manager listed below.

Project Delivery Manager - Name	Company Responsible

Project Team Representatives and Role

Company Name	Representative and Authorised Responsible Agent	Role

Document Authority

This project plan has been agreed by the representatives of the project team as listed above with the authority of their parent companies to accept this document as the agreed **BIM Execution Plan**.



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1 Contract Information

Table 1 – Contract information

Contract Name	
Contract Address	
Contract Number (Clients Project Number or reference)	
Contract Form	
Contract Design Start Date	
Contract Construction Start Date	
Contract Completion and Handover Date	
Contract Description	
Contract Brief and Health and Safety requirements (Construction Design and Management)	[reference]
Contract Deliverable	Refer To EIR



2 Information required by the EIR

The following subsections of the BEP respond to the parts of the EIR specifically requesting the suppliers response.

2.1 *Planning of work and data segregation*

The management of the modelling process (e.g.model management, naming conventions, etc.) needs to explicate the compliance strategy to the EIR requirements.The planning of work and data segregation aspects of the project are described in later parts of the BEP, in particular Section 3 Management, Section 4 Planning and documentation and Section 5 Standard method and procedure.

2.2 *Co-ordination and clash detection*

This section of the BEP contains the bidders" proposals for managing the co-ordination process. The requirements for co-ordination are stated in EIR.

2.3 *Collaboration process*

This section of the BEP contains the agreed strategy for the management of the collaboration process in compliance to the EIR requirements.

This is described in Section 4.2. Refer to the EIR for the requierements.

2.4 *Health and safety management*

This section of the BEP contains the bidders" proposals for using BIM and the Common Data Environment to support the management of Health and Safety requirements and the related Health and Safety artifacts.

2.5 *Compliance plan*

This section of the BEP contains the bidders" proposals for managing the co-ordination process and the strategies for compliance to the EIR requirements.



3 Management

This section of the BEP covers the requirements of Employers Information Requirements in a reference to the management procedures:

- roles, responsibilities and authorities;
- major contract milestones consistent with the contract programme and the overall MMRCL programme;
- project information model deliverable strategy in compliance to the EIR;
- survey strategy including the use of point clouds, photogrammetry, light detecting and ranging (LIDAR) or global navigation satellite systems (GNSS);
- existing legacy data use;
- approval of information; and
- Project Information Model authorization process;

3.1 Roles, responsibilities and authorities

At the start of a project it is important to identify the roles and responsibilities of the design teams. Table 2 is used to record the names and contact details of the individuals fulfilling the necessary project roles

Table 2 – Roles and responsibilities

Role Company	Name	Email and Telephone number
Lead Designer Representative Company.....		
Employer Information Manager Company.....		
Document Controller Company.....		
Design Coordination Manager Company		
Construction Manager / Project Manager Company.....		
Designated Technical Lead / Manager Company.....		
Project Information Manager Company..... Company.....		
Task Team Manager * Company..... Company.....		
Task Team Information Manager * Company..... Company.....		
Task Team Interface Manager * Company..... Company.....		



CAD Coordinator Company.....		
CAD Manager Company.....		
Task Team BIM Authors * Company..... Company..... Company.....		

* Note – specify these roles for each task team involved in the project

The responsibilities of the different roles related to production and management of information are described in the MMRCL EIR Standards, Methods and Procedures (SMP) document.

The standard authorities of the different roles related to production and management of information are described in the table 3.

Table 3 – Role authorities

Role	Authority
Employers Information Manager	Enforce the application of the Employers Information Requirements and ensure the delivery of the information in compliance to standards from the Employer side.
Project Information Manager	Enforce the BEP and the other Governance Procedures and ensure delivery of the Information requirements specified in the EIR from the Supplier side
Lead Designer	Enforce spatial coordination
Task Team Manager	Enforce documentation standards
Interface Manager	Negotiate space allocation
Task Team Information Manager	Reject non compliant models, drawings & documents
CAD Coordinator and Manager	Enforce CAD related Project BIM Standards
Design Coordination Manager	Ensure the timely delivery of the deliverables.
Project Manager	Enforce the timely delivery of the deliverables.
... other authorities as required per contract	

3.2 Major project milestones

Table 4 – Major project milestones

Start Date	Design Completion	Detail Design Completion + Fabrication	Construction	As Constructed Models, Documents and Data	Handover.



Only the Major milestones are listed. A more detail and co-ordinated MIDP and Project Plan must be developed and agreed with the stakeholders.

3.3 ***Project information model delivery strategy***

The major goals and objectives for the BIM implementation must be considered and stated as a project strategy document, append to this document, under the headings listed in Table 5.

Table 5 – Strategy for information delivery

Brief	Concept	Definition	Design	Build & Commission	Handover & Closeout	In use

[specify and/or refer the process here]



3.4 Survey strategy

Table 6 – Survey strategy

Survey Method	Delivery Format	Survey Origin	Details, notes
Point cloud			
Light detecting and ranging (LIDAR)			
Global navigation satellite systems (GNSS)			
<<others as appropriate>>			

[specify and/or refer the process here]

3.5 Approval of information

To ensure that model, drawing files and spreadsheet extraction are adequately checked, some form of agreed approvals process needs to be in place to enable the design teams and the contractor (or client) to approve and sign-off the development of the design information for a project and to assign responsible team members.

Table 7 – Schedule of information approval responsibilities

Role or Title	Models	Drawings	Peer Review	Lead Designer/Lead Contractor	Client Review Team

[specify and/or refer the process here]



3.6 Production Information authorisation process

The design and construction approval process should be specified, agreed and documented as early as possible in the project. This includes the sign off of specialist design completion information.

Sign off and authorisation process to be agreed and published in coordination with the abilities of the collaboration or EDMS solution and inserted here.

[specify and/or refer the process here]

4 Planning and documentation

This section of the BEP covers the requirements of Employers Information Requirements and in specific the requirements for planning and documentation:

- revised Project Implementation Plan confirming the capability of the supply chain;
- agreed project processes for collaboration and information modelling;
- agreed matrix of responsibilities across the supply chain;
- TIDP; and
- MIDP;

4.1 Revised Project Implementation Plan

The revised PIP confirms the capability of the supply chain.

i Supply chain capability readiness

The PIP consists of the following completed supply chain assessment forms documentation:

- Supply chain capability summary form, which summarises the contents of ...
- Supplier building information management assessment form(s)
- Supplier IT assessment form(s)
- Supplier resource assessment form(s)

These are available as separate templates provided by MMRCL.

S

The supplier resource for the project shall be summarised as per the example in Table 8. *Table 8 – Supplier resource summary*

Supplier	Discipline	Resource numbers	Levels of competence	Years of Experience	Names of individuals
<<name 1>>	Qualified Architect	2	RIBA, CAD/BIM, Specification Author		
	Architectural Technologist (CIAT)	3	CIAT, CAD/BIM Trained		
	Architectural Technician	5	Certificate of CAD or Model Competence		



<<name 2>>	Qualified Structural Engineer	3	MIStructE,		
Etc					

ii Supply Chain Capability development and support

The supply chain capability must be continuously developed and supported (e.g. training and support). The related strategy shall be referenced here.

4.2 Agreed project processes for collaboration and information modelling

Table 9 – Processes for collaboration and information modelling

Company	Solution	Network	Database	File based	Comments

[specify and/or refer the process here]

The clash rendition viewer to be used across the whole contract.

Table 10 – Clash rendition viewer

Agreed clash rendition viewer	Version

This section of the BEP also covers the agreed authorisations for security and extranet access and authority to distribute documents.

Table 11 – Authorisations for security, extranet and document distribution

Company	Authorised Manager	Authority (Upload, download, change Access/Distribution)



4.3 *Agreed matrix of responsibilities across the supply chain*

It is important to define who models what (the BIM Author) and to what Level of Definition (LOD).

There are 7 levels of definition defined in the EIR which do not reflect specific modelling guidelines for any particular software, rather a generic definition of model detail (graphical), how individual objects display themselves and the level of information as a minimum to answer the English question stated in the EIR.

The responsibility matrix will specify who is responsible for the production of the deliverables related to the specific systems as per the MPDT (Master Production Delivery Table) Requirements issued with the EIR.

The deliverables list and their responsibility will be specified in the MIDP (Master Information Delivery Plan) which will be reflected, monitored and maintained in **Bentley AssetWise**.

The production of the 3D deliverables in alignment with the table 12 below and the MPDT Requirement will be enforced via MIDP.

Refer to the EIR section 3.4 for more guidance.

Table 12 – Responsibility matrix for information production

[illegible]

[illegible]



4.4 (Task and) Master Information Delivery Plan (MIDP)

A task information delivery plan (TIDP) for each task (performed by a specific sub-contractor/sub-consultant) within the Contract shall be prepared using the template below and shall be agreed with the Lead Supplier/Contractor.

The master information delivery plan (MIDP) shall be developed by combining the separate Task Information Delivery Plans (TIDP) produced for each task within the contract. The detailed, co-ordinated MIDP must be developed and agreed with all the stakeholders producing information within the Contract. When completed the MIDP should be

- appended to this document inserted into Bentley AssetWise environment for monitoring. The Supply Chain will deliver the information in accordance to the MIDP into the CDE (Common Data Environment) as per the Employer Information Requirements. Refer to the “MMRCL Task and Master Information Delivery Plan – Template” for more details.

5 Standard method and procedure

This section of the BEP covers the requirements for the standard method and procedure:

- the volume strategy;
- Production Information origin and orientation (which may also be geo-references to the earth’s surface using a specified projection);
- file naming convention;
- layer naming convention, where used;
- agreed construction tolerances for all
- disciplines;
- drawing sheet templates;
- annotation, dimensions, abbreviations and symbols; and attribute data;

5.1 Production Information origin and orientation

The origin and orientation of the project are based on the Contract location and its reference to other global or local grids,

Refer to the EIR for the requirements.

. Table 14 – Record of information model origin and orientation

Point	Grid intersection notation	Easting (m)	Northing (m)	Elevation or site Datum
Site local grid origin				
Grid origin Bottom Left Intersection				
Grid Intersection Bottom Right				
Grid Intersection Top Left				

5.2 Engineering Assurance File Naming Convention

Refer to the EIR for the requirements.

5.3 Agreed construction tollerances for all disciplines

Refer to the CAD Standard.



5.4 Drawing sheet templates

Refer to the CAD Standard.

5.5 Annotations, dimensions, abbreviations and symbols

Refer to the CAD Standard.

5.6 Attribute data

Refer to the EIR for the requirements and to the MPDT.

6 IT solutions

This section of the BEP is intended to demonstrate the supply chain IT capability and understanding of the requirements included within the Employers Information requirements, clause 6.

6.1 Software versions

The CAD software and versions that will be used by the design teams shall be agreed before starting the project.

Table 30 – Agreed software versions

Company	Database	CAD software	Version	Format	Comments

6.2 Exchange formats

The agreed formats for model and drawing file exchange are

Refer to the EIR.

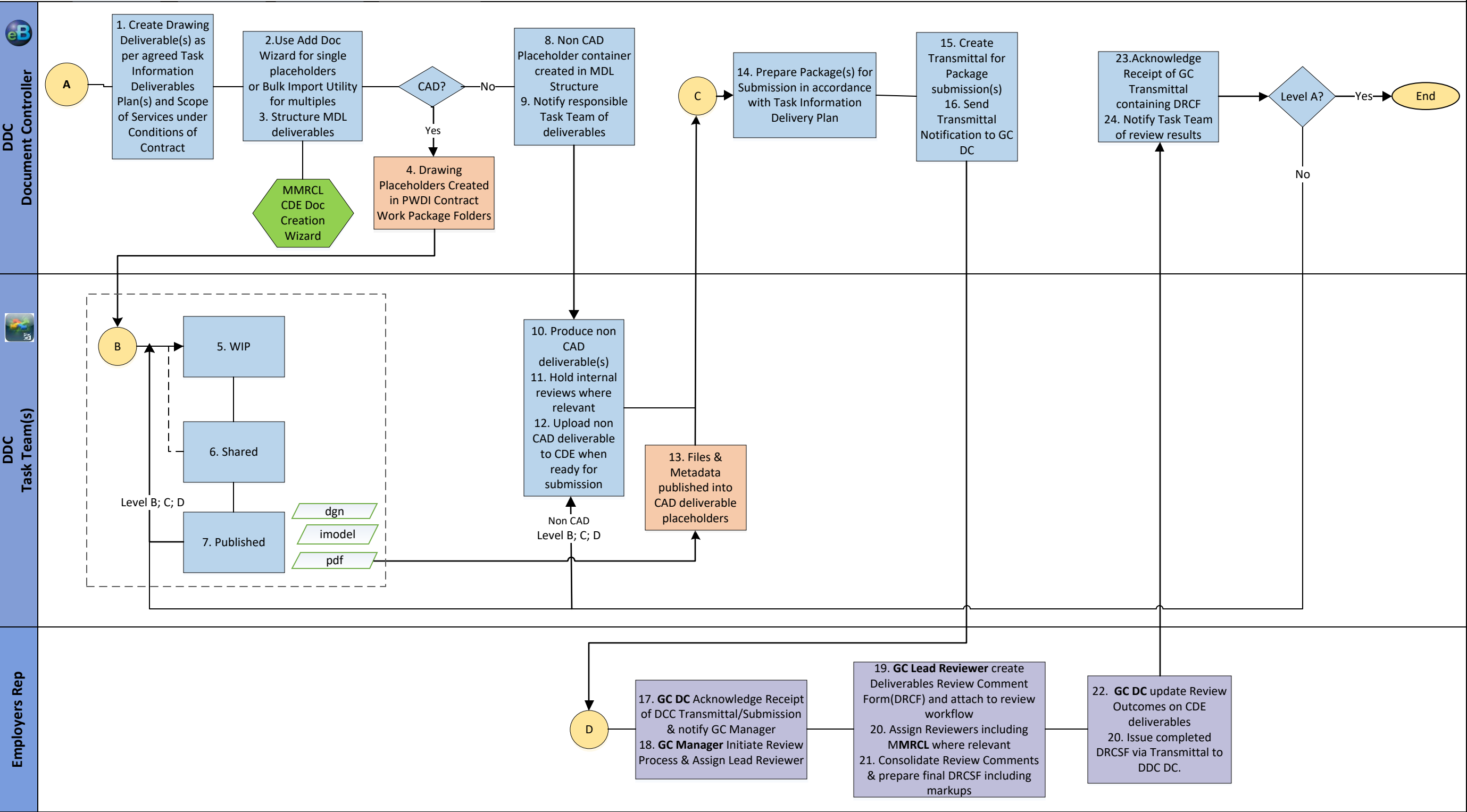
[specify and/or refer any additional process here]

6.3 Process and data management systems

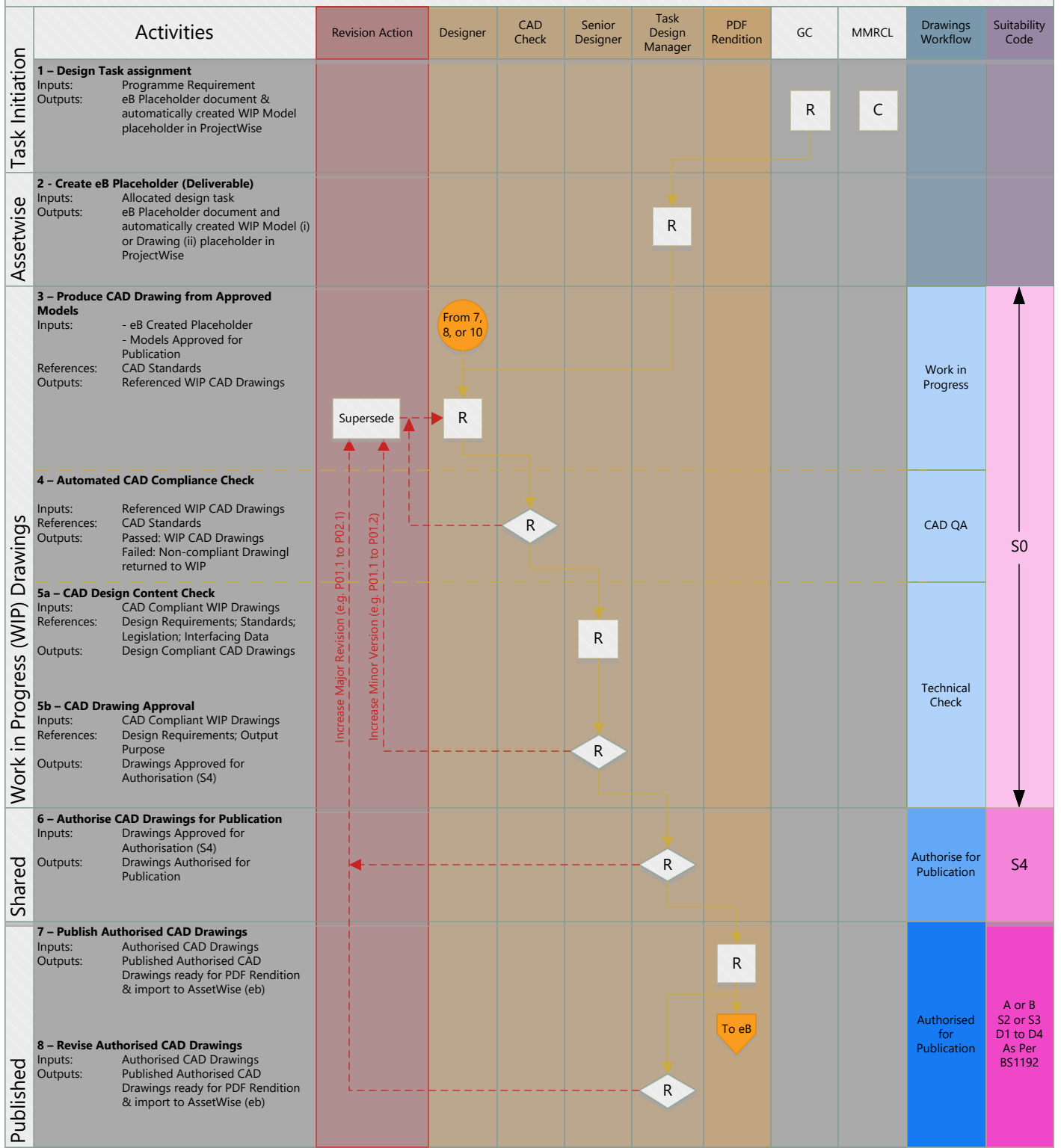
The process and data management systems shall be described under section 4.2 Agreed project processes for collaboration and information modelling.

BIM CDE End to End Deliverables Workflow Process

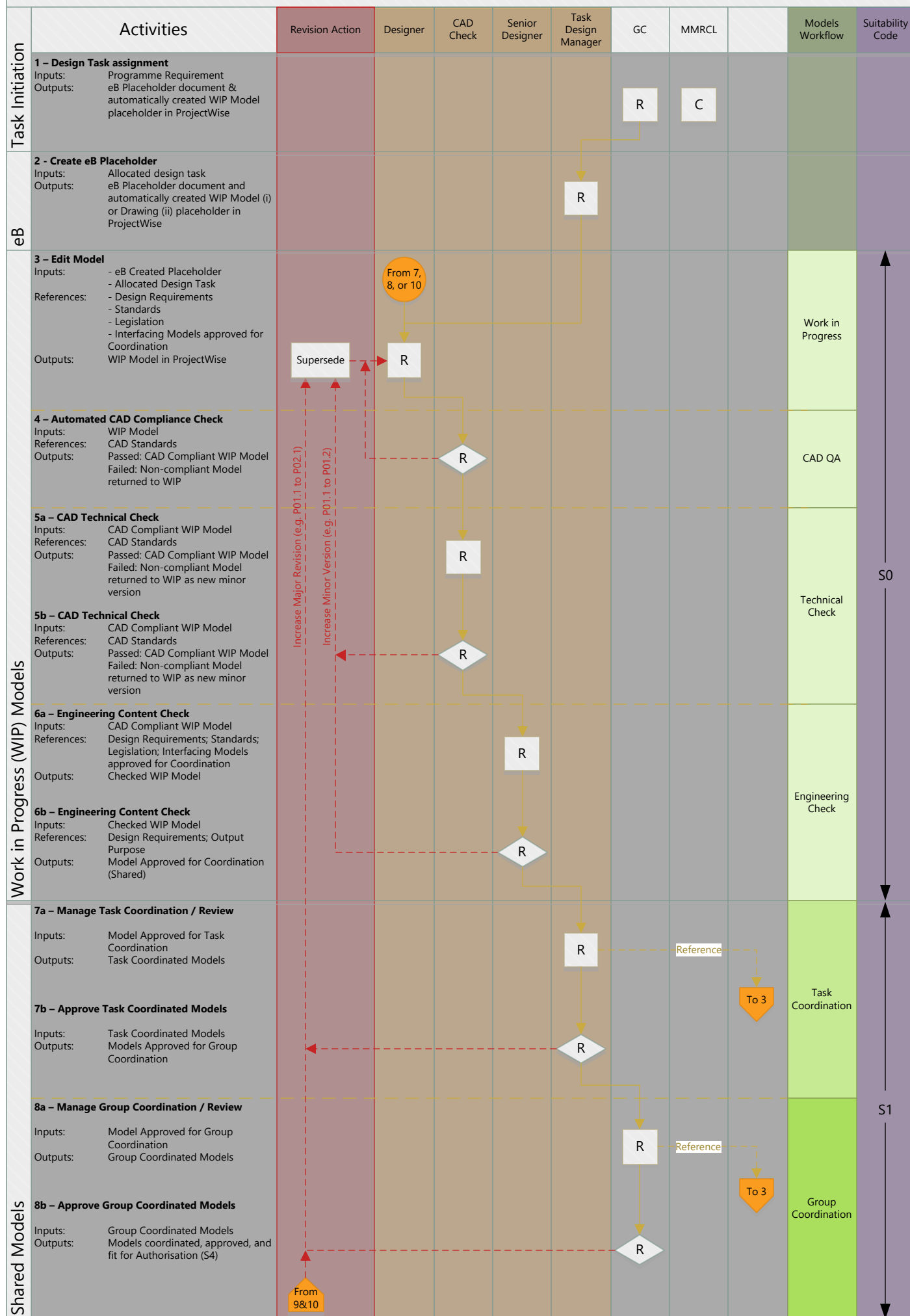
Key/Legend DDC Contractor GC/MMRCL CDE Custom eB-PW Connector



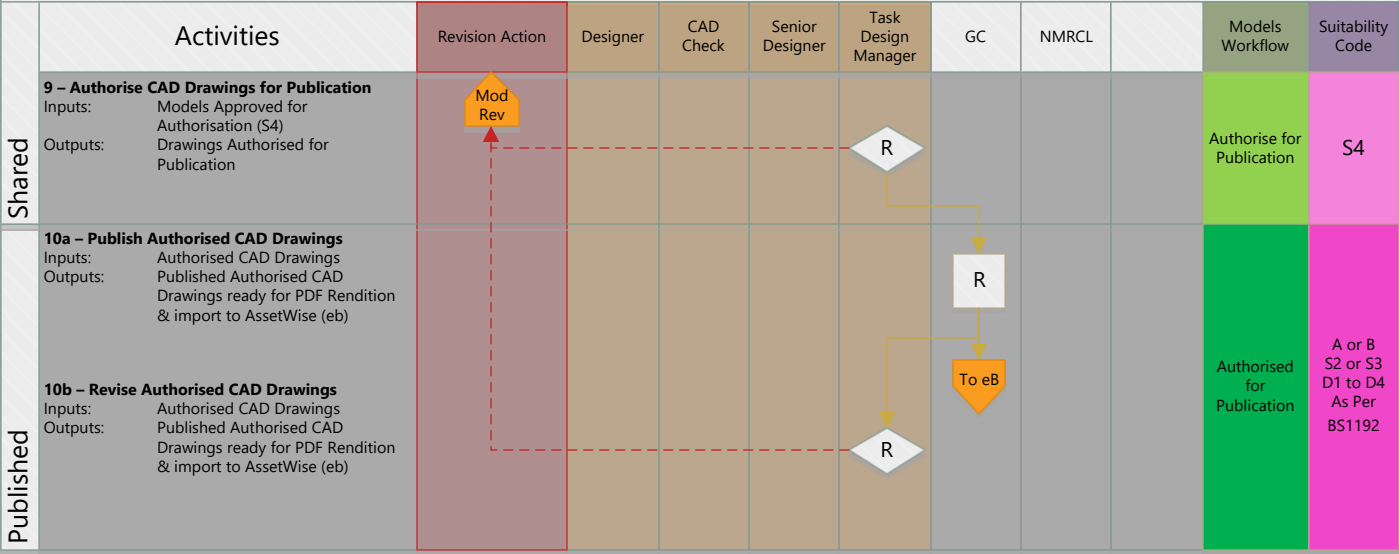
Management of Drawing Data



Management of Model Data



Management of ProjectWise Model Data



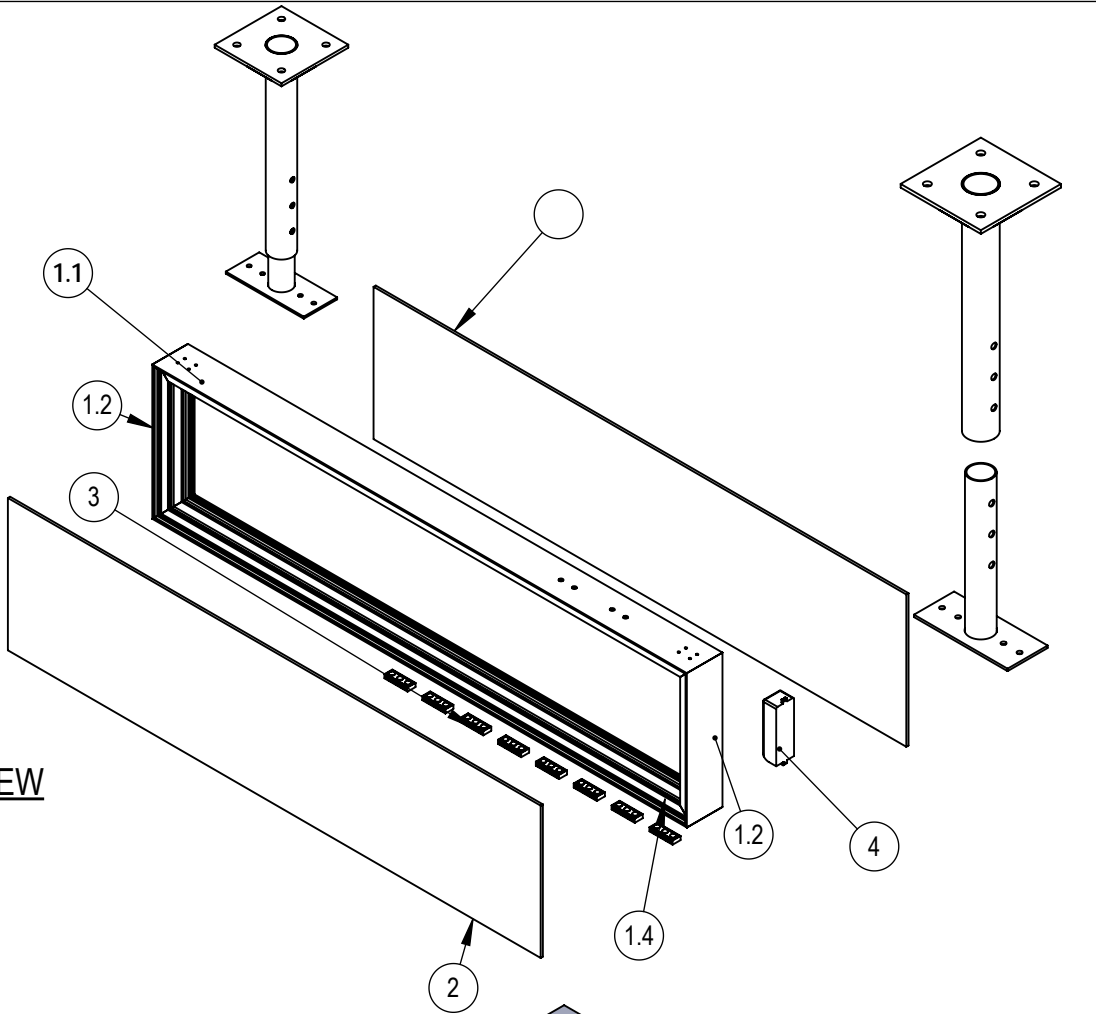
ITEM NO.	DESCRIPTION	LENGTH	FINISH	QTY.
1	AL EXTRUSION FRAME			1
1.1	80mm AL EXTRUSION PROFILE	1200	RAL CLASSIC 7046 PC	1
1.2	80mm AL EXTRUSION PROFILE	300	RAL CLASSIC 7046 PC	2
1.3	25X25X3.0 mm MS ANGLE FOR TOP PROFILE			2
1.4	80mm AL EXTRUSION PROFILE	1200	RAL CLASSIC 7046 PC	1
1.5				1
2	5 mm THK 0-40 ACRYLIC			2
3	LED MODULE 6500 K			8
4	POWER SUPPLY			1
5	SUSPENDER MECHANISM		RAL CLASSIC 7046 PC	2
5.1	DIA 50 X 2 MM THK MS PIPE	AS PER SITE		1
5.2	150 X 150 X 6mm THK MS PLATE			1
5.3	DIA 42 X 2 MM THK MS PIPE	260		1
5.4	175 X 75 X 4 mm THK MS PLATE			1
5.5	50X50X5.0mm THK MS RIB			4

1200X300

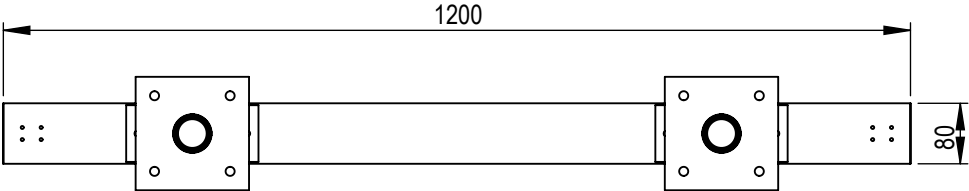
1.1.1a

ILLUMINATED

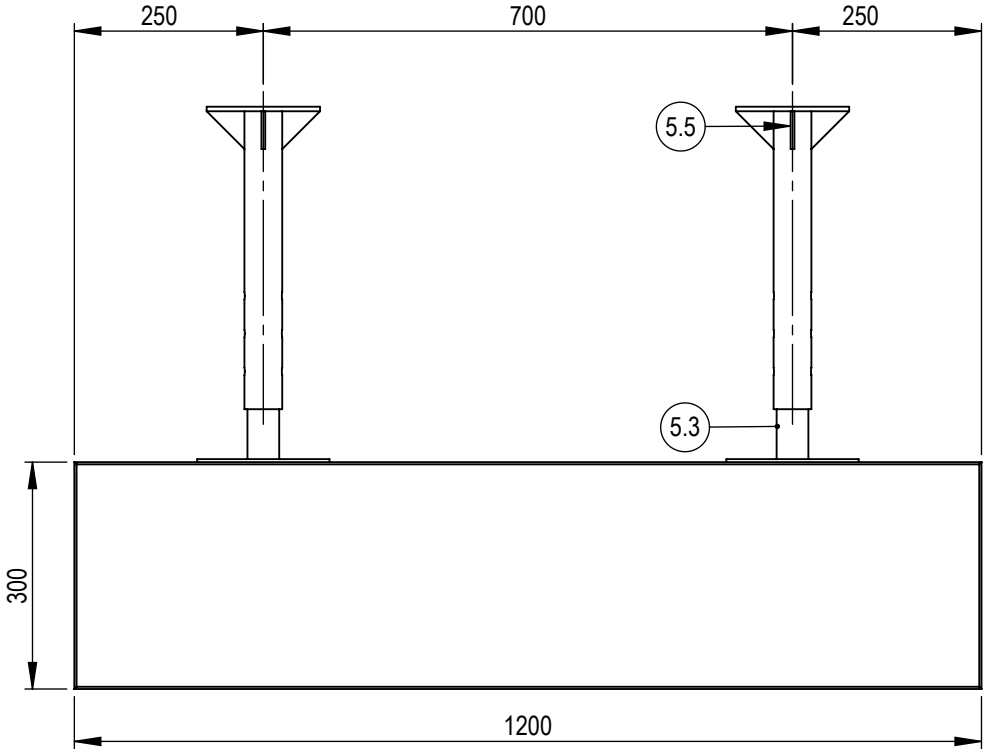
DOUBLE SIDED



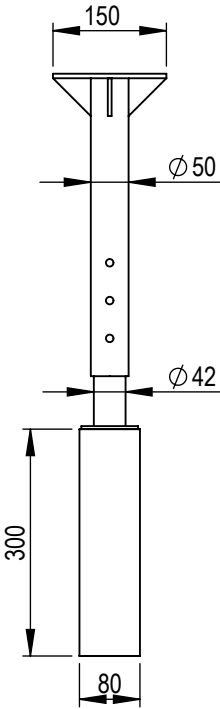
EXPLODED VIEW



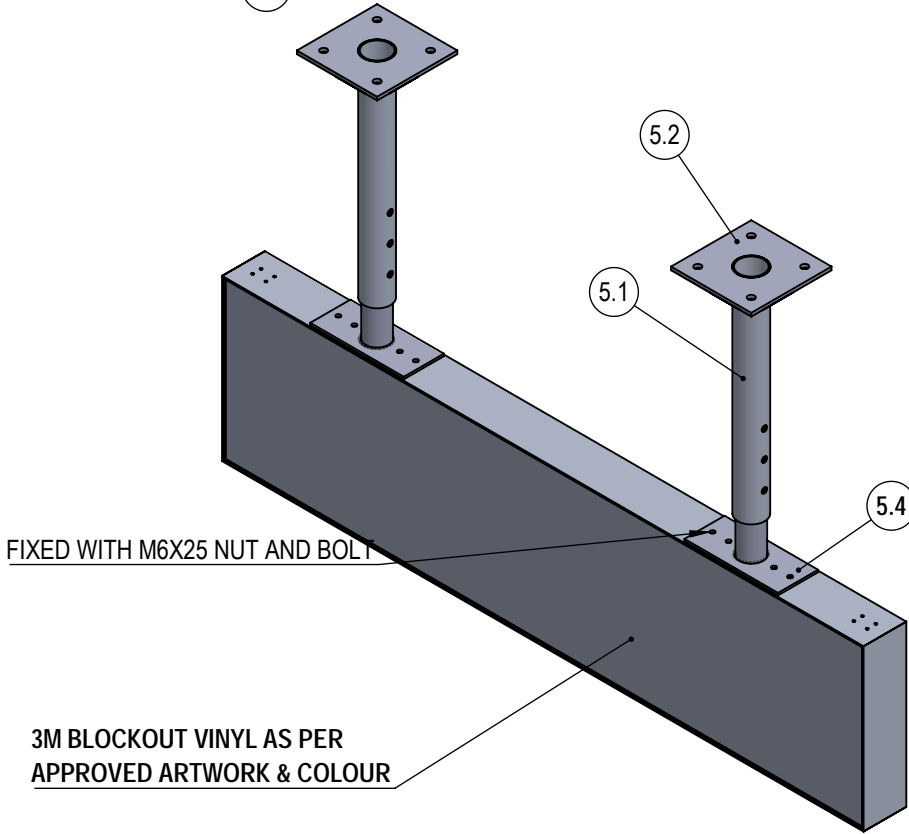
TOP VIEW



FRONT VIEW

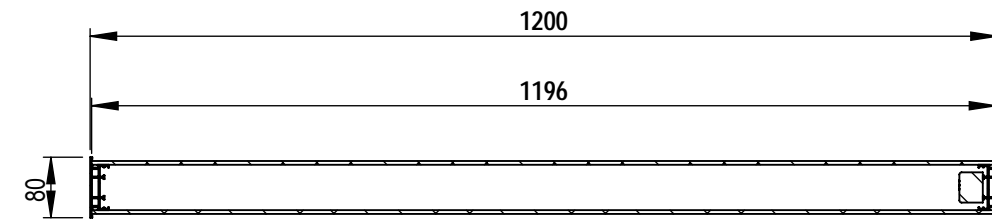


SIDE VIEW

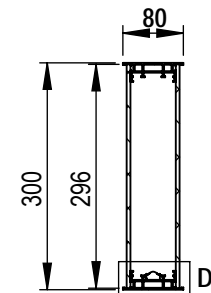
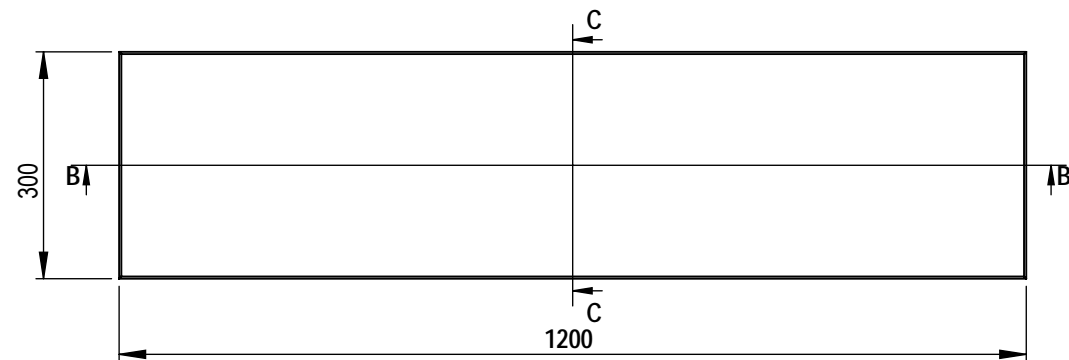
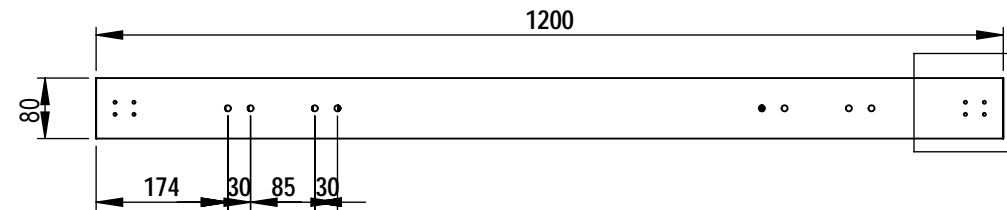


ISOMETRIC VIEW

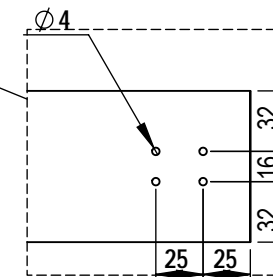
NOTE - TECH SPECS FOLLOW AS PER PROTO



SECTION B-B



SECTION C-C

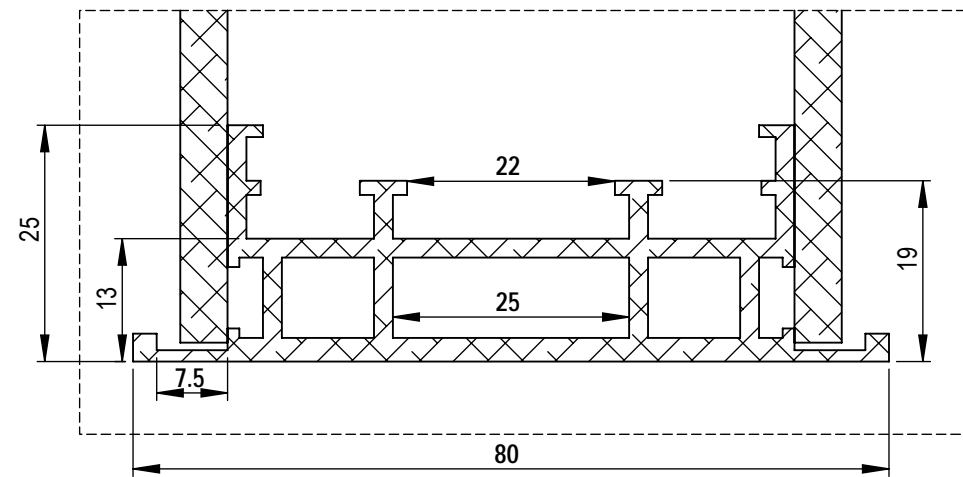
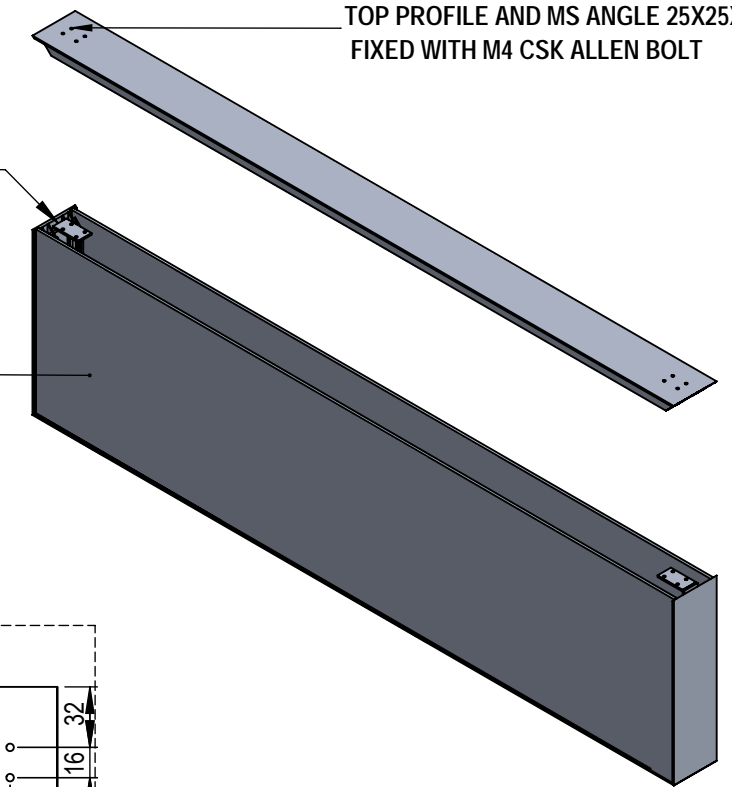


DETAIL E
SCALE 1 : 4

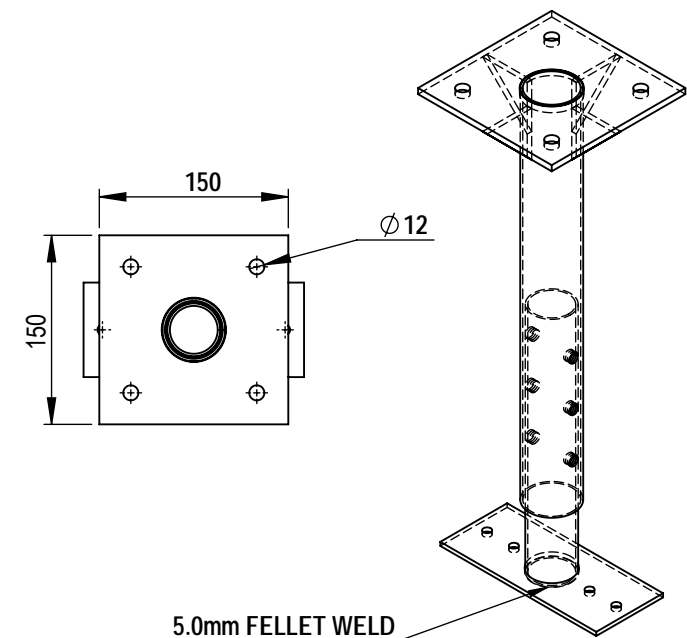
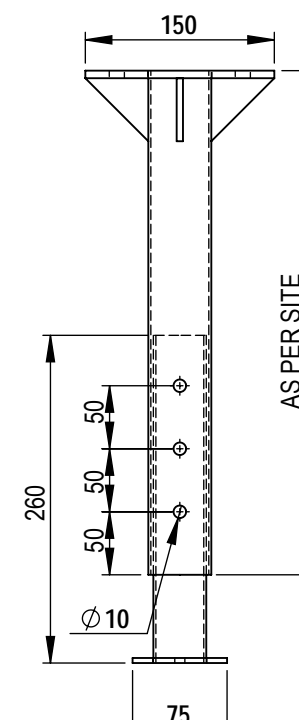
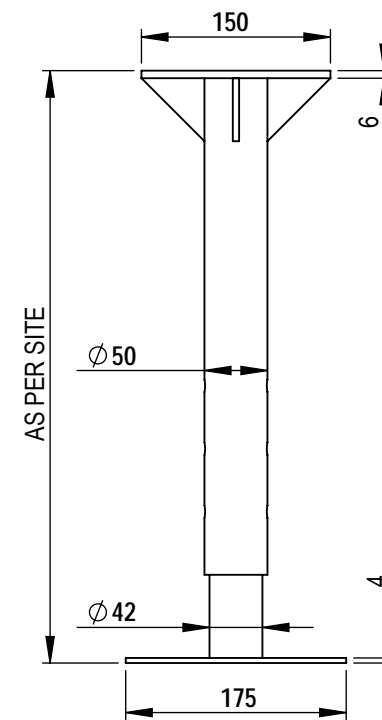
25X25 X3.0mm THK-50mm
MS ANGLE AND SIDE PROFILE
FIXED WITH POP RIVET

ACRYLIC INSERT FROM TOP

TOP PROFILE AND MS ANGLE 25X25X3.0
FIXED WITH M4 CSK ALLEN BOLT

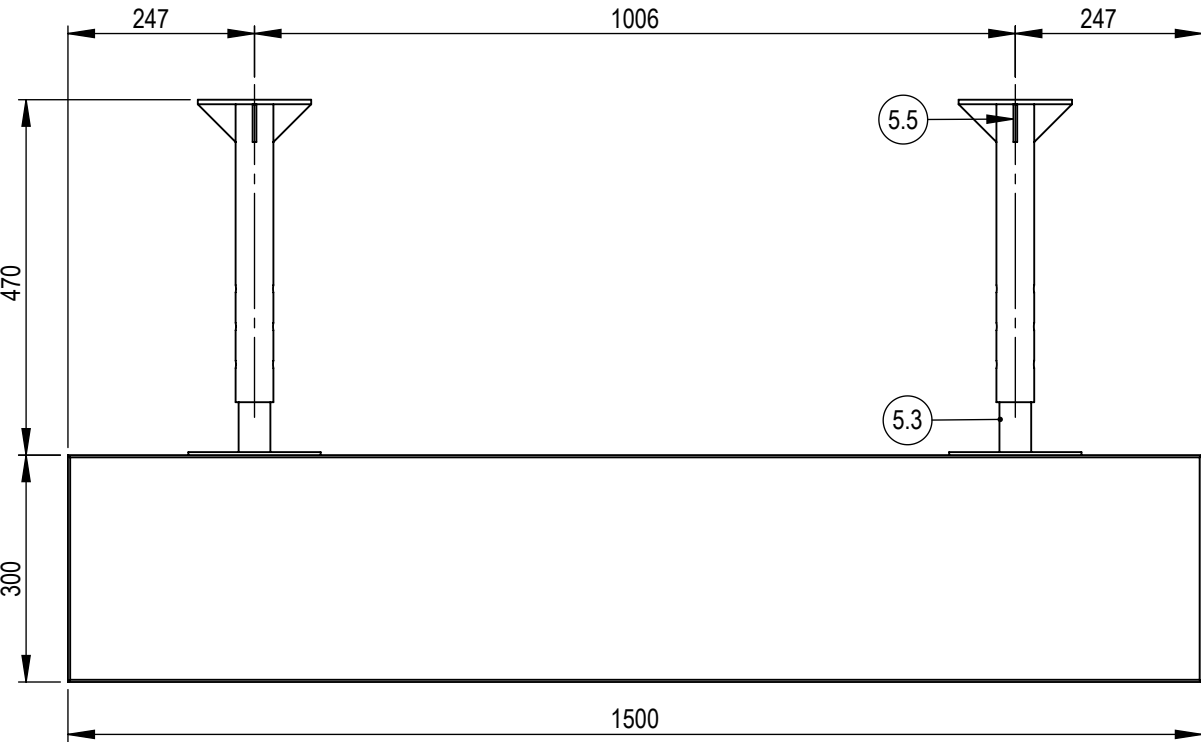
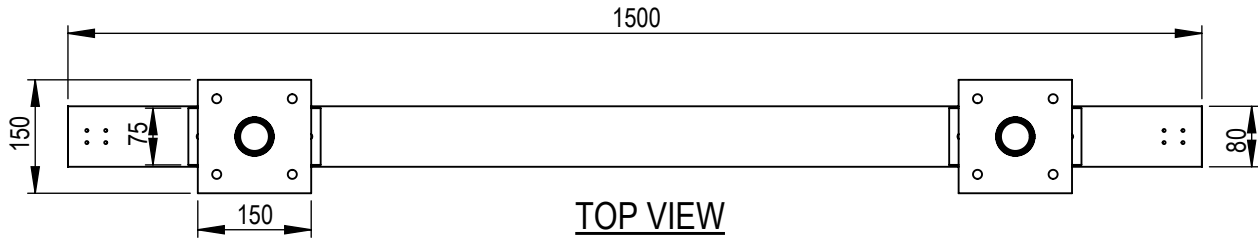


DETAIL D
SCALE 1 : 0.8



ITEM NO.	DESCRIPTION	LENGTH	FINISH	QTY.
1	AL EXTRUSION FRAME			1
1.1	80mm AL EXTRUSION PROFILE	1500	RAL CLASSIC 7046 PC	1
1.2	80mm AL EXTRUSION PROFILE	300	RAL CLASSIC 7046 PC	2
1.3	25X25X3.0 mm MS ANGLE FOR TOP PROFILE			2
1.4	80mm AL EXTRUSION PROFILE	1500	RAL CLASSIC 7046 PC	1
1.5				1
2	5 mm THK 0-40 ACRYLIC			2
3	LED MODULE 6500 K			17
4	POWER SUPPLY			1
5	SUSPENDER MECHANISM		RAL CLASSIC 7046 PC	2
5.1	DIA 50 X 2 MM THK MS PIPE	AS PER SITE		1
5.2	150 X 150 X 6mm THK MS PLATE			1
5.3	DIA 42 X 2 MM THK MS PIPE	260		1
5.4	175 X 75 X 4 mm THK MS PLATE			1
5.5	50X50X5.0mm THK MS RIB			4

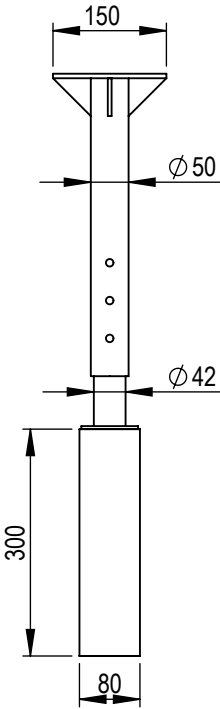
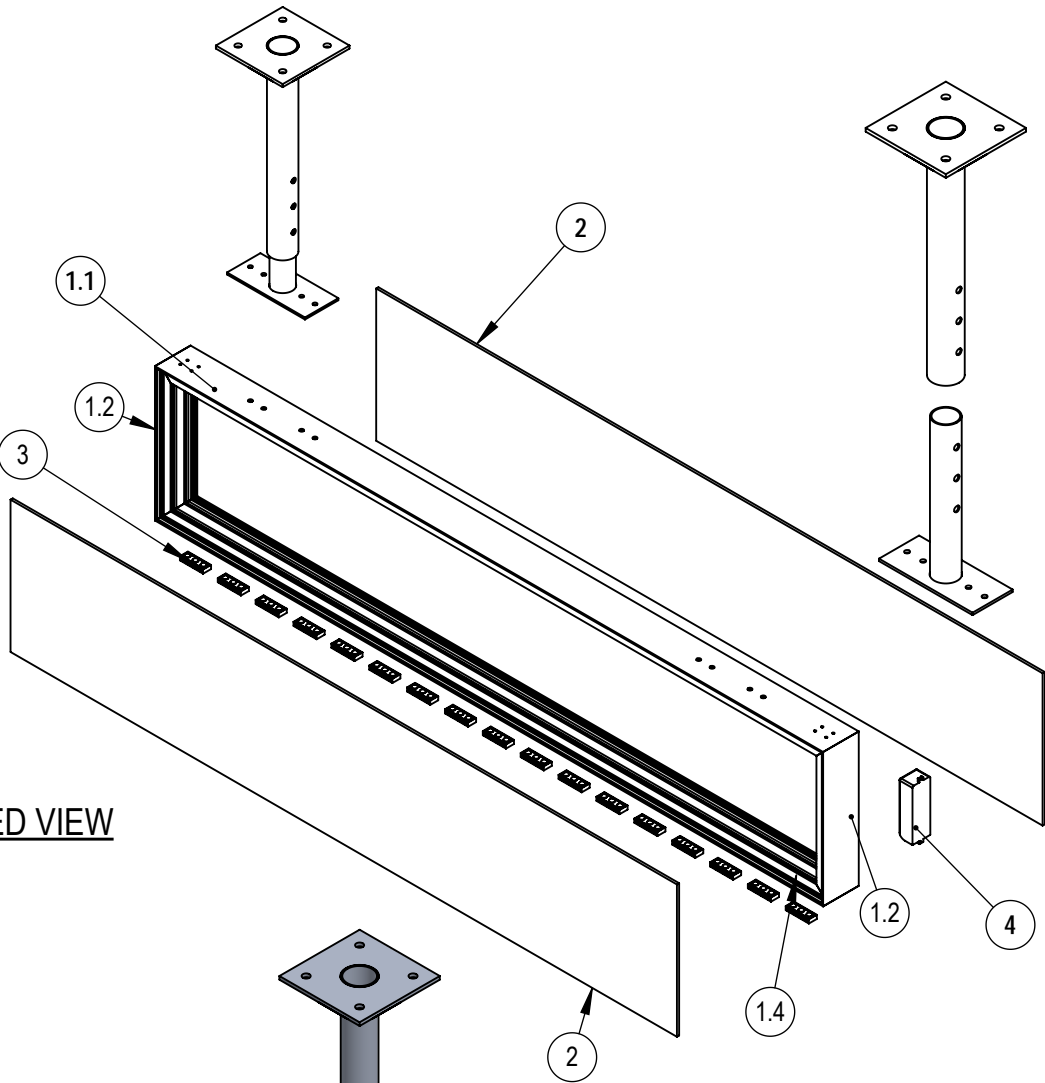
1500X300
1.1.1b
ILLUMINATED
DOUBLE SIDED



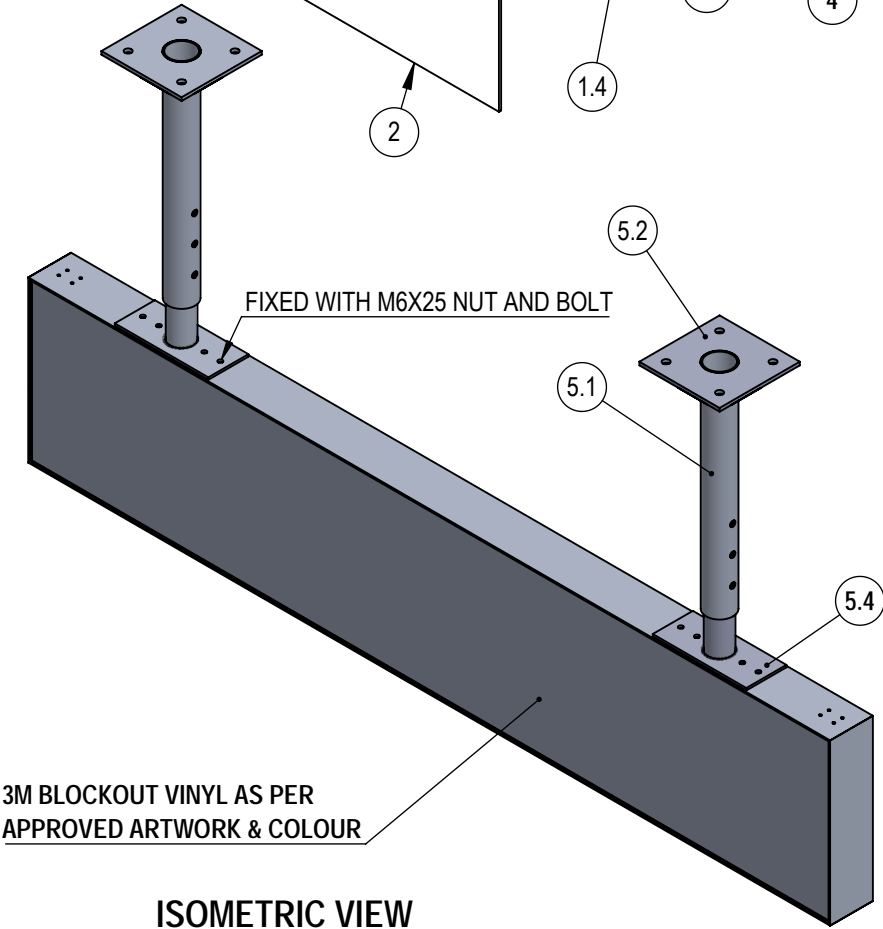
FRONT VIEW

NOTE - TECH SPECS FOLLOW AS PER PROTO

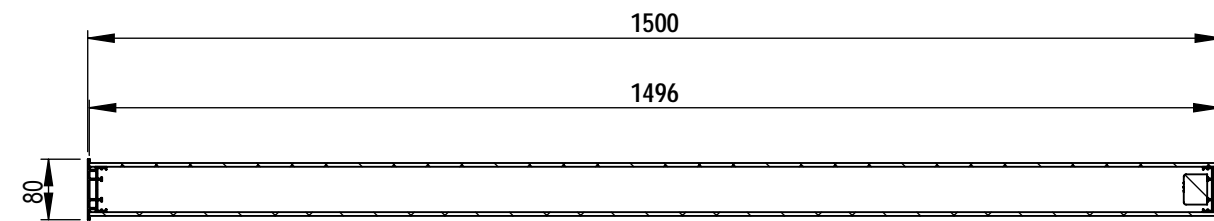
EXPLODED VIEW



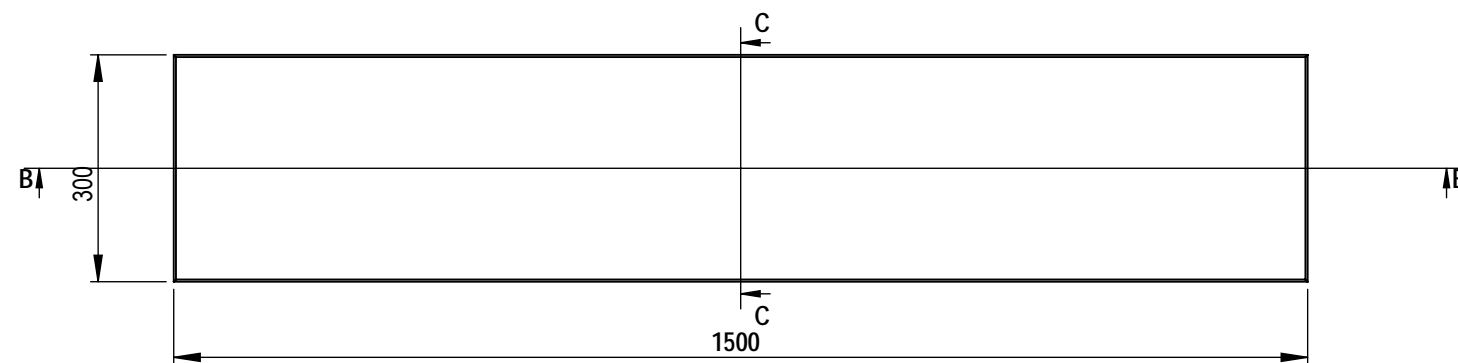
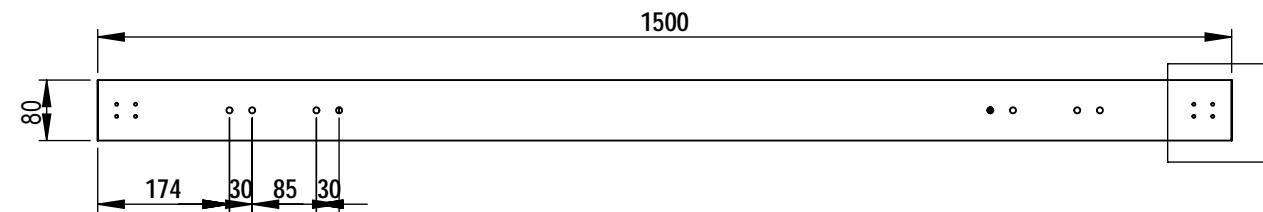
SIDE VIEW



ISOMETRIC VIEW



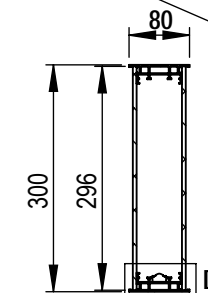
SECTION B-B



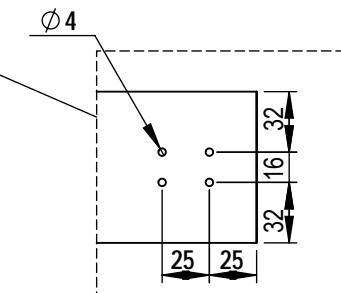
25X25 X3.0mm THK-50mm
MS ANGLE AND SIDE PROFILE
FIXED WITH POP RIVET

TOP PROFILE AND MS ANGLE 25X25X3.0
FIXED WITH M4 CSK ALLEN BOLT

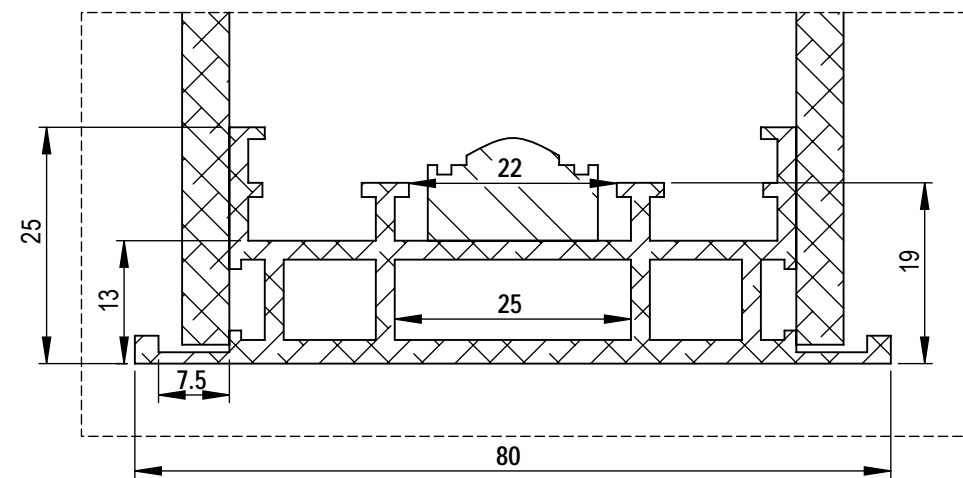
ACRYLIC INSERT FROM TOP



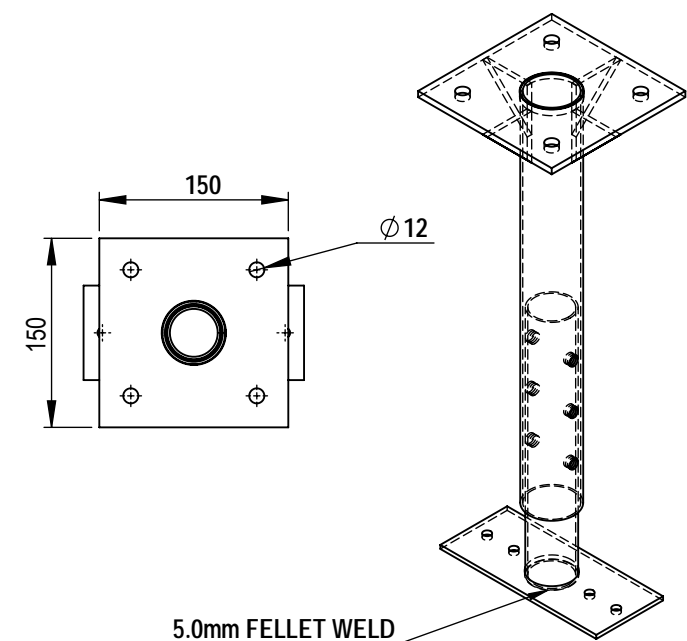
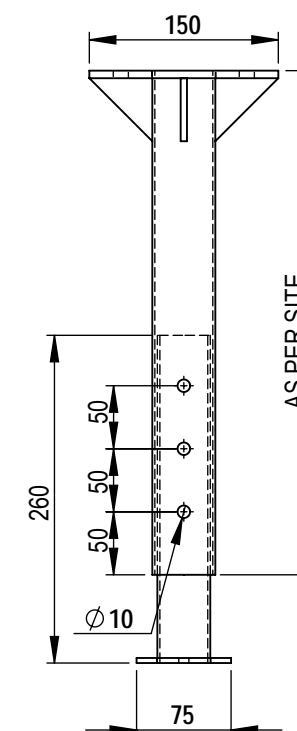
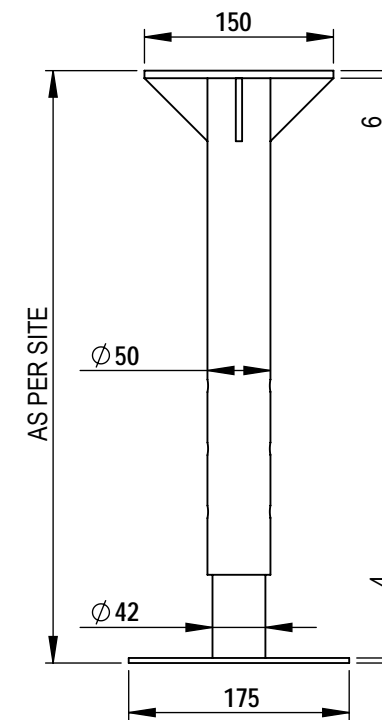
SECTION C-C



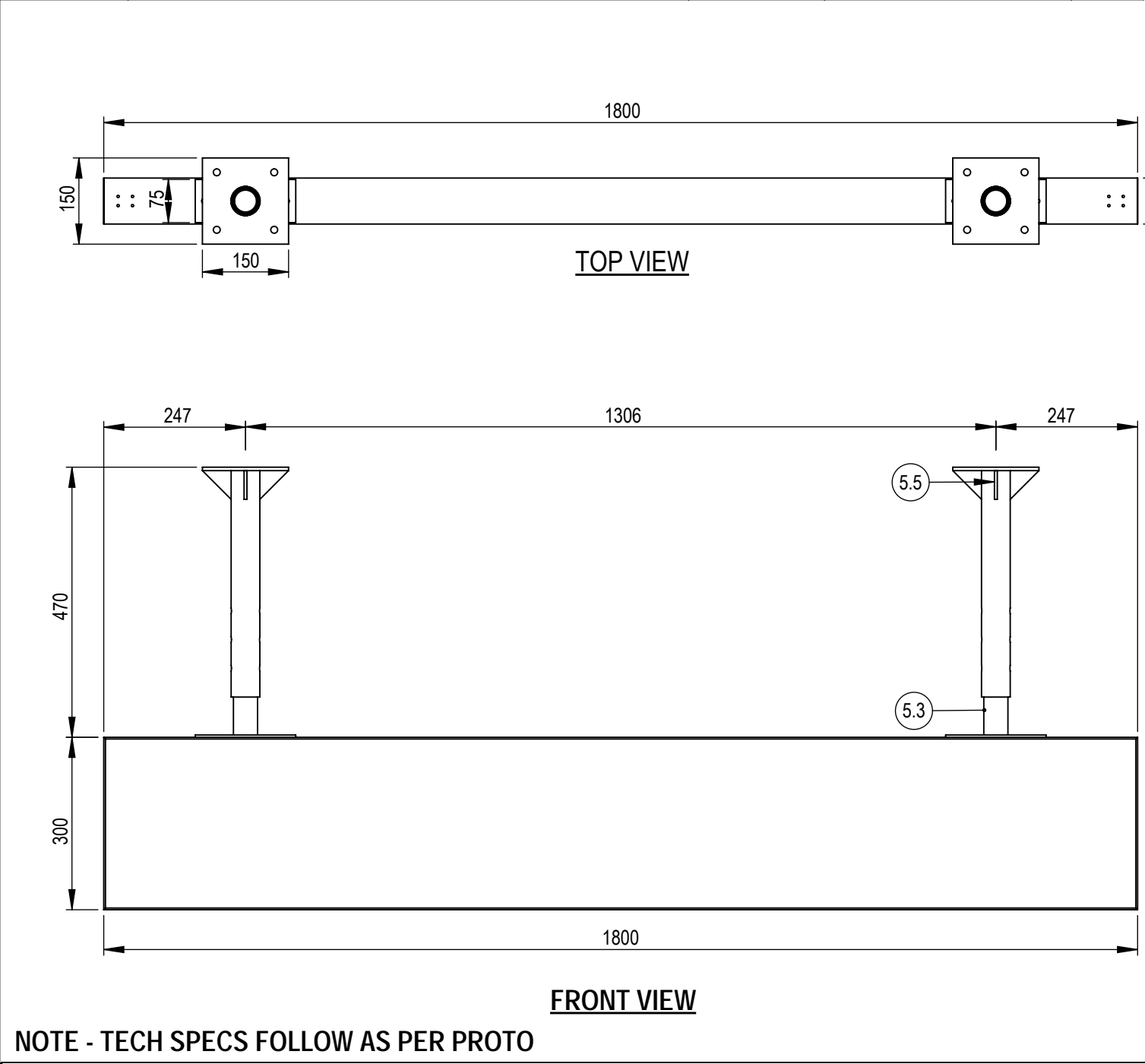
DETAIL E
SCALE 1 : 4



DETAIL D
SCALE 1 : 0.8

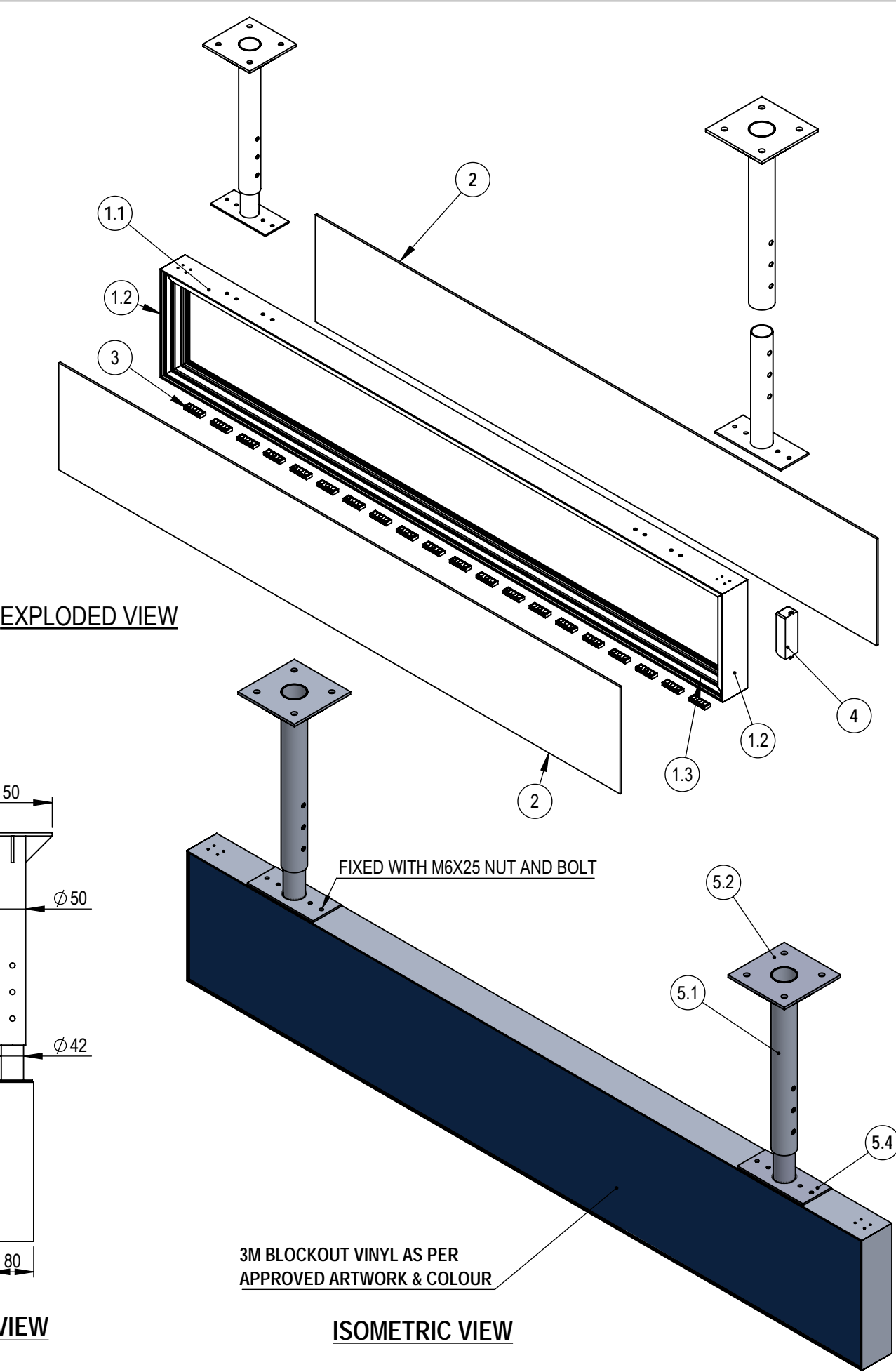


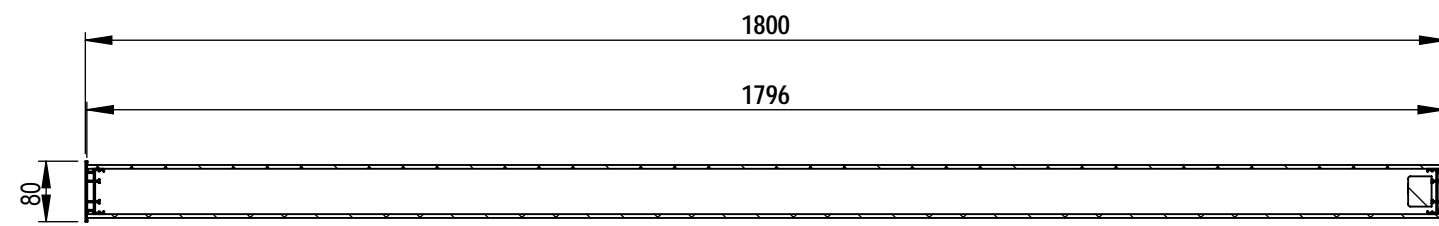
ITEM NO.	DESCRIPTION	LENGTH	FINISH	QTY.
1	AL EXTRUSION FRAME			1
1.1	80mm AL EXTRUSION PROFILE	1800	RAL CLASSIC 7046 PC	1
1.2	80mm AL EXTRUSION PROFILE	300	RAL CLASSIC 7046 PC	2
1.3	80mm AL EXTRUSION PROFILE	1800	RAL CLASSIC 7046 PC	1
1.4	25X25X3.0 mm MS ANGLE FOR TOP PROFILE			2
2	5 mm THK 0-40 ACRYLIC			2
3	LED MODULE 6500 K			20
4	POWER SUPPLY			1
5	SUSPENDER MECHANISM		RAL CLASSIC 7046 PC	2
5.1	DIA 50 X 2 MM THK MS PIPE	400		1
5.2	150 X 150 X 6mm THK MS PLATE			1
5.3	DIA 42 X 2 MM THK MS PIPE	260		1
5.4	175 X 75 X 4 mm THK MS PLATE			1
5.5	50X50X5.0mm THK MS RIB			4



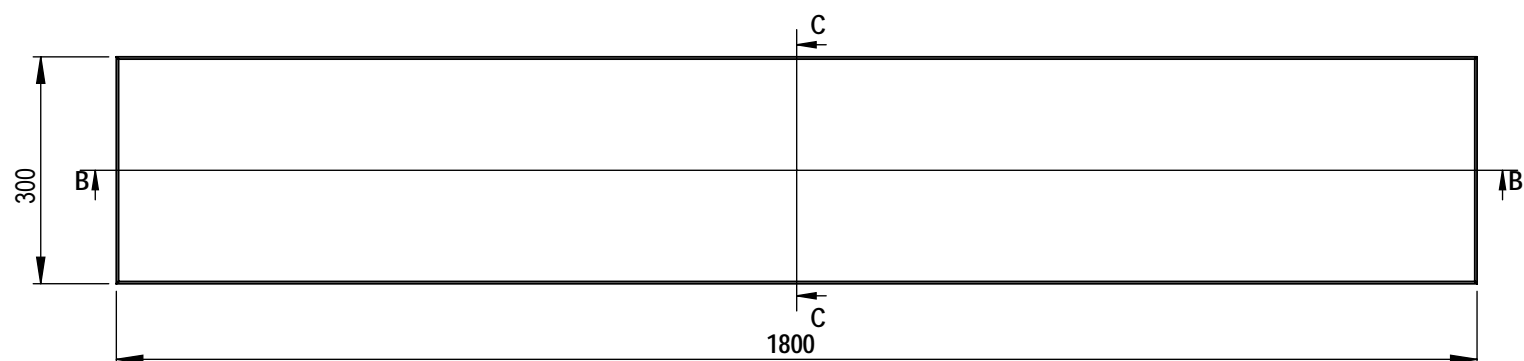
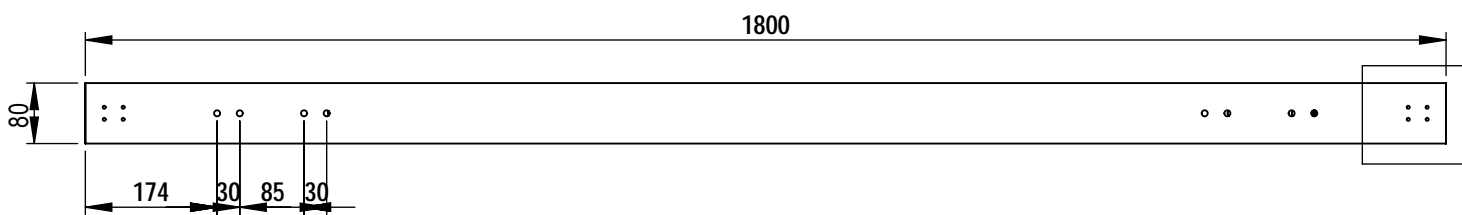
NOTE - TECH SPECS FOLLOW AS PER PROTO

1800X300
1.1.1c
ILLUMINATED
DOUBLE SIDED





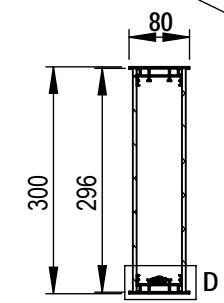
SECTION B-B



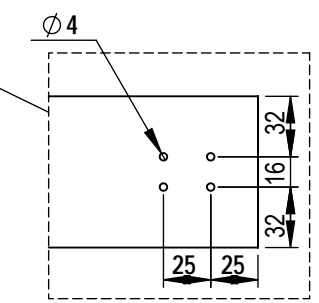
25X25 X3.0mm THK-50mm
MS ANGLE AND SIDE PROFILE
FIXED WITH POP RIVET

TOP PROFILE AND MS ANGLE 25X25X3.0
FIXED WITH M4 CSK ALLEN BOLT

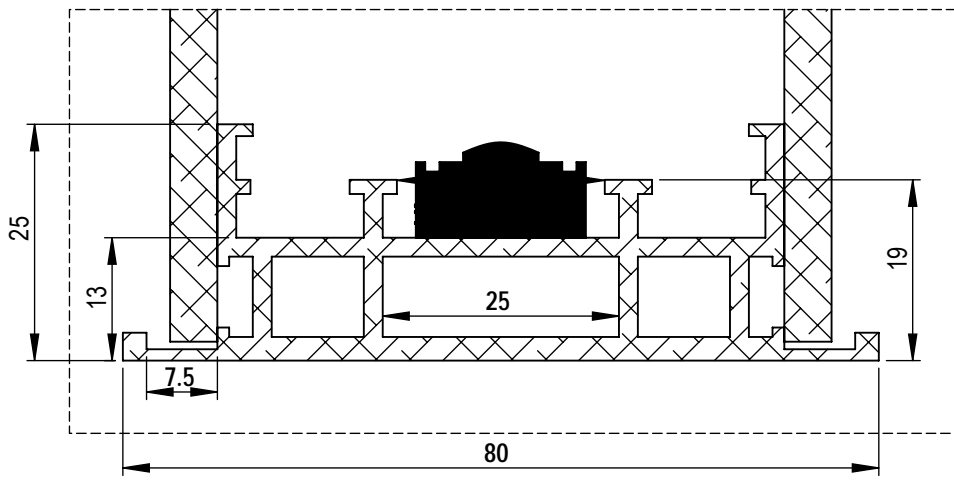
ACRYLIC INSERT FROM TOP



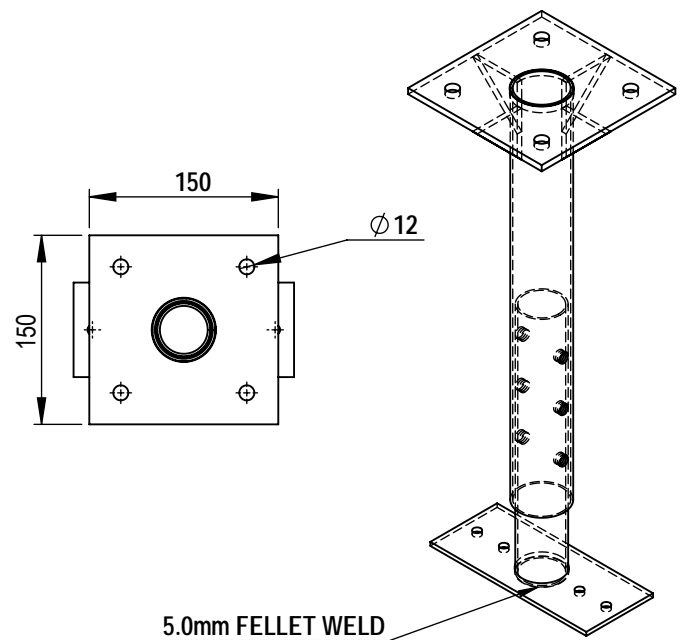
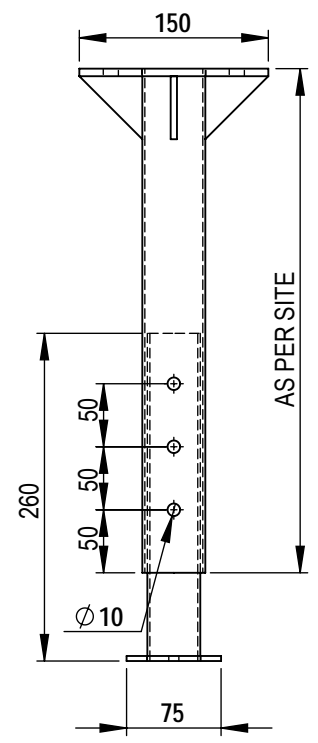
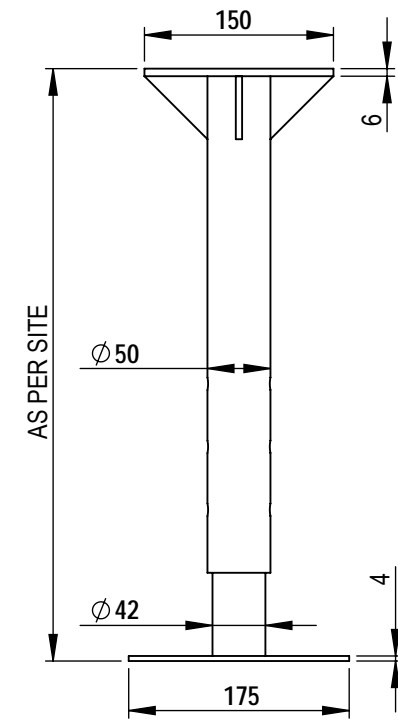
SECTION C-C



DETAIL E
SCALE 1 : 4

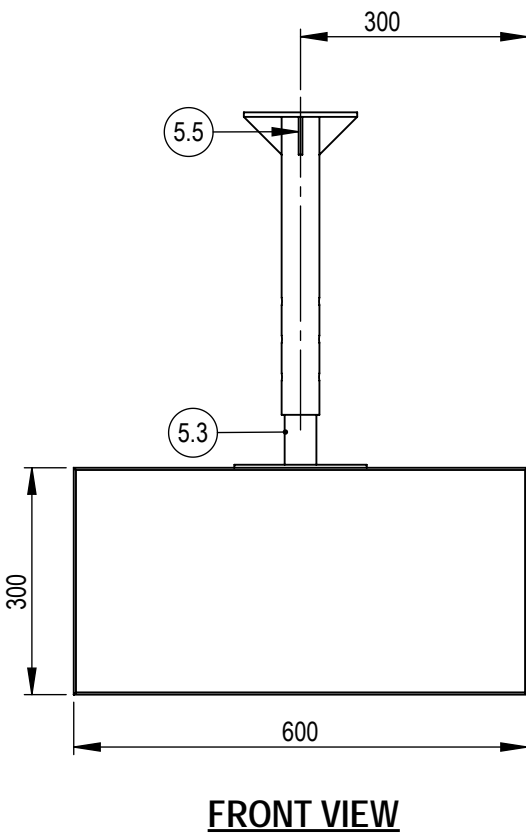
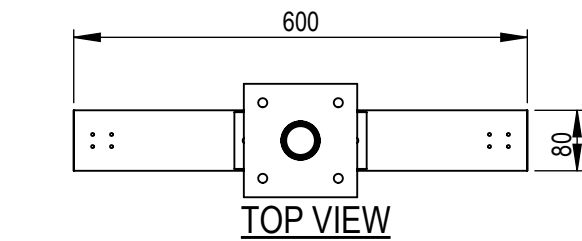


DETAIL D
SCALE 1 : 0.8

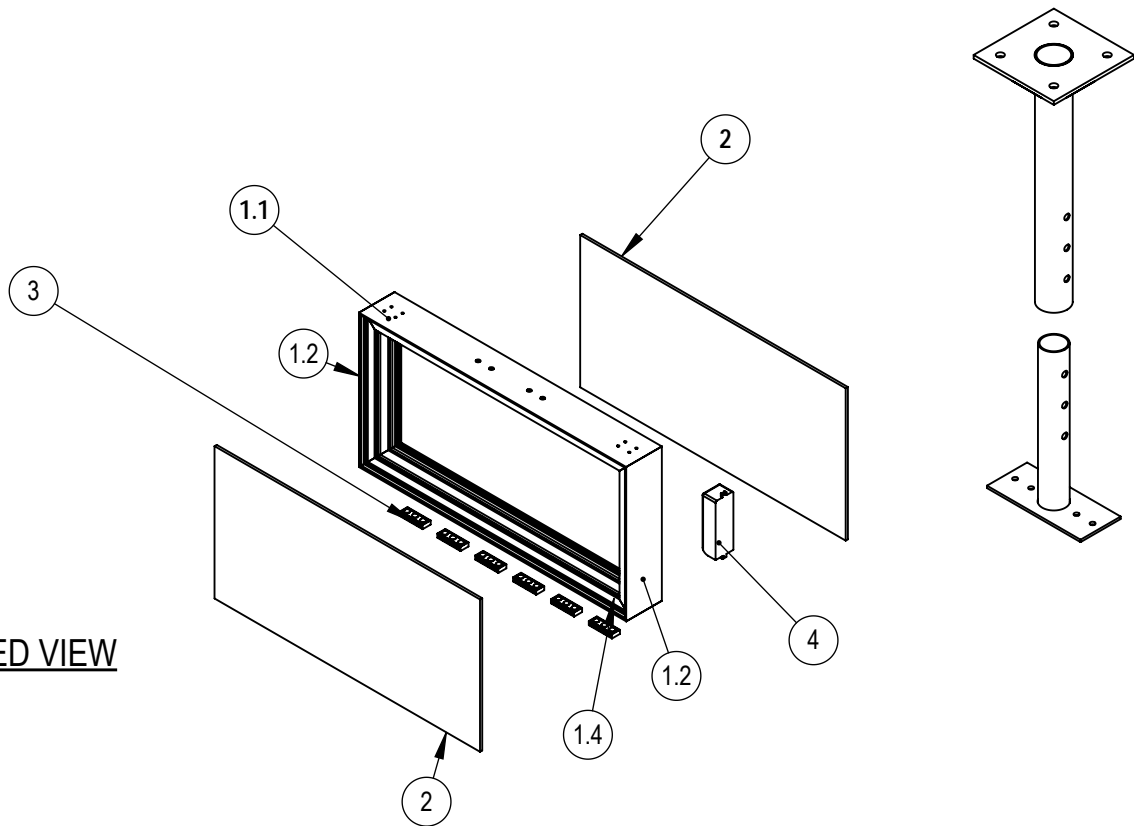


ITEM NO.	DESCRIPTION	LENGTH	FINISH	QTY.
1	AL EXTRUSION FRAME			1
1.1	80mm AL EXTRUSION PROFILE	600	RAL CLASSIC 7046 PC	1
1.2	80mm AL EXTRUSION PROFILE	300	RAL CLASSIC 7046 PC	2
1.3	25X25X3.0 mm MS ANGLE FOR TOP PROFILE			2
1.4	80mm AL EXTRUSION PROFILE	600	RAL CLASSIC 7046 PC	1
1.5				1
2	5 mm THK 0-40 ACRYLIC			2
3	LED MODULE 6500 K			6
4	POWER SUPPLY			1
5	SUSPENDER MECHANISM		RAL CLASSIC 7046 PC	2
5.1	DIA 50 X 2 MM THK MS PIPE	AS PER SITE		1
5.2	150 X 150 X 6mm THK MS PLATE			1
5.3	DIA 42 X 2 MM THK MS PIPE	260		1
5.4	175 X 75 X 4 mm THK MS PLATE			1
5.5	50X50X5.0mm THK MS RIB			4

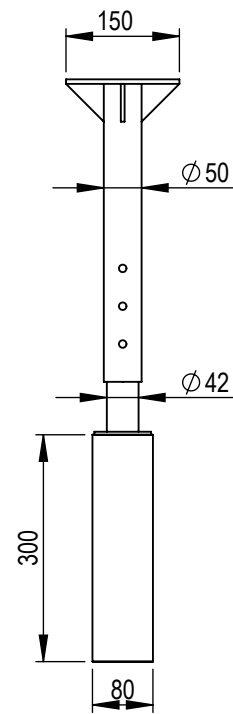
600X300
1.1.1d
ILLUMINATED
DOUBLE SIDED



EXPLODED VIEW



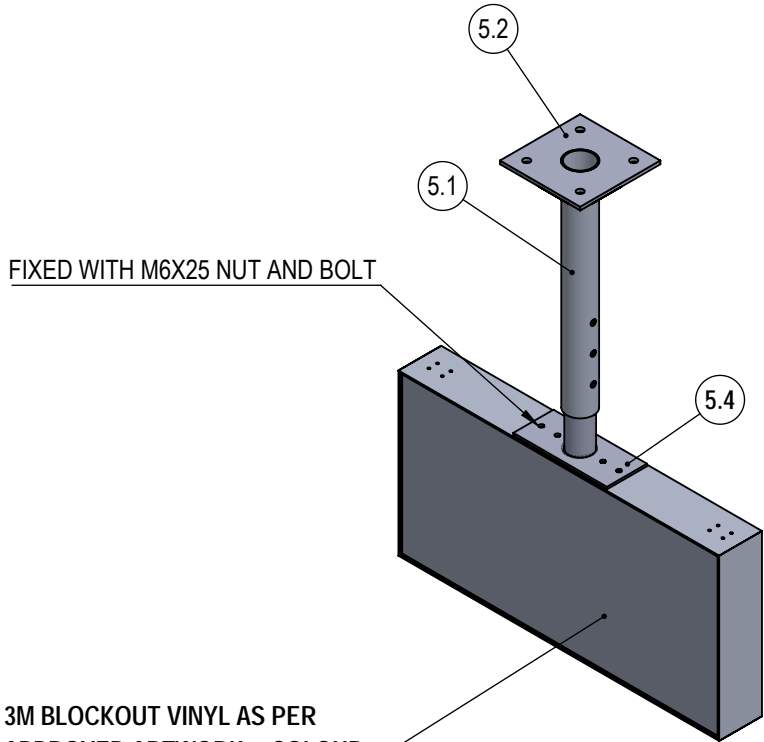
SIDE VIEW



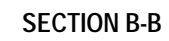
FIXED WITH M6X25 NUT AND BOLT

3M BLOCKOUT VINYL AS PER
APPROVED ARTWORK & COLOUR

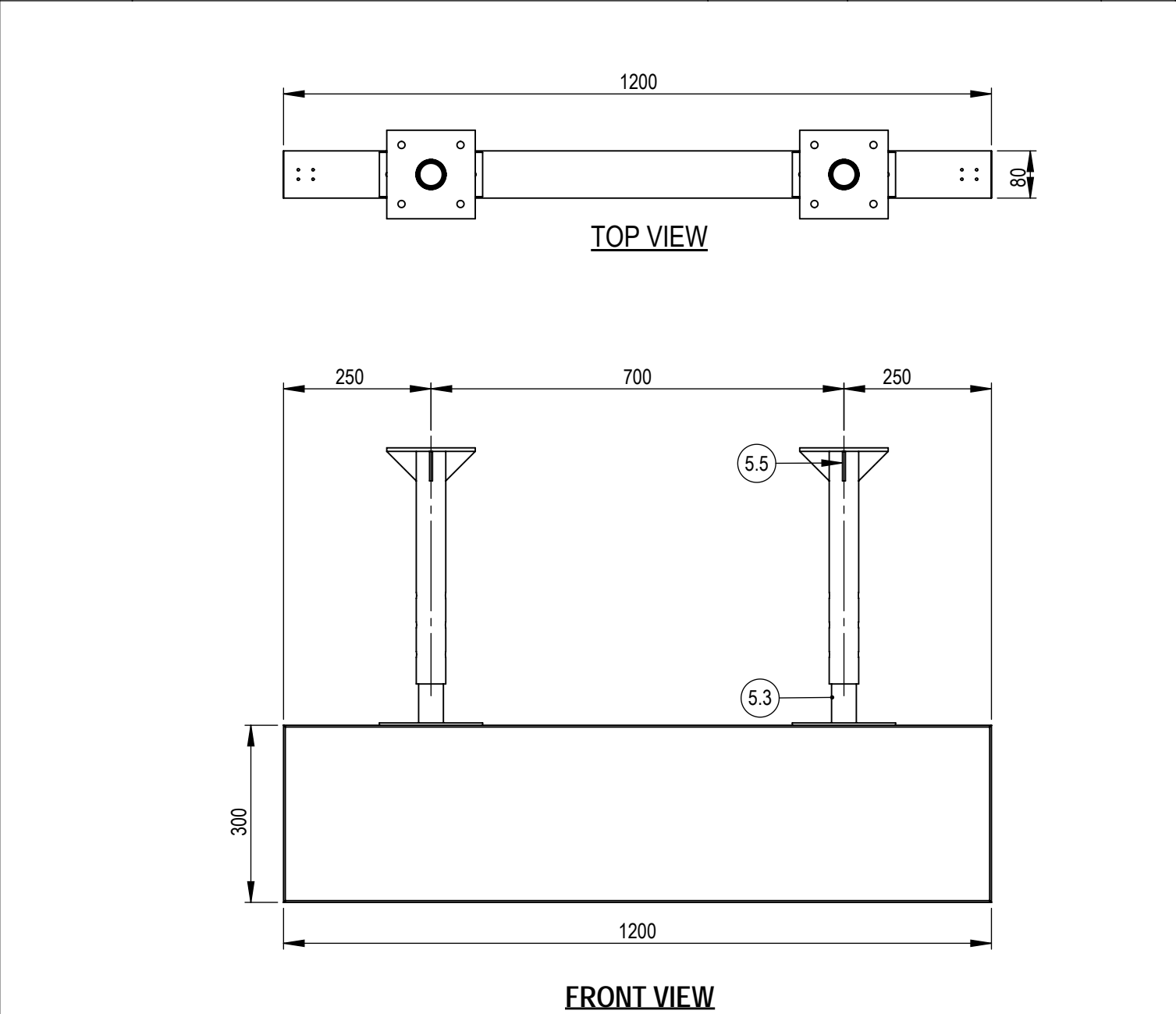
ISOMETRIC VIEW



NOTE - TECH SPECS FOLLOW AS PER PROTO



ITEM NO.	DESCRIPTION	LENGTH	FINISH	QTY.
1	AL EXTRUSION FRAME			1
1.1	80mm AL EXTRUSION PROFILE	1200	RAL CLASSIC 7046 PC	1
1.2	80mm AL EXTRUSION PROFILE	300	RAL CLASSIC 7046 PC	2
1.3	25X25X3.0 mm MS ANGLE FOR TOP PROFILE			2
1.4	80mm AL EXTRUSION PROFILE	1200	RAL CLASSIC 7046 PC	1
1.5				1
2	5 mm THK 0-40 ACRYLIC			2
3	LED MODULE 6500 K			8
4	POWER SUPPLY			1
5	SUSPENDER MECHANISM		RAL CLASSIC 7046 PC	2
5.1	DIA 50 X 2 MM THK MS PIPE	AS PER SITE		1
5.2	150 X 150 X 6mm THK MS PLATE			1
5.3	DIA 42 X 2 MM THK MS PIPE	260		1
5.4	175 X 75 X 4 mm THK MS PLATE			1
5.5	50X50X5.0mm THK MS RIB			4

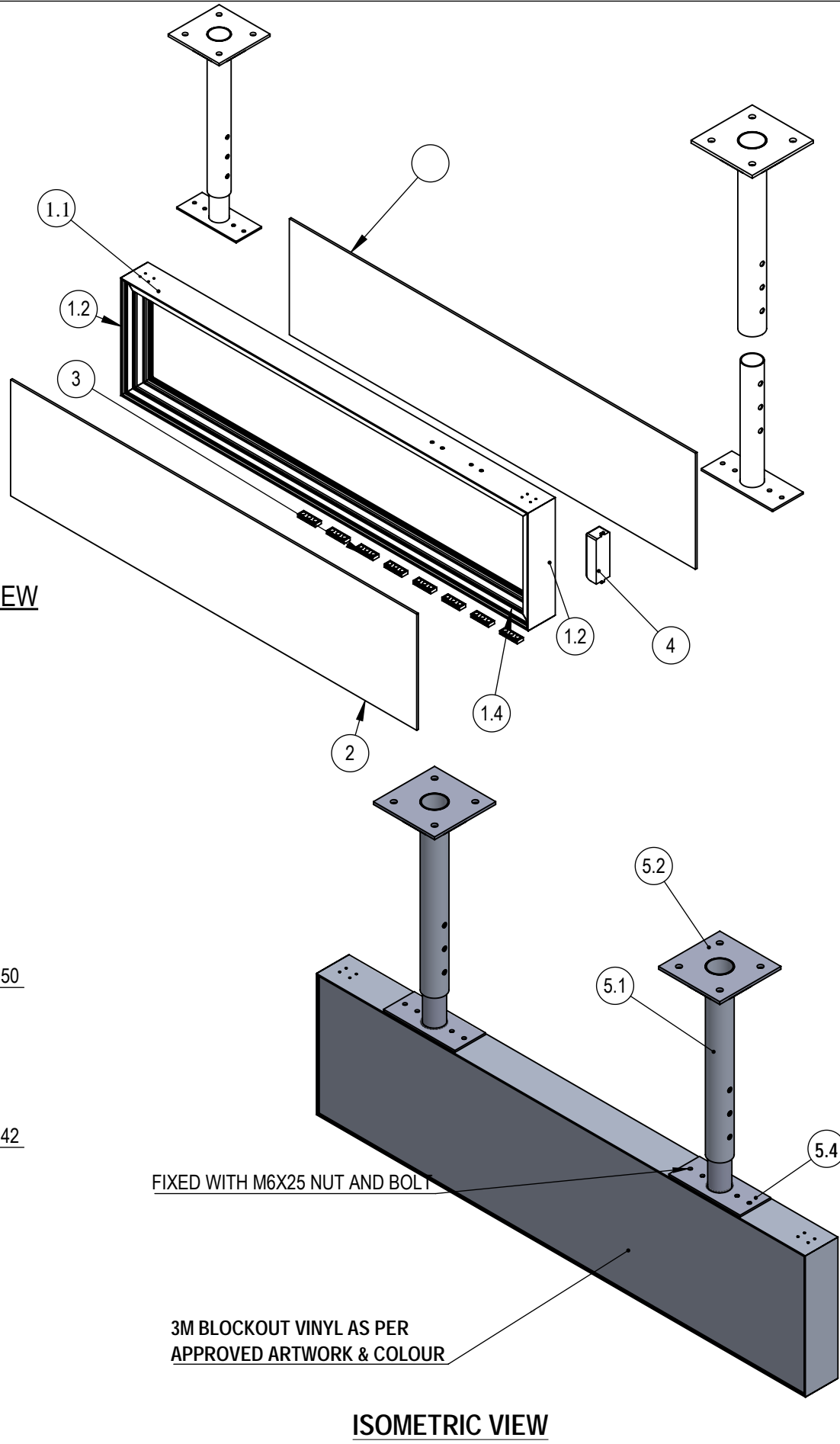


NOTE - TECH SPECS FOLLOW AS PER PROTO

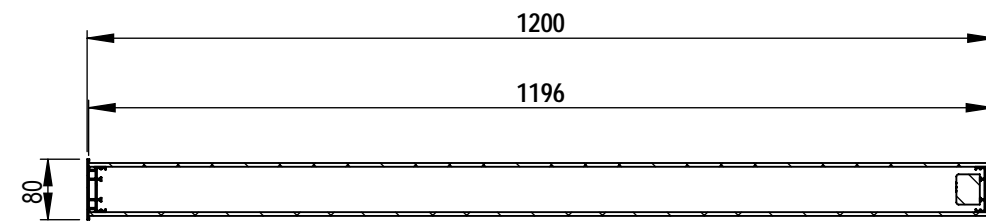
1200X300
1.1.1e
ILLUMINATED
DOUBLE SIDED

EXPLODED VIEW

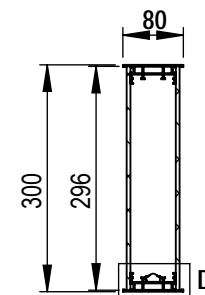
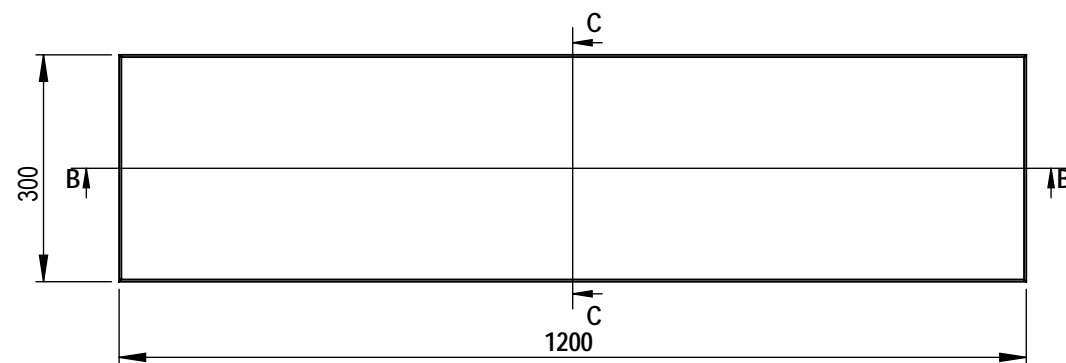
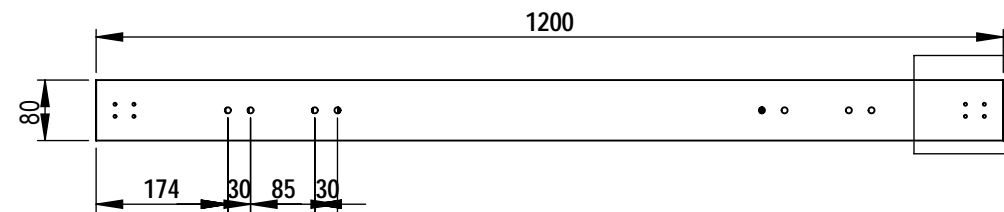
SIDE VIEW



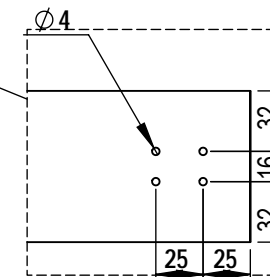
ISOMETRIC VIEW



SECTION B-B



SECTION C-C

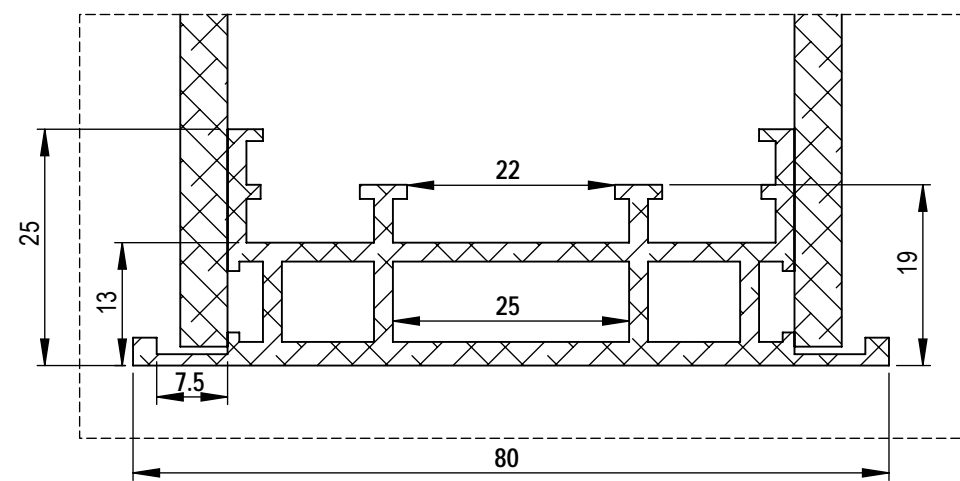


DETAIL E
SCALE 1 : 4

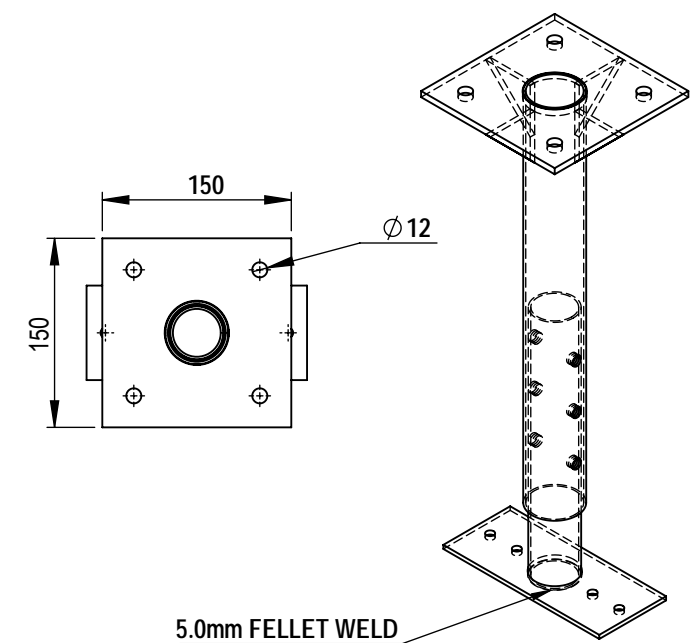
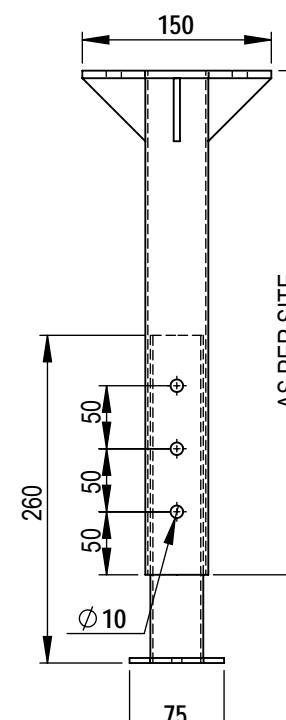
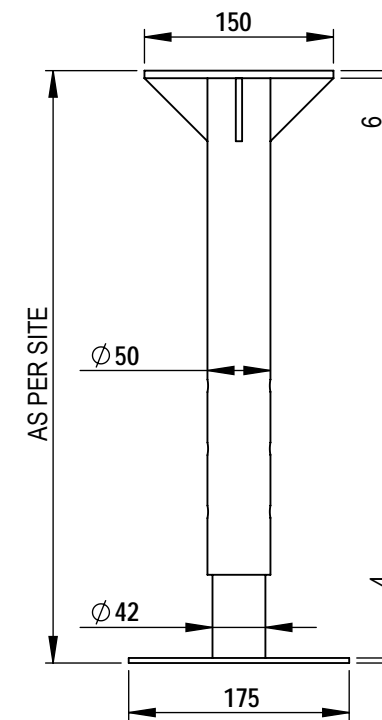
25X25 X3.0mm THK-50mm
MS ANGLE AND SIDE PROFILE
FIXED WITH POP RIVET

ACRYLIC INSERT FROM TOP

TOP PROFILE AND MS ANGLE 25X25X3.0
FIXED WITH M4 CSK ALLEN BOLT



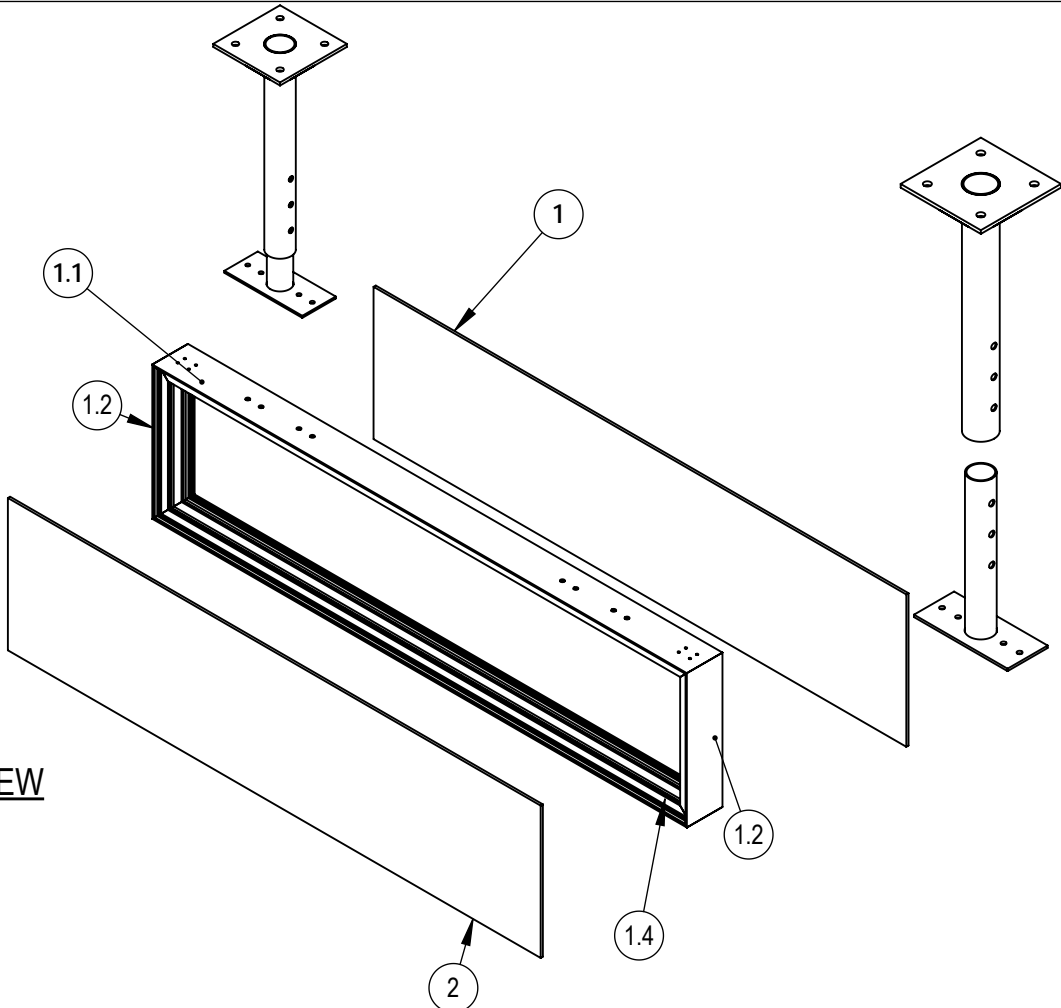
DETAIL D
SCALE 1 : 0.8



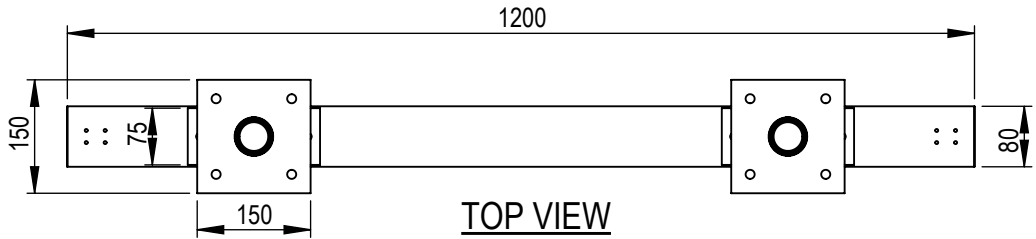
5.0mm FELLET WELD

ITEM NO.	DESCRIPTION	LENGTH	FINISH	QTY.
1	AL EXTRUSION FRAME			1
1.1	80mm AL EXTRUSION PROFILE	1200	RAL CLASSIC 7046 PC	1
1.2	80mm AL EXTRUSION PROFILE	300	RAL CLASSIC 7046 PC	2
1.3	25X25X3.0 mm MS ANGLE FOR TOP PROFILE			2
1.4	80mm AL EXTRUSION PROFILE	1200	RAL CLASSIC 7046 PC	1
1.5				1
2	5 mm THK 0-40 ACRYLIC			2
3	SUSPENDER MECHANISM		RAL CLASSIC 7046 PC	2
3.1	DIA 50 X 2 MM THK MS PIPE	AS PER SITE		1
3.2	150 X 150 X 6mm THK MS PLATE			1
3.3	DIA 42 X 2 MM THK MS PIPE	260		1
3.4	175 X 75 X 4 mm THK MS PLATE			1
3.5	50X50X5.0mm THK MS RIB			4

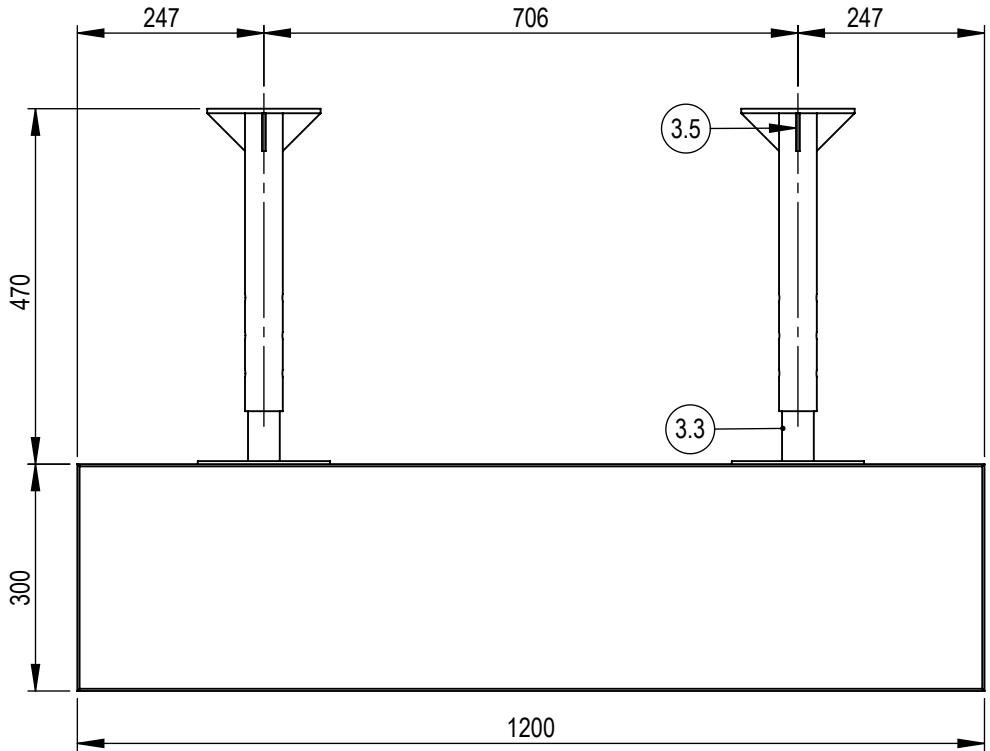
1200X300
1.1.2a
NON -LIT
DOUBLE SIDED



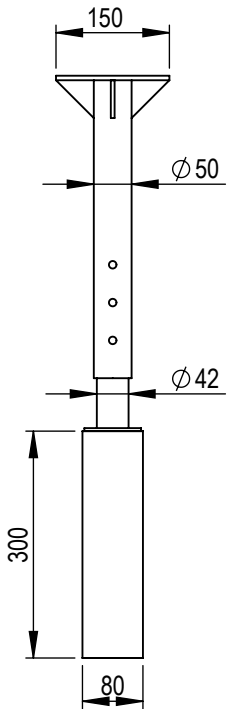
EXPLODED VIEW



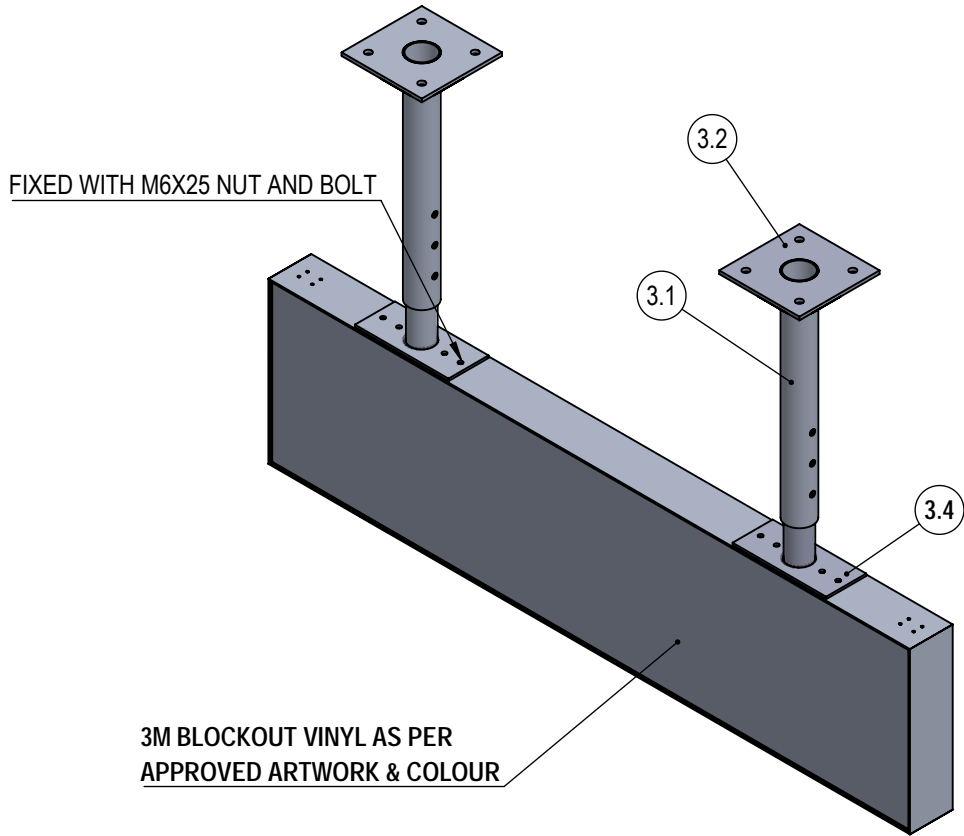
TOP VIEW



FRONT VIEW

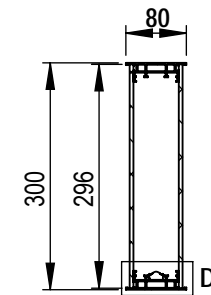
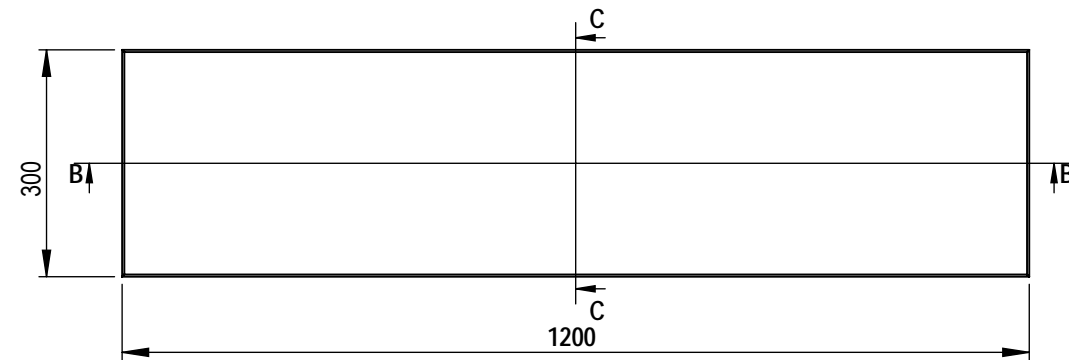
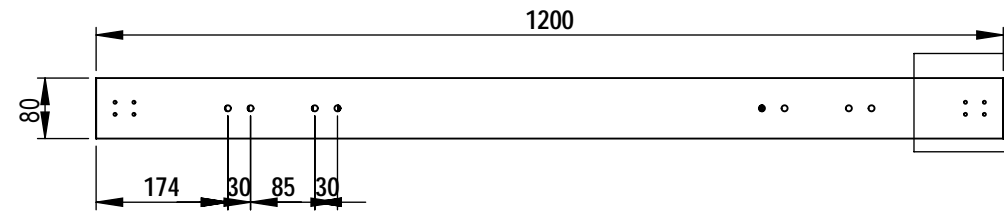
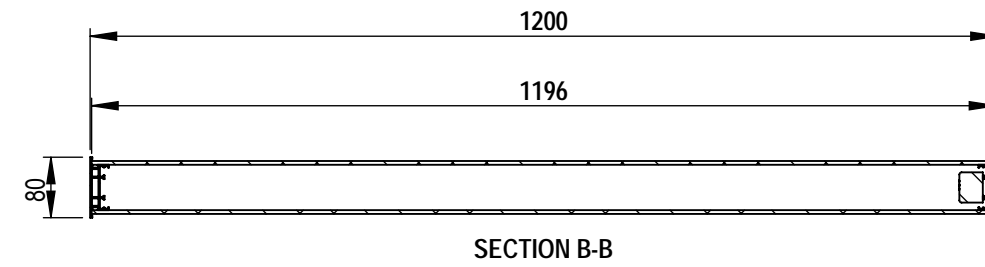


SIDE VIEW

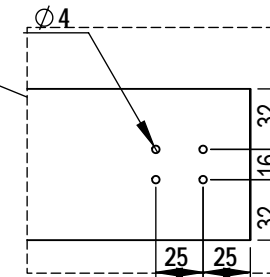


ISOMETRIC VIEW

NOTE - TECH SPECS FOLLOW AS PER PROTO



SECTION C-C

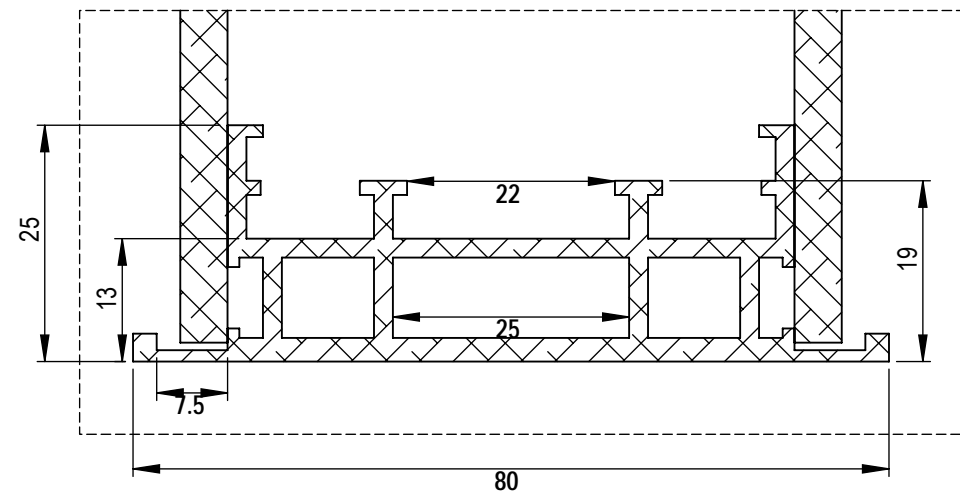
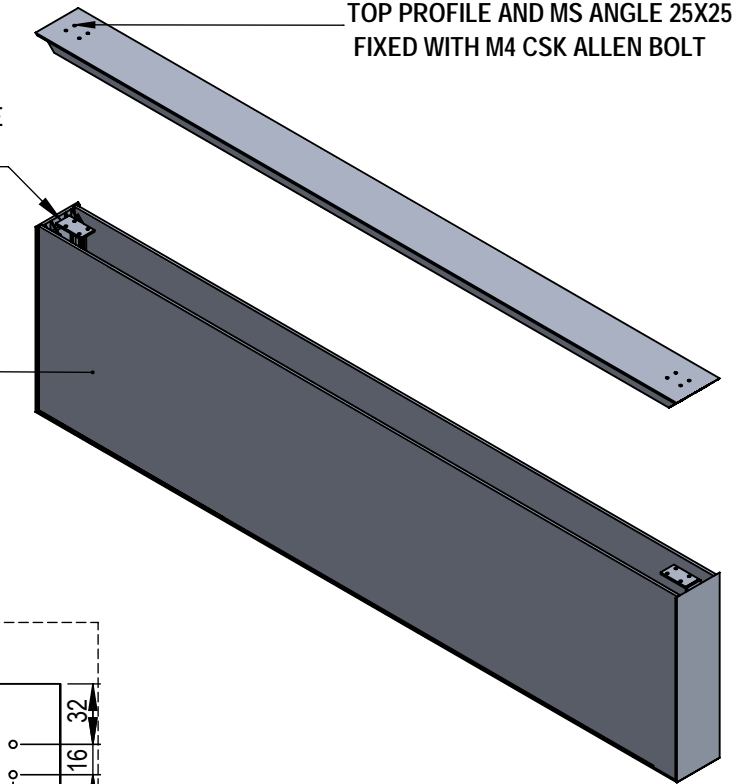


DETAIL E
SCALE 1 : 4

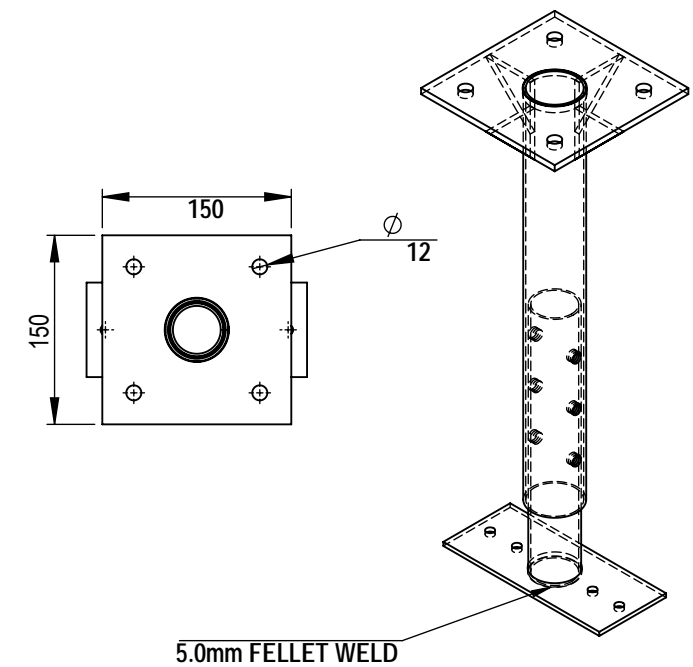
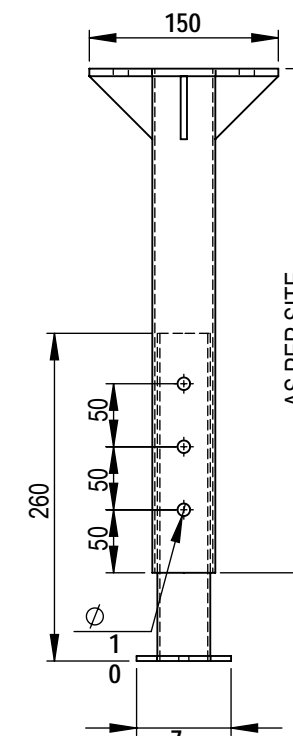
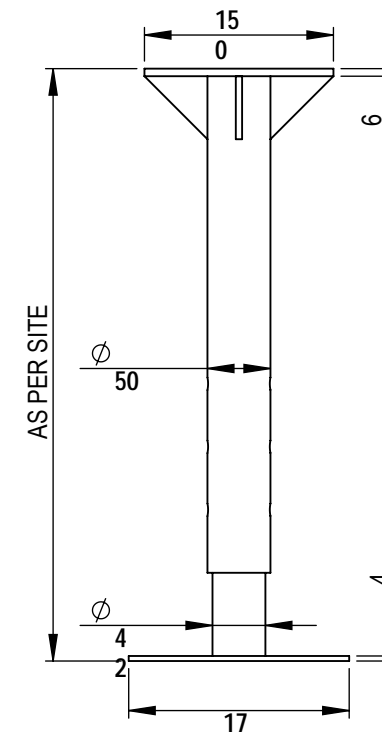
25X25 X3.0mm THK-50mm
MS ANGLE AND SIDE PROFILE
FIXED WITH POP RIVET

ACRYLIC INSERT FROM TOP

TOP PROFILE AND MS ANGLE 25X25X3.0
FIXED WITH M4 CSK ALLEN BOLT

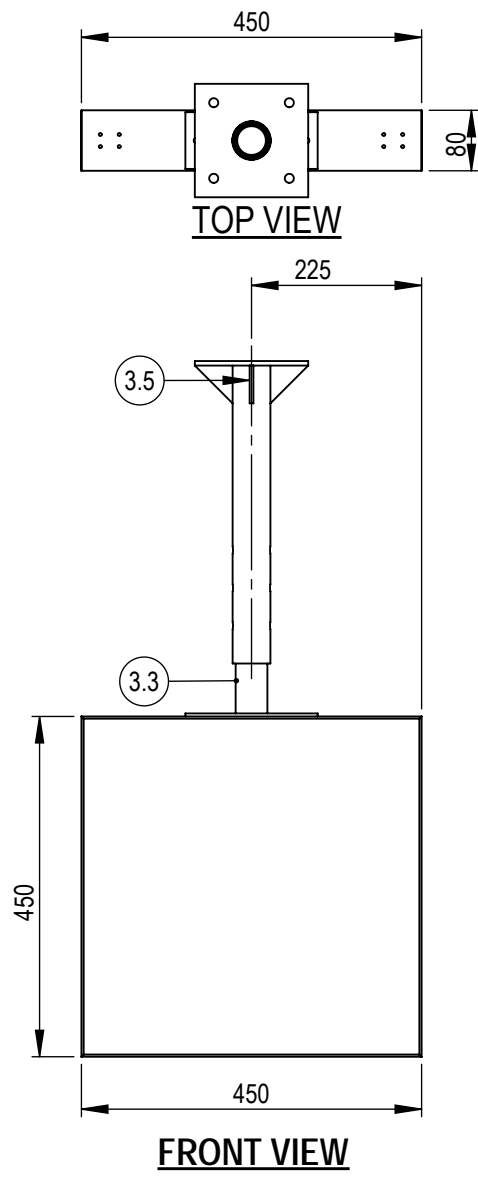


DETAIL D
SCALE 1 : 0.8

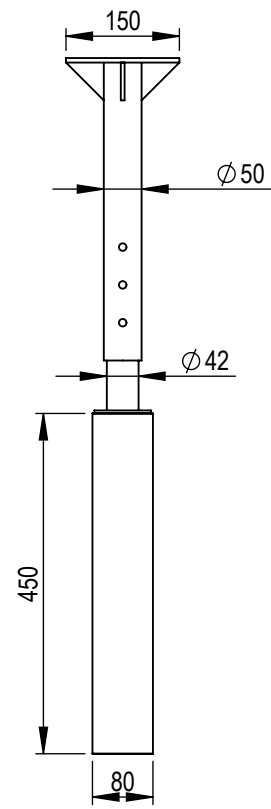


ITEM NO.	DESCRIPTION	LENGTH	FINISH	QTY.
1	AL EXTRUSION FRAME			1
1.1	80mm AL EXTRUSION PROFILE	450	RAL CLASSIC 7046 PC	1
1.2	80mm AL EXTRUSION PROFILE	450	RAL CLASSIC 7046 PC	3
1.3	25X25X3.0 mm MS ANGLE FOR TOP PROFILE			2
2	5 mm THK 0-40 ACRYLIC			2
3	SUSPENDER MECHANISM		RAL CLASSIC 7046 PC	2
3.1	DIA 50 X 2 MM THK MS PIPE	AS PER SITE		1
3.2	150 X 150 X 6mm THK MS PLATE			1
3.3	DIA 42 X 2 MM THK MS PIPE	260		1
3.4	175 X 75 X 4 mm THK MS PLATE			1
3.5	50X50X5.0mm THK MS RIB			4

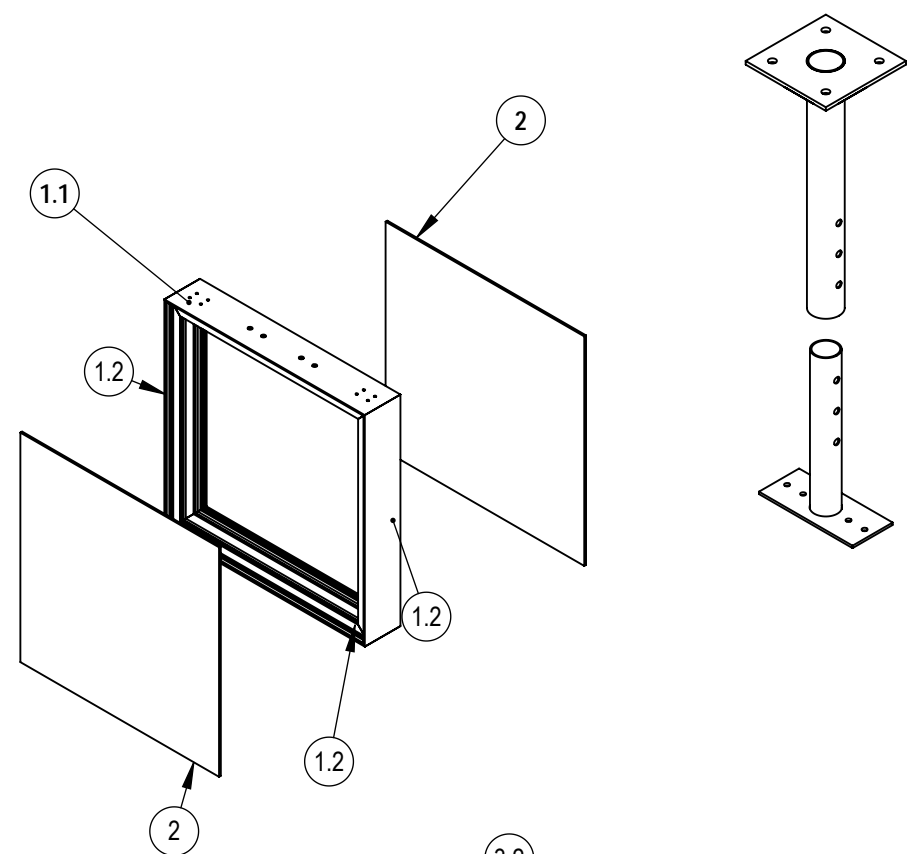
450X450
1.1.2b
NON - ILLUMINATED
DOUBLE SIDED



EXPLODED VIEW



SIDE VIEW

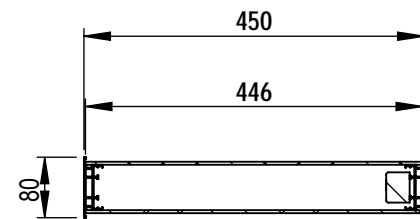


FIXED WITH M6X25 NUT AND BOLT

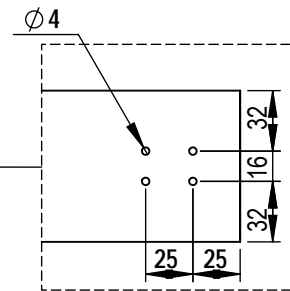
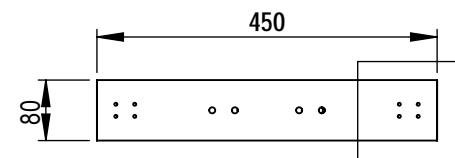
3M BLOCKOUT VINYL AS PER
APPROVED ARTWORK & COLOUR

ISOMETRIC VIEW

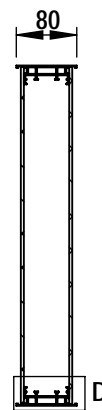
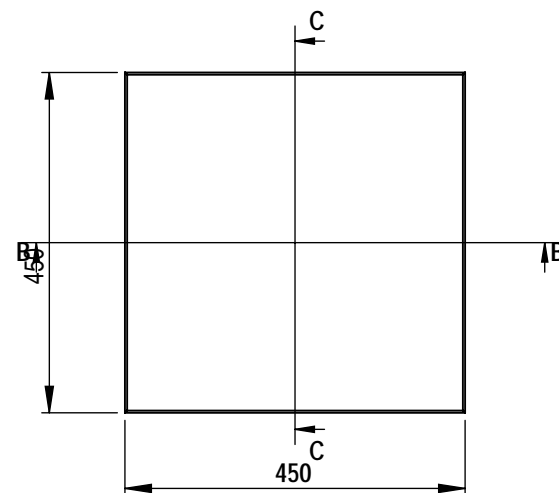
NOTE - TECH SPECS FOLLOW AS PER PROTO



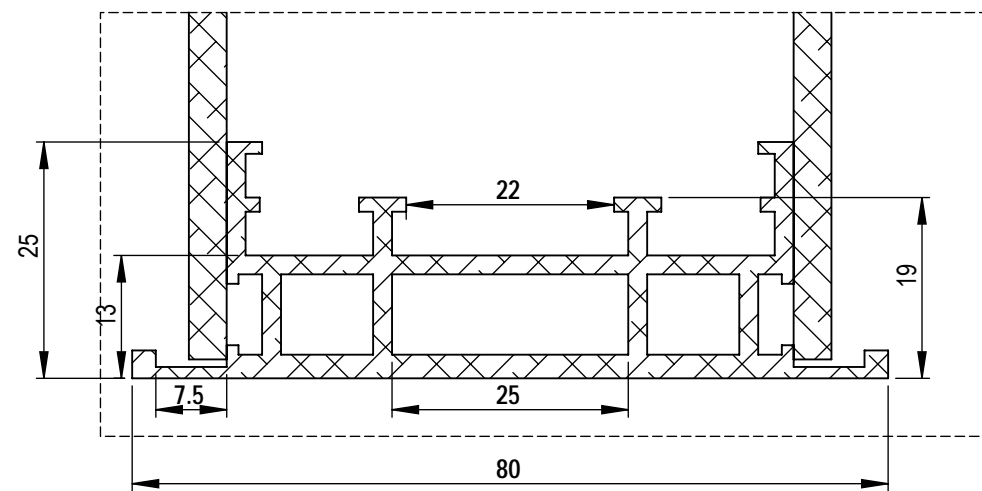
SECTION B-B



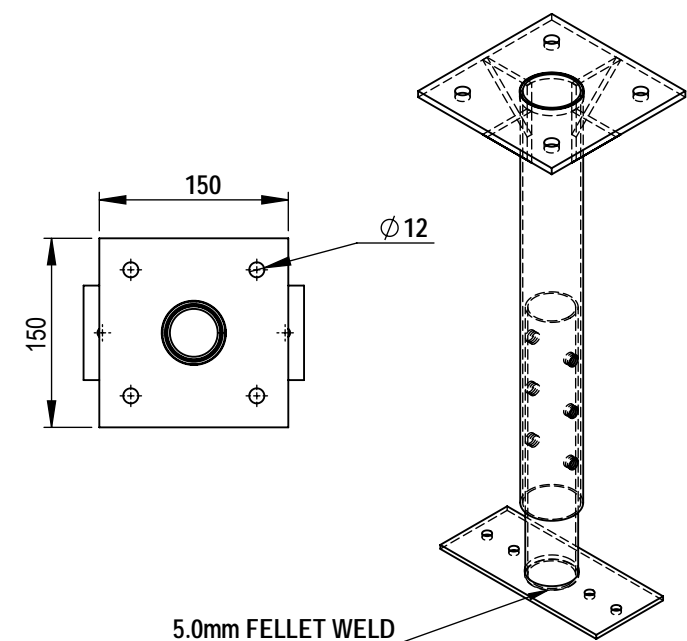
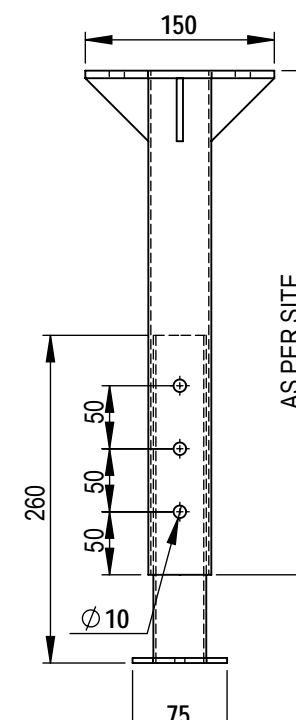
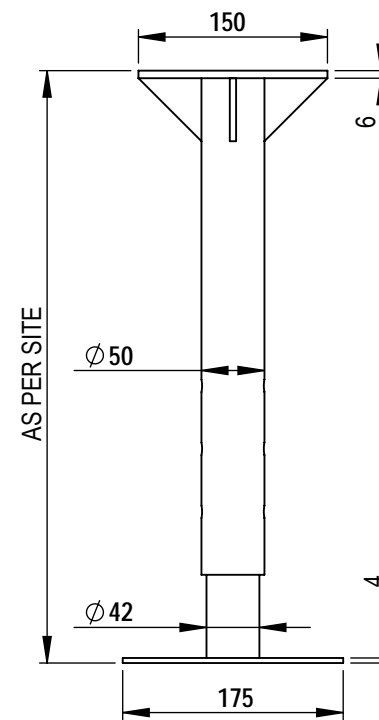
DETAIL E
SCALE 1 : 4



SECTION C-C



DETAIL D
SCALE 1 : 0.8



5.0mm FELLET WELD

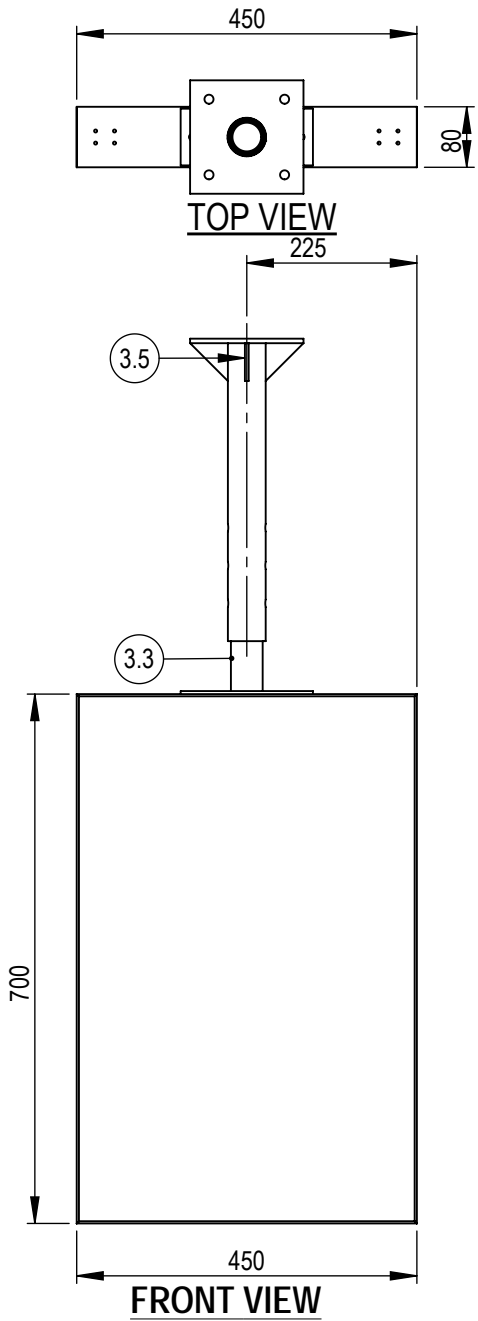
25X25 X3.0mm THK-50mm
MS ANGLE AND SIDE PROFILE
FIXED WITH POP RIVET

TOP PROFILE AND MS ANGLE 25X25X3.0
FIXED WITH M4 CSK ALLEN BOLT

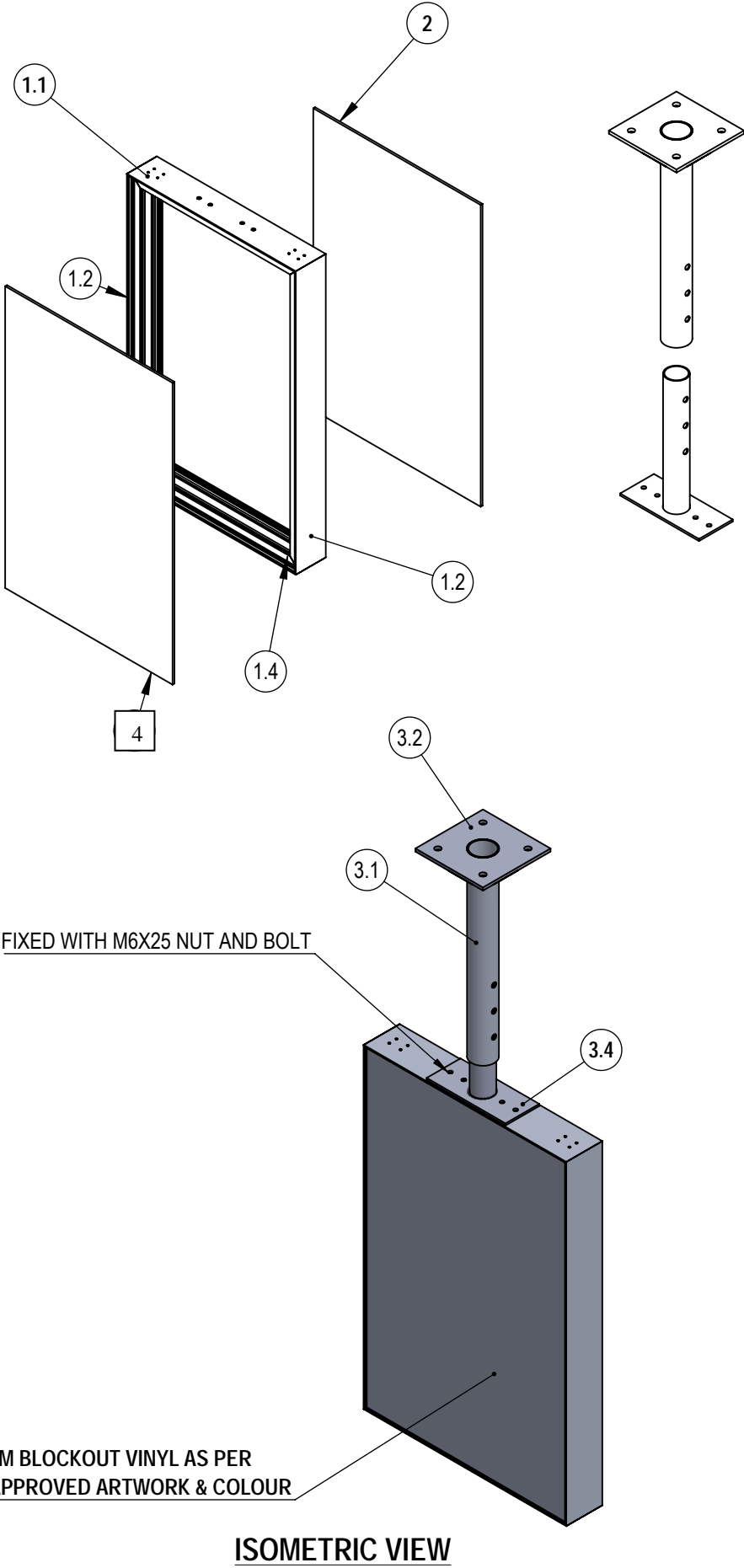
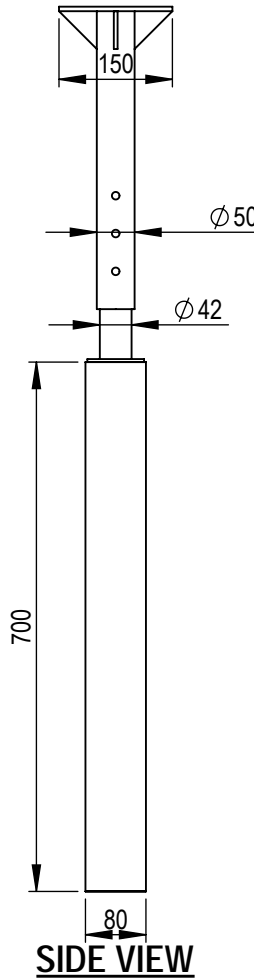
ACRYLIC INSERT FROM TOP

ITEM NO.	DESCRIPTION	LENGTH	FINISH	QTY.
1	AL EXTRUSION FRAME			1
1.1	80mm AL EXTRUSION PROFILE	450	RAL CLASSIC 7046 PC	1
1.2	80mm AL EXTRUSION PROFILE	700	RAL CLASSIC 7046 PC	2
1.3	25X25X3.0 mm MS ANGLE FOR TOP PROFILE			2
1.4	80mm AL EXTRUSION PROFILE	450		1
2	4.0mm THK ACP SHEET WITH PURE WHITE PAINT			2
3	SUSPENDER MECHANISM		RAL CLASSIC 7046 PC	2
3.1	DIA 50 X 2 MM THK MS PIPE	AS PER SITE		1
3.2	150 X 150 X 6mm THK MS PLATE			1
3.3	DIA 42 X 2 MM THK MS PIPE	260		1
3.4	175 X 75 X 4 mm THK MS PLATE			1
3.5	50X50X5.0mm THK MS RIB			4
4.0	5mm THK 0.40 ACRYLIC			

450X700
1.1.3a
NON- ILLUMINATED
SINGLE SIDE

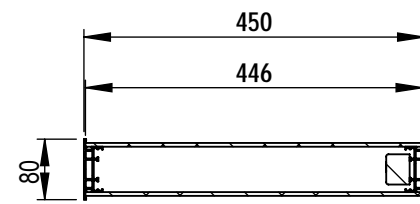


EXPLODED VIEW

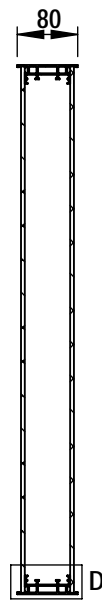
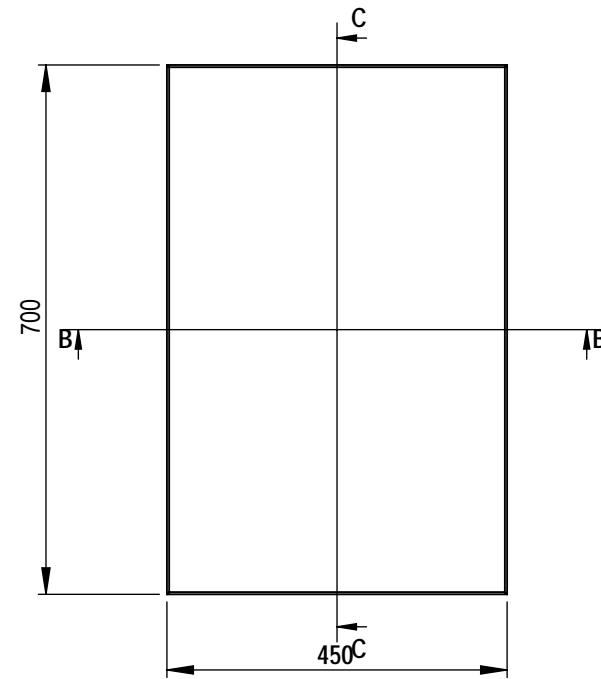
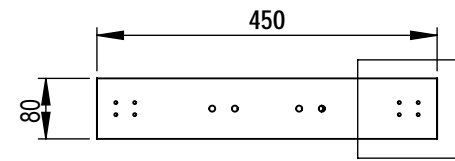


ISOMETRIC VIEW

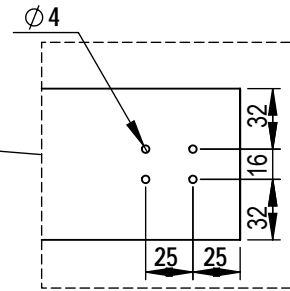
NOTE - TECH SPECS FOLLOW AS PER PROTO



SECTION B-B



SECTION C-C

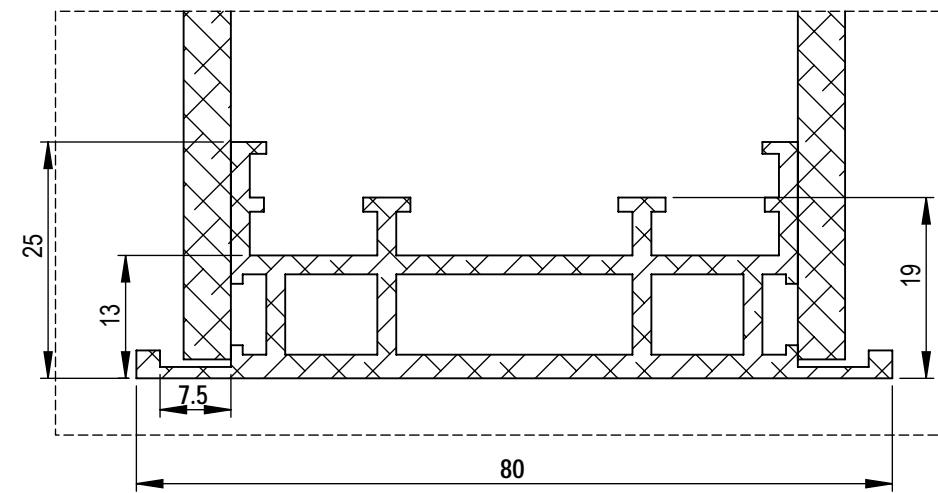


DETAIL E
SCALE 1 : 4

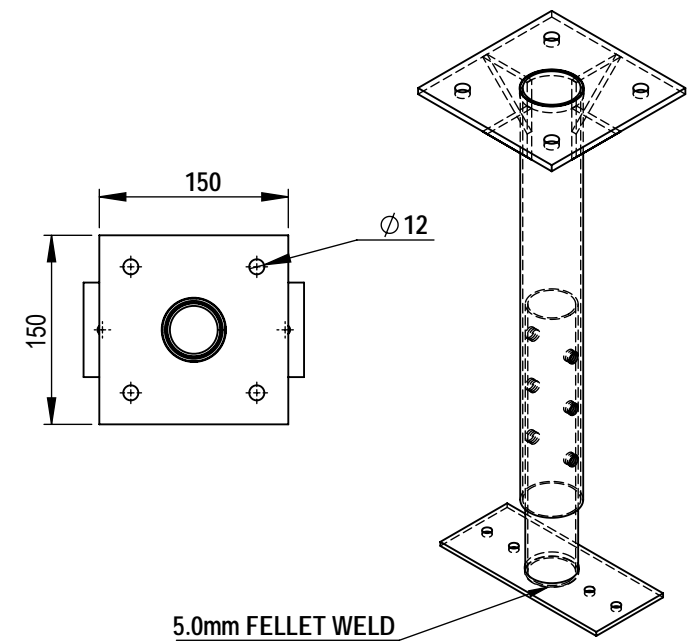
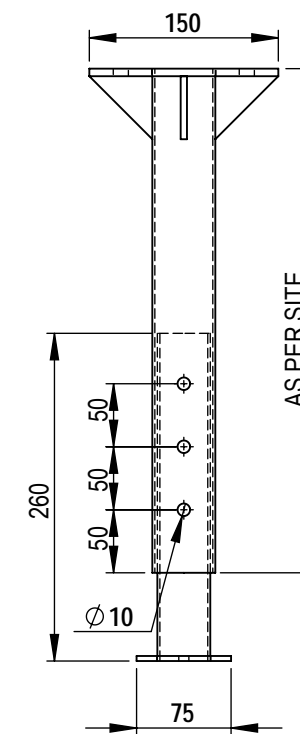
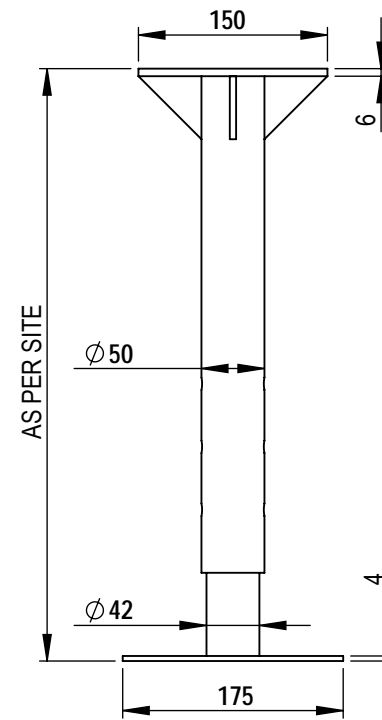
25X25 X3.0mm THK-50mm
MS ANGLE AND SIDE PROFILE
FIXED WITH POP RIVET

TOP PROFILE AND MS ANGLE 25X25X3.0
FIXED WITH M4 CSK ALLEN BOLT

ACRYLIC INSERT FROM TOP

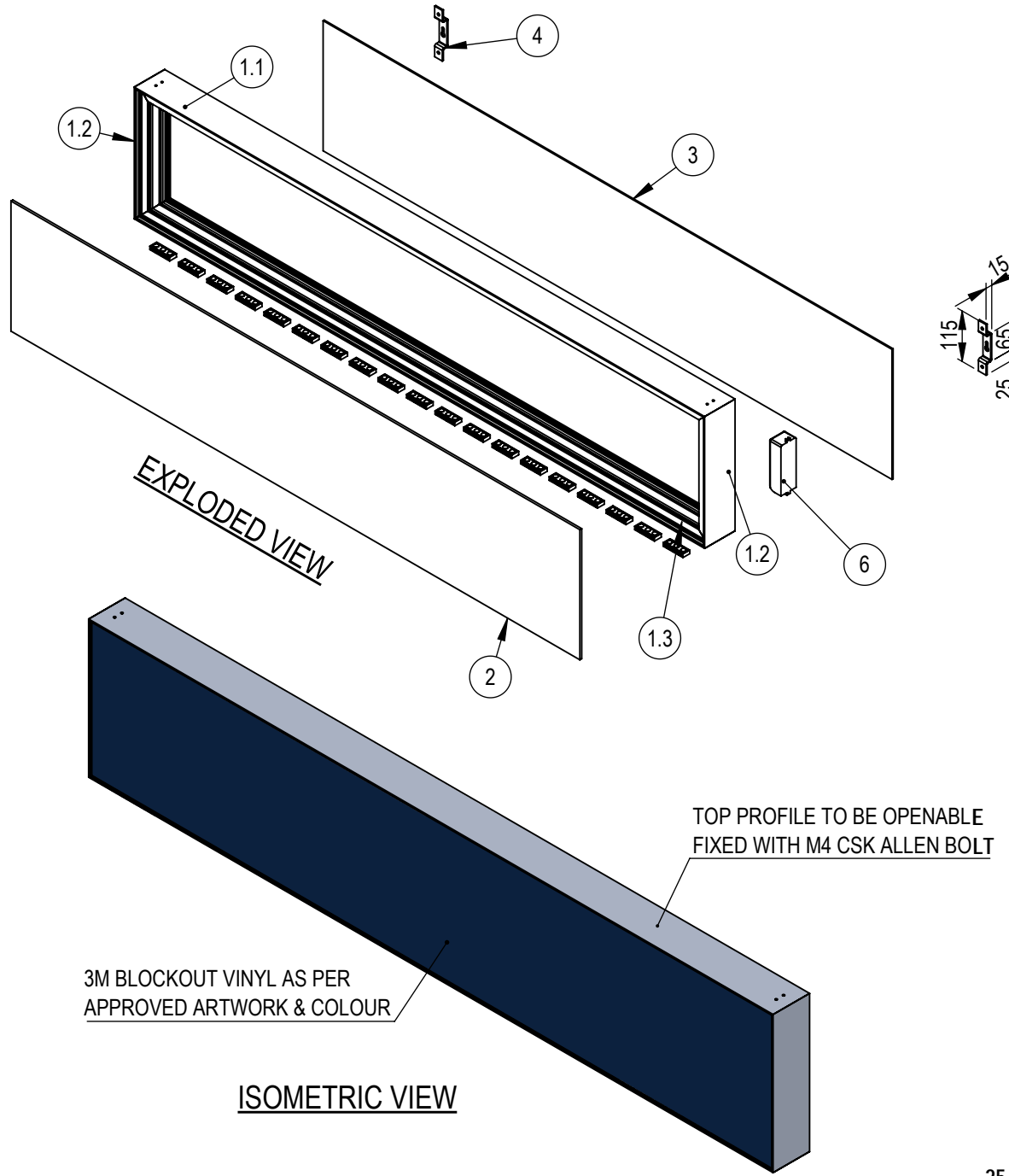
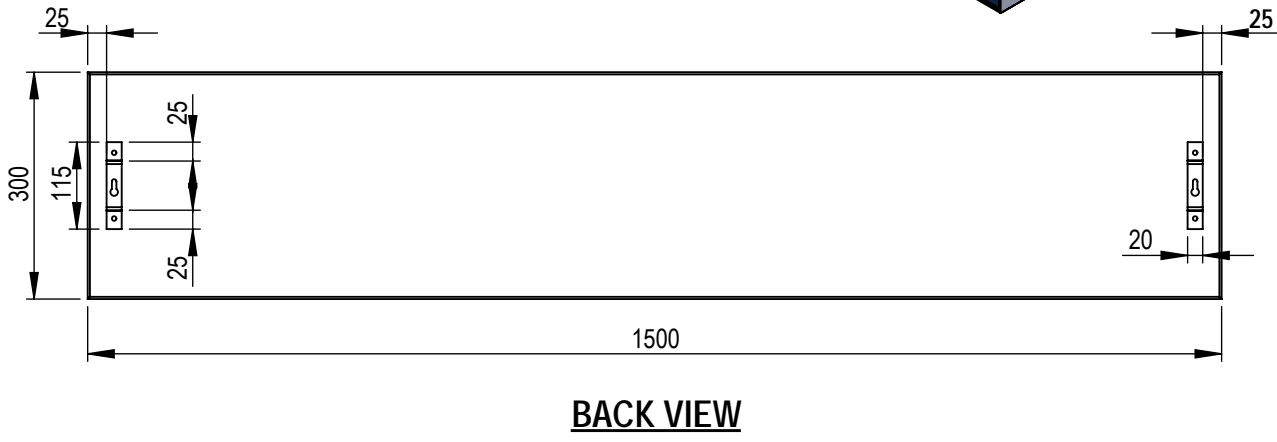
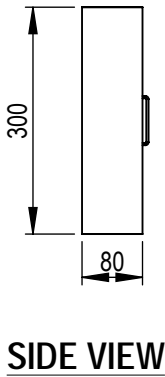
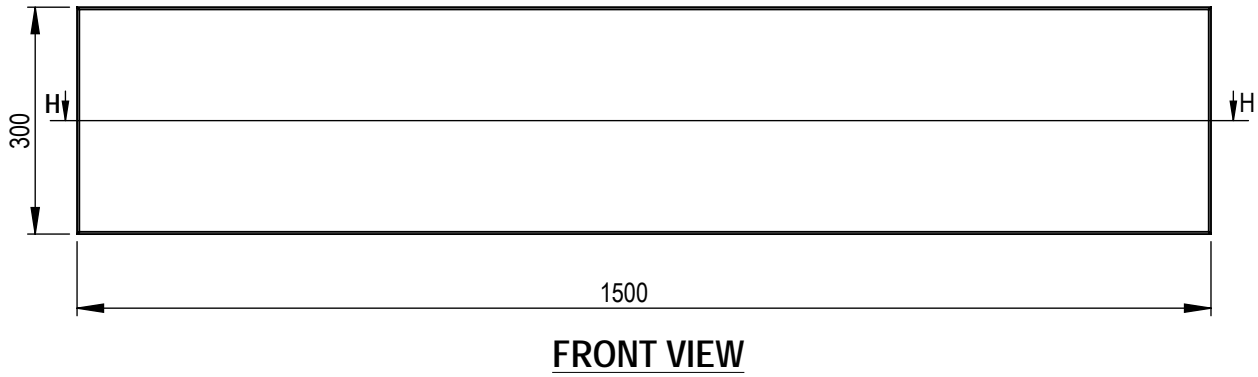
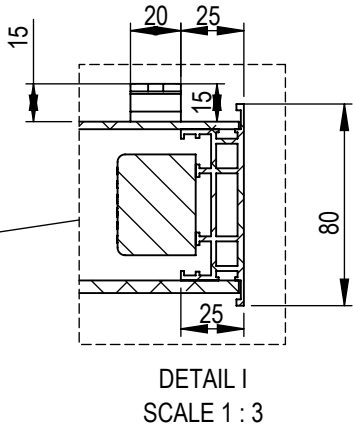
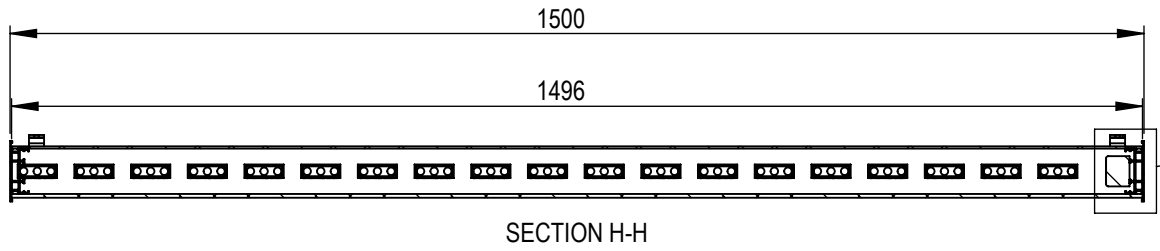
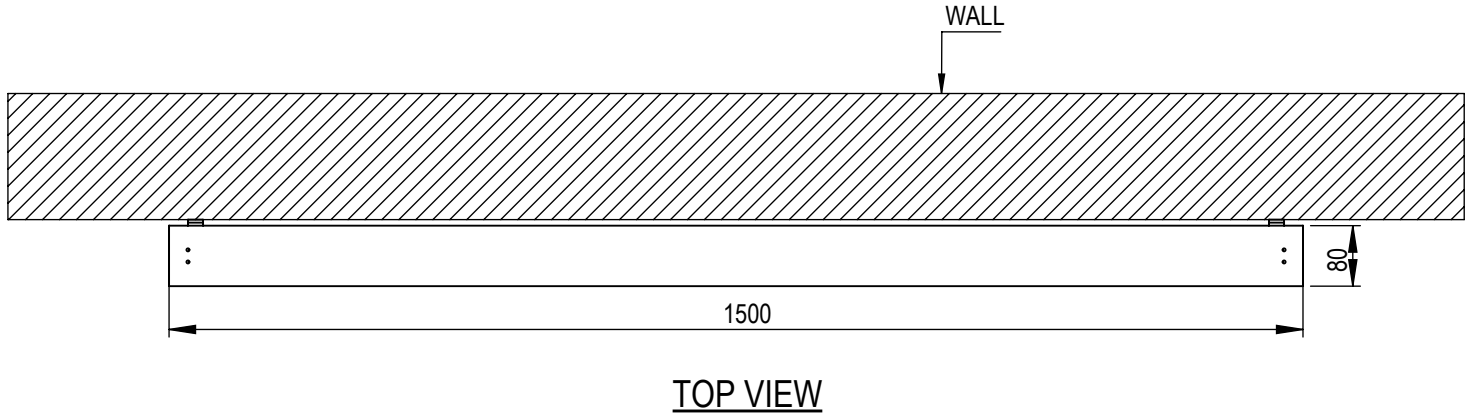


DETAIL D
SCALE 1 : 0.8



ITEM NO.	DESCRIPTION	LENGTH	FINISH	QTY.
1	AL EXTRUSION FRAME			1
1.1	80mm AL EXTRUSION PROFILE	1500	RAL CLASSIC 7046 PC	1
1.2	80mm AL EXTRUSION PROFILE	300	RAL CLASSIC 7046 PC	2
1.3	80mm AL EXTRUSION PROFILE	1500	RAL CLASSIC 7046 PC	1
1.4	25X25X3.0 mm MS ANGLE FOR TOP PROFILE			2
2	5 mm THK 0-40 ACRYLIC SIZE 296 X 1496			1
3	4.0mm THK ACP SHEET AT BACK		RAL CLASSIC 7046 PC	1
4	3.0mm THL AL BARCKET WELD WITH BACK SHEET		RAL CLASSIC 7046 PC	2
5	LED MODULE 6500 K			19
6	POWER SUPPLY			1

1500X300
2.1.1a
ILLUMINATED
SINGLE SIDE



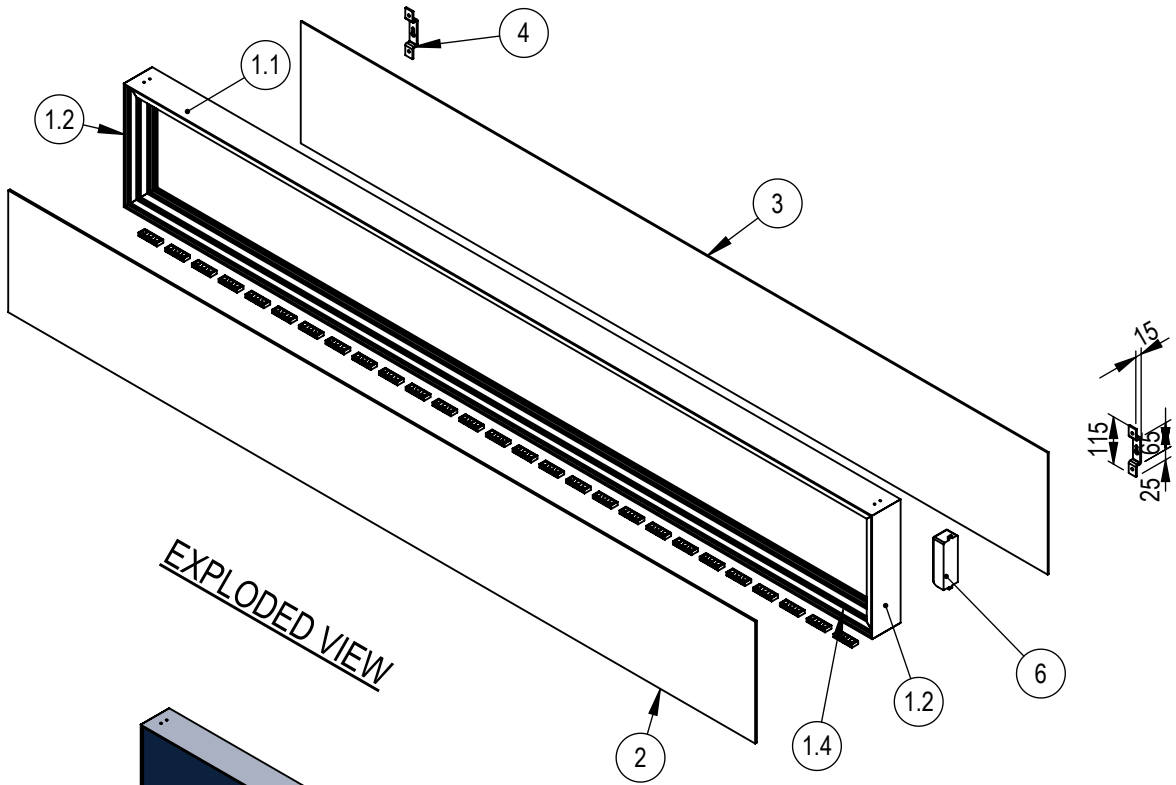
NOTE - TECH SPECS FOLLOW AS PER PROTO

ITEM NO.	DESCRIPTION	LENGTH	FINISH	QTY.
1	AL EXTRUSION FRAME			1
1.1	80mm AL EXTRUSION PROFILE	2100	RAL CLASSIC 7046 PC	1
1.2	80mm AL EXTRUSION PROFILE	300	RAL CLASSIC 7046 PC	2
1.3	25X25X3.0 mm MS ANGLE FOR TOP PROFILE			2
1.4	80mm AL EXTRUSION PROFILE	2100	RAL CLASSIC 7046 PC	1
2	5 mm THK 0-40 ACRYLIC SIZE 296 X 2096			1
3	4.0mm THK ACP SHEET AT BACK		RAL CLASSIC 7046 PC	1
4	3.0mm THL AL BARCKET WELD WITH BACK SHEET		RAL CLASSIC 7046 PC	2
5	LED MODULE 6500 K			27
6	POWER SUPPLY			1

2100X300

2.1.1b

ILLUMINTED
SINGLE SIDED

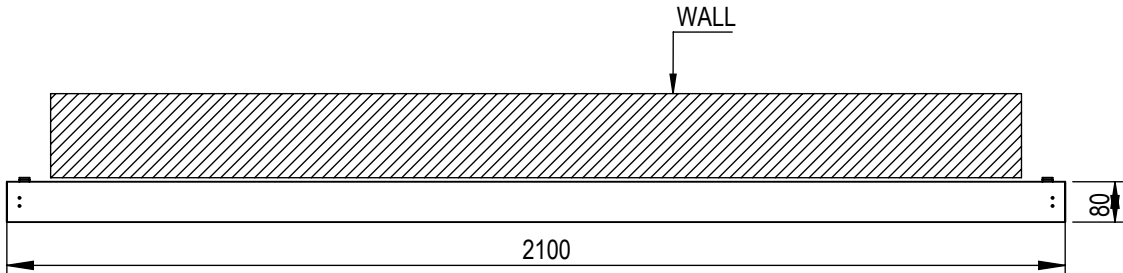


EXPLODED VIEW

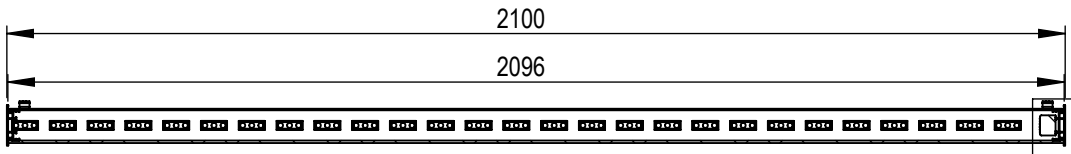
3M BLOCKOUT VINYL AS PER
APPROVED ARTWORK & COLOUR

TOP PROFILE TO BE OPENABLE
FIXED WITH M4 CSK ALLEN BOLT

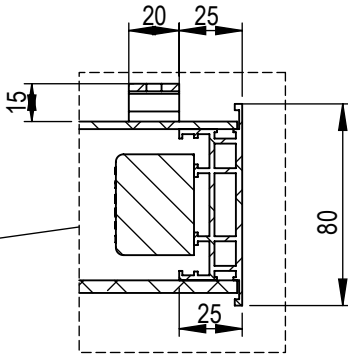
ISOMETRIC VIEW



TOP VIEW



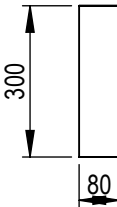
SECTION H-H
SCALE 1 : 15



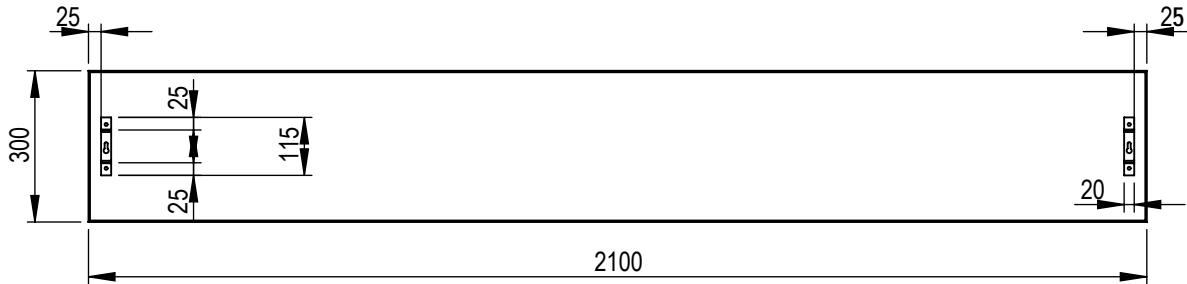
DETAIL I
SCALE 1 : 3



FRONT VIEW



SIDE VIEW



BACK VIEW

NOTE - TECH SPECS FOLLOW AS PER PROTO

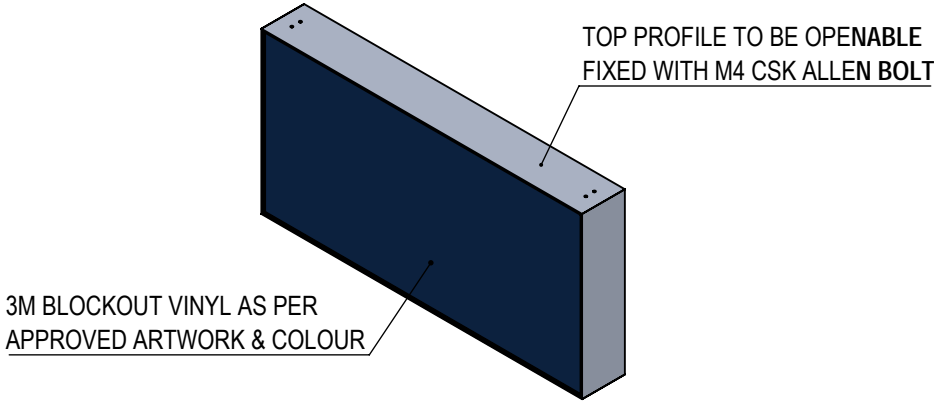
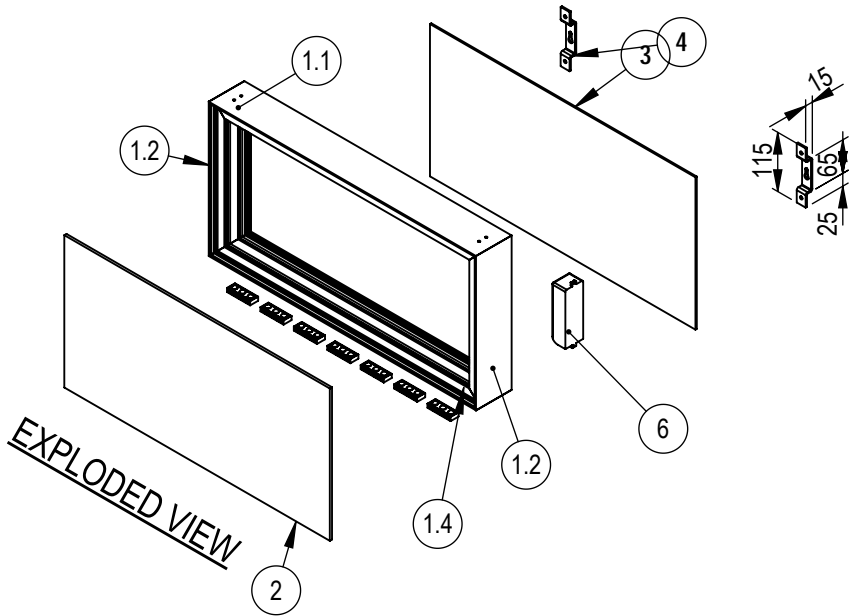
ITEM NO.	DESCRIPTION	LENGTH	FINISH	QTY.
1	AL EXTRUSION FRAME			1
1.1	80mm AL EXTRUSION PROFILE	600	RAL CLASSIC 7046 PC	1
1.2	80mm AL EXTRUSION PROFILE	300	RAL CLASSIC 7046 PC	2
1.3	25X25X3.0 mm MS ANGLE FOR TOP PROFILE			2
1.4	80mm AL EXTRUSION PROFILE	600	RAL CLASSIC 7046 PC	1
2	5 mm THK 0-40 ACRYLIC SIZE 296 X 596			1
3	4.0mm THK ACP SHEET AT BACK		RAL CLASSIC 7046 PC	1
4	3.0mm THL AL BARCKET WELD WITH BACK SHEET		RAL CLASSIC 7046 PC	2
5	LED MODULE 6500 K			7
6	POWER SUPPLY			1

600X300

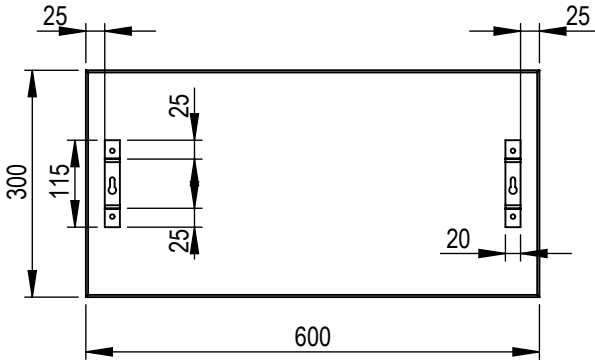
2.1.1c

ILLUMINTED

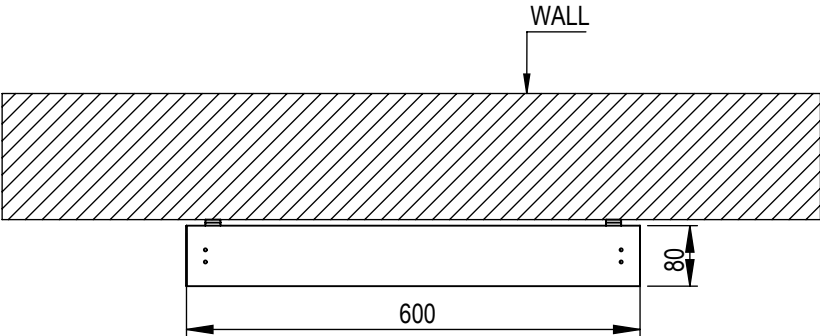
SINGLE SIDE



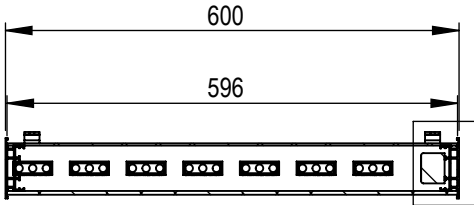
ISOMETRIC VIEW



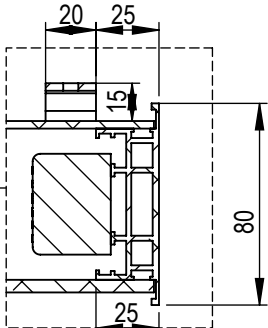
BACK VIEW



TOP VIEW



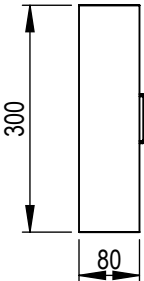
SECTION H-H



DETAIL I
SCALE 1 : 3



FRONT VIEW

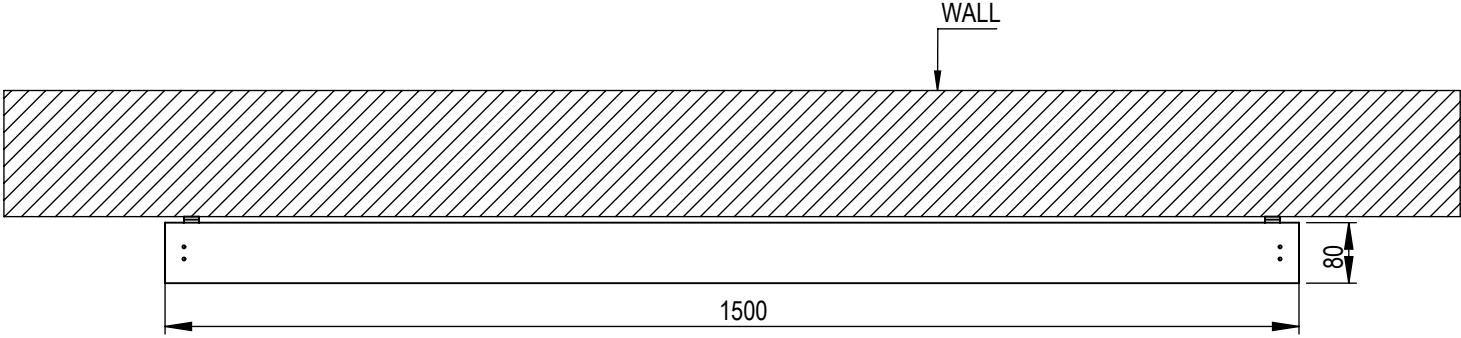


SIDE VIEW

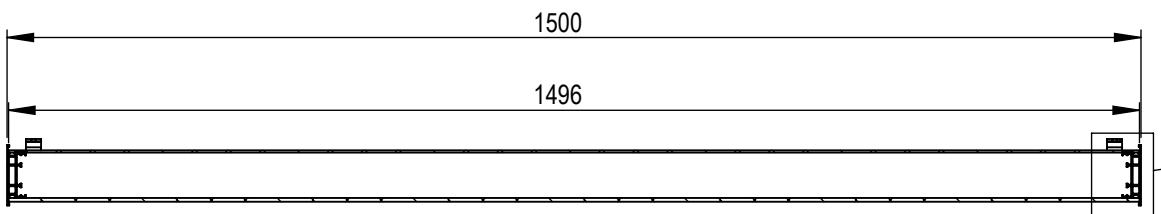
NOTE - TECH SPECS FOLLOW AS PER PROTO

ITEM NO.	DESCRIPTION	LENGTH	FINISH	QTY.
1	AL EXTRUSION FRAME			1
1.1	80mm AL EXTRUSION PROFILE	1500	RAL CLASSIC 7046 PC	1
1.2	80mm AL EXTRUSION PROFILE	300	RAL CLASSIC 7046 PC	2
1.3	25X25X3.0 mm MS ANGLE FOR TOP PROFILE			2
1.4	80mm AL EXTRUSION PROFILE	1500	RAL CLASSIC 7046 PC	1
2	5 mm THK 0-40 ACRYLIC SIZE 296 X 1496			1
3	3.0mm THK ACP SHEET AT BACK		RAL CLASSIC 7046 PC	1
4	3.0mm THL AL BARCKET WELD WITH BACK SHEET		RAL CLASSIC 7046 PC	2

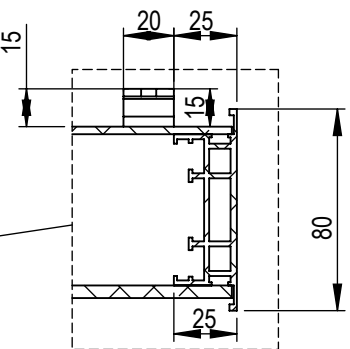
1500X300
2.1.2a
NON- ILLUMINATED
SINGLE SIDED



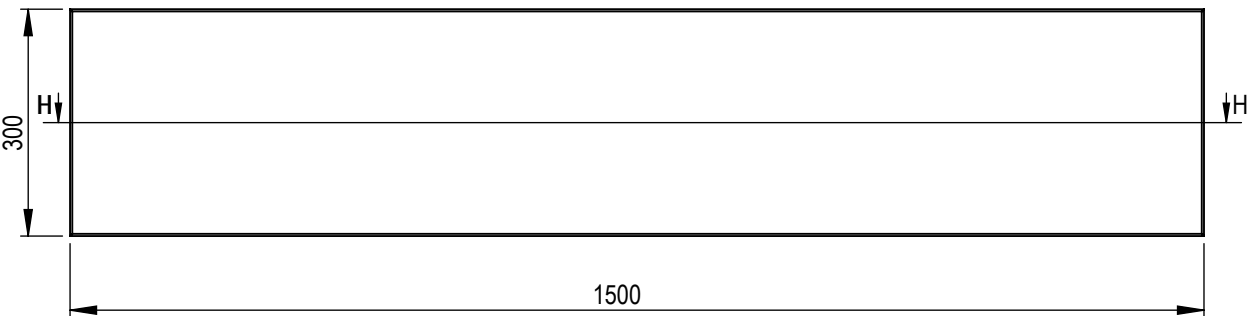
TOP VIEW



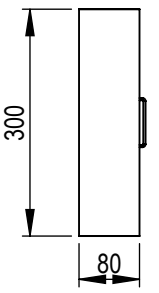
SECTION H-H



DETAIL I
SCALE 1 : 3



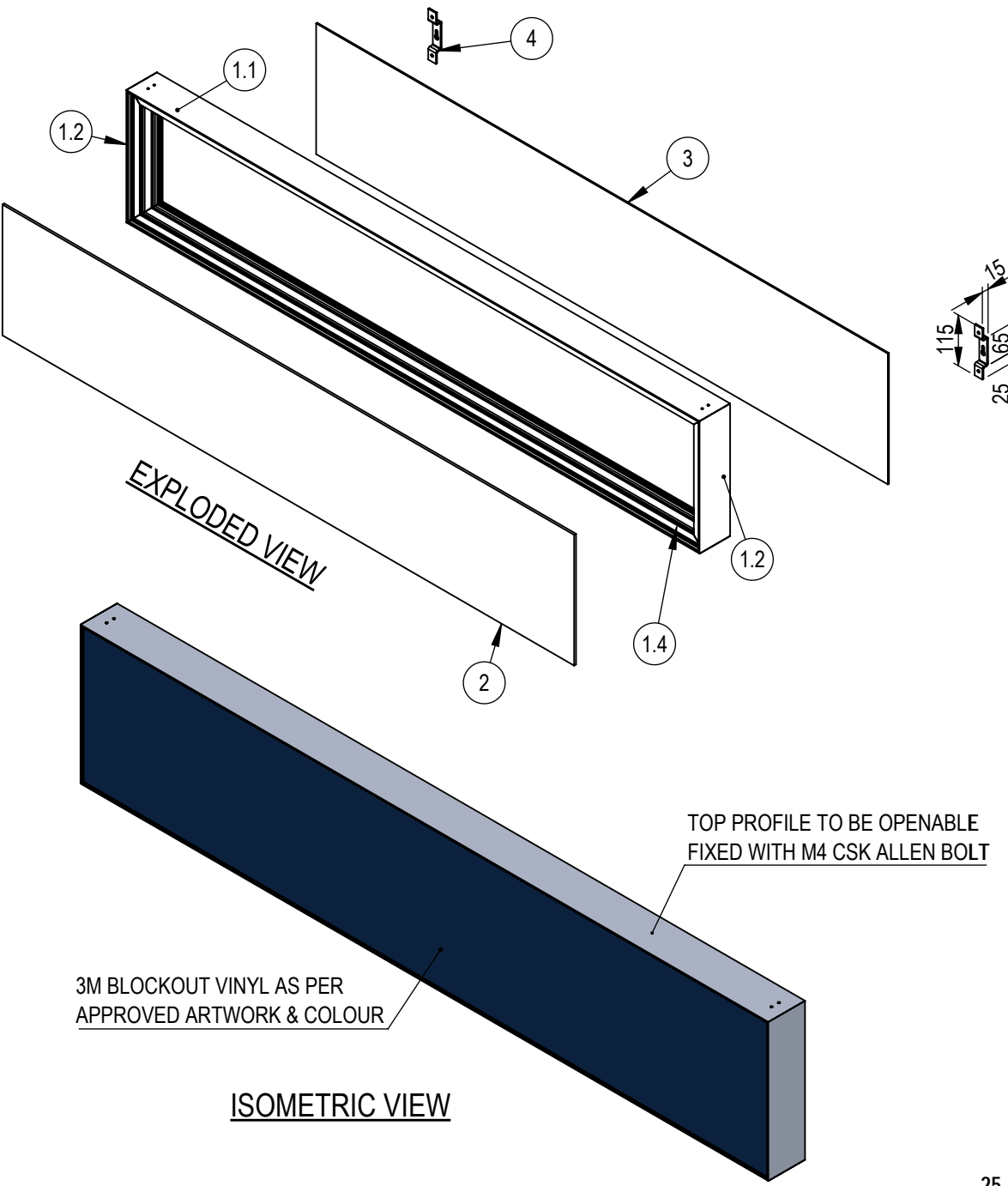
FRONT VIEW



SIDE VIEW



BACK VIEW



ISOMETRIC VIEW

EXPLODED VIEW

TOP PROFILE TO BE OPENABLE
FIXED WITH M4 CSK ALLEN BOLT

3M BLOCKOUT VINYL AS PER
APPROVED ARTWORK & COLOUR

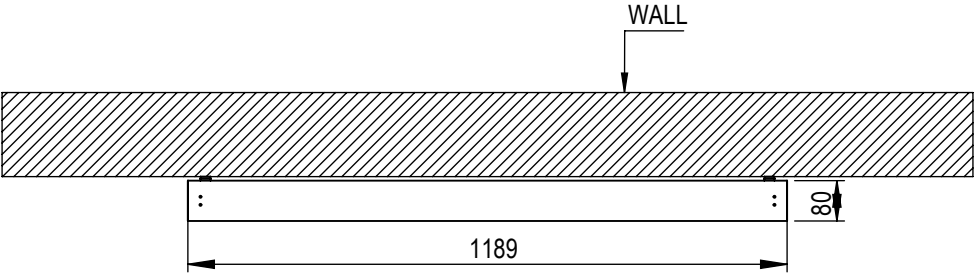
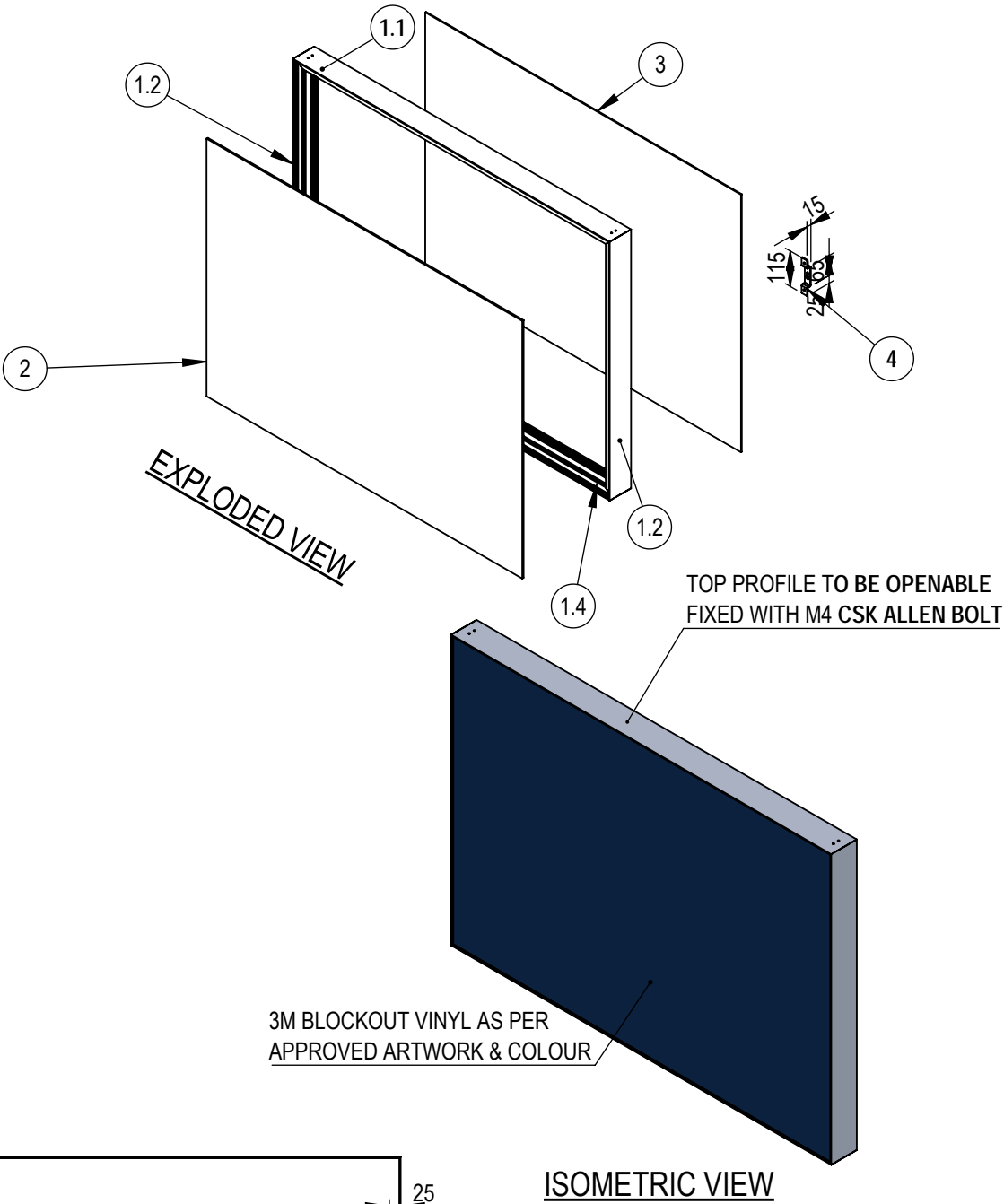
NOTE - TECH SPECS FOLLOW AS PER PROTO

ITEM NO.	DESCRIPTION	LENGTH	FINISH	QTY.
1	AL EXTRUSION FRAME			1
1.1	80mm AL EXTRUSION PROFILE	1189	RAL CLASSIC 7046 PC	1
1.2	80mm AL EXTRUSION PROFILE	841	RAL CLASSIC 7046 PC	2
1.3	25X25X3.0 mm MS ANGLE FOR TOP PROFILE			2
1.4	80mm AL EXTRUSION PROFILE	1189	RAL CLASSIC 7046 PC	1
2	5 mm THK 0-40 ACRYLIC SIZE 837 X 1185			1
3	4.0mm THK AC SHEET AT BACK		RAL CLASSIC 7046 PC	1
4	3.0mm THL AL BARCKET WELD WITH BACK SHEET		RAL CLASSIC 7046 PC	2

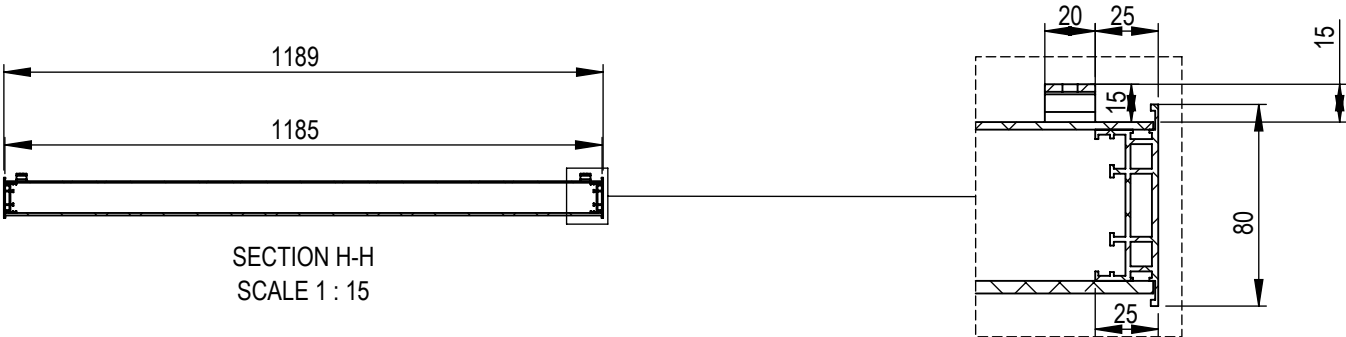
1189X841

2.1.2b

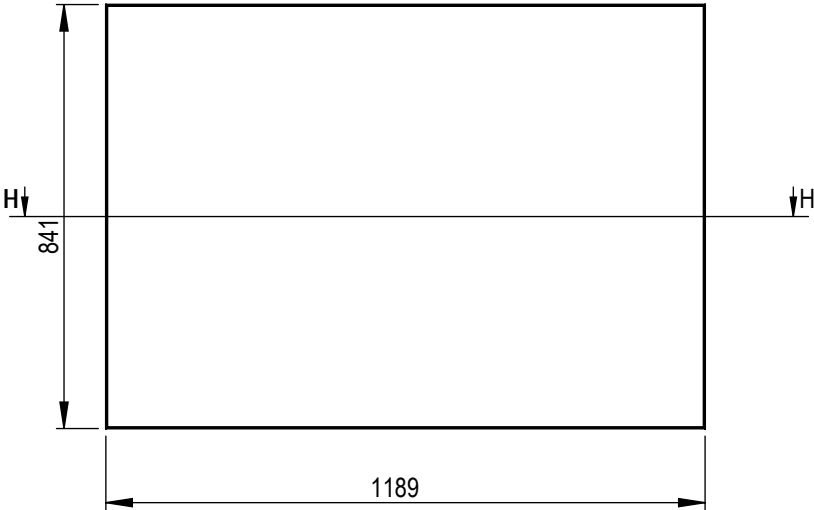
NON ILLUMINATED
SINGLE SIDED



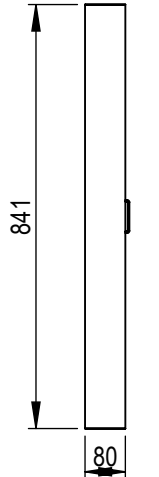
TOP VIEW



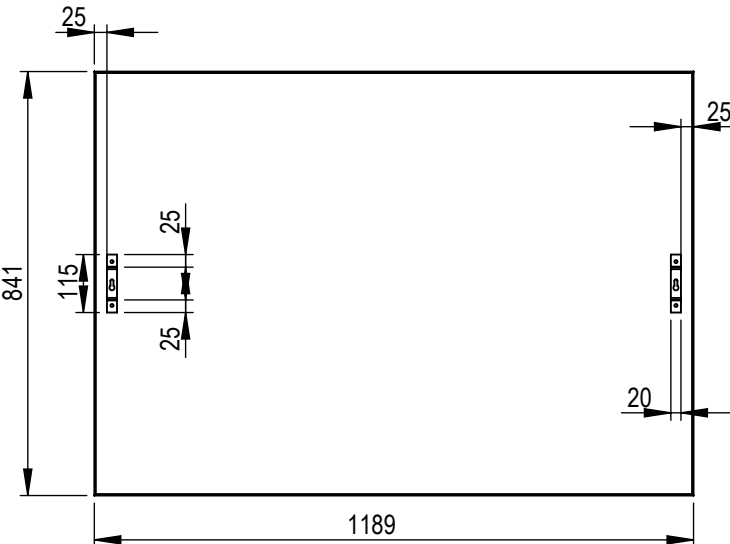
DETAIL I
SCALE 1 : 3



FRONT VIEW



SIDE VIEW



BACK VIEW

ISOMETRIC VIEW

NOTE - TECH SPECS FOLLOW AS PER PROTO

297X210 (2.1.3a)
PLATE SIGN

2.0mm THK AL SHEET
FINISH WHITE POWDER COAT

3M VINYL AS PER APPROVED
ARTWORK & COLOUR PASTED
OVER AL SHEET

WALL

3M VHB TAPE

2

210

297

210

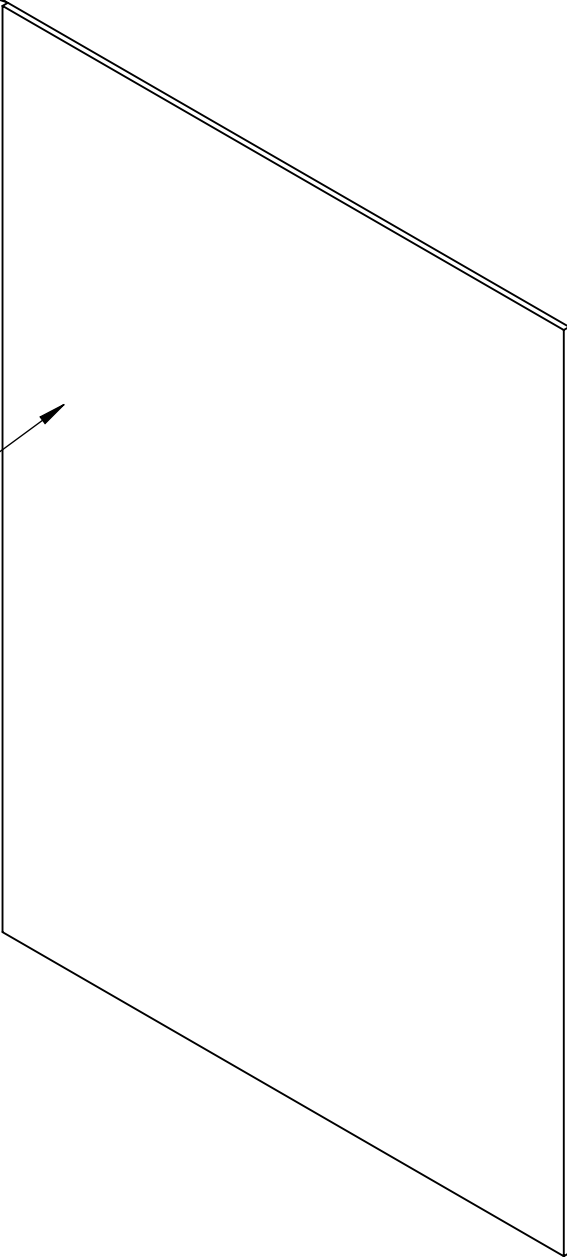
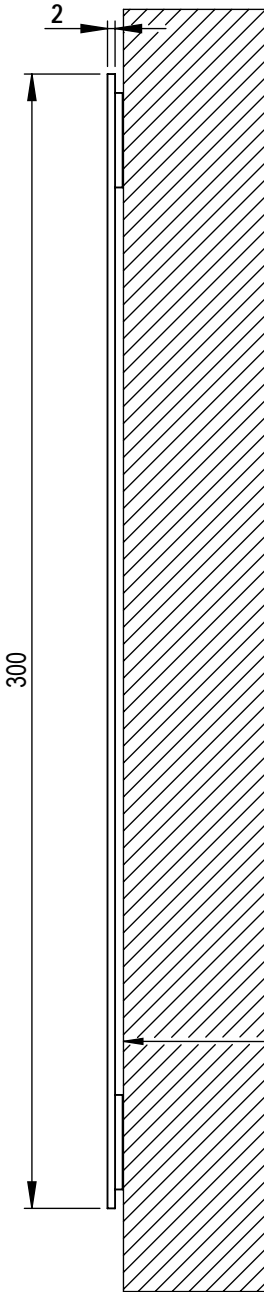
210X300 (2.1.3b)
PLATE SIGN

2.0mm THK AL SHEET
FINISH WHITE POWDER COAT

3M VINYL AS PER APPROVED
ARTWORK & COLOUR PASTED
OVER AL SHEET

WALL

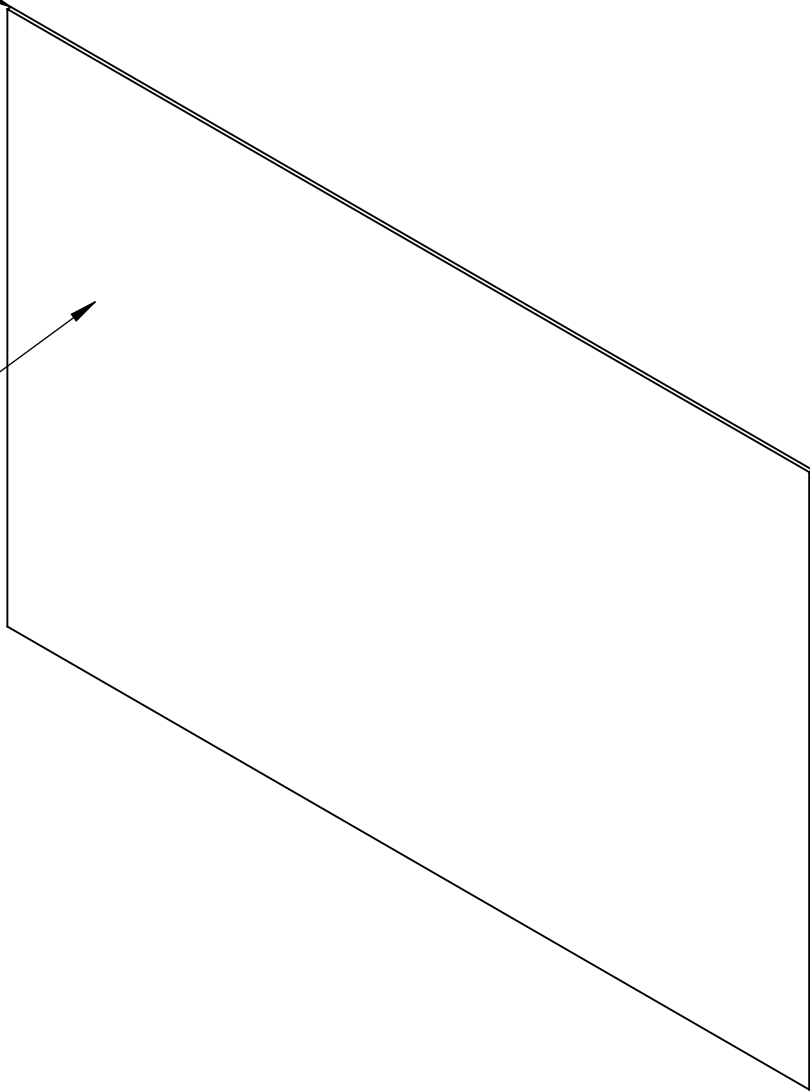
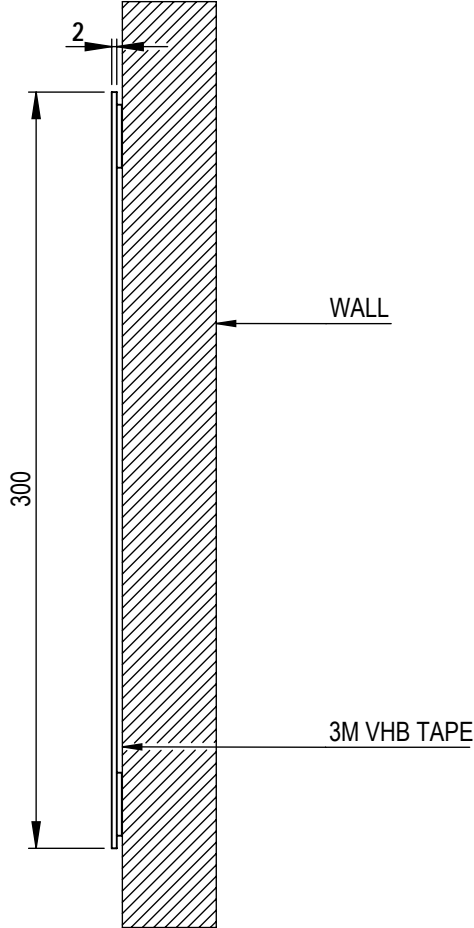
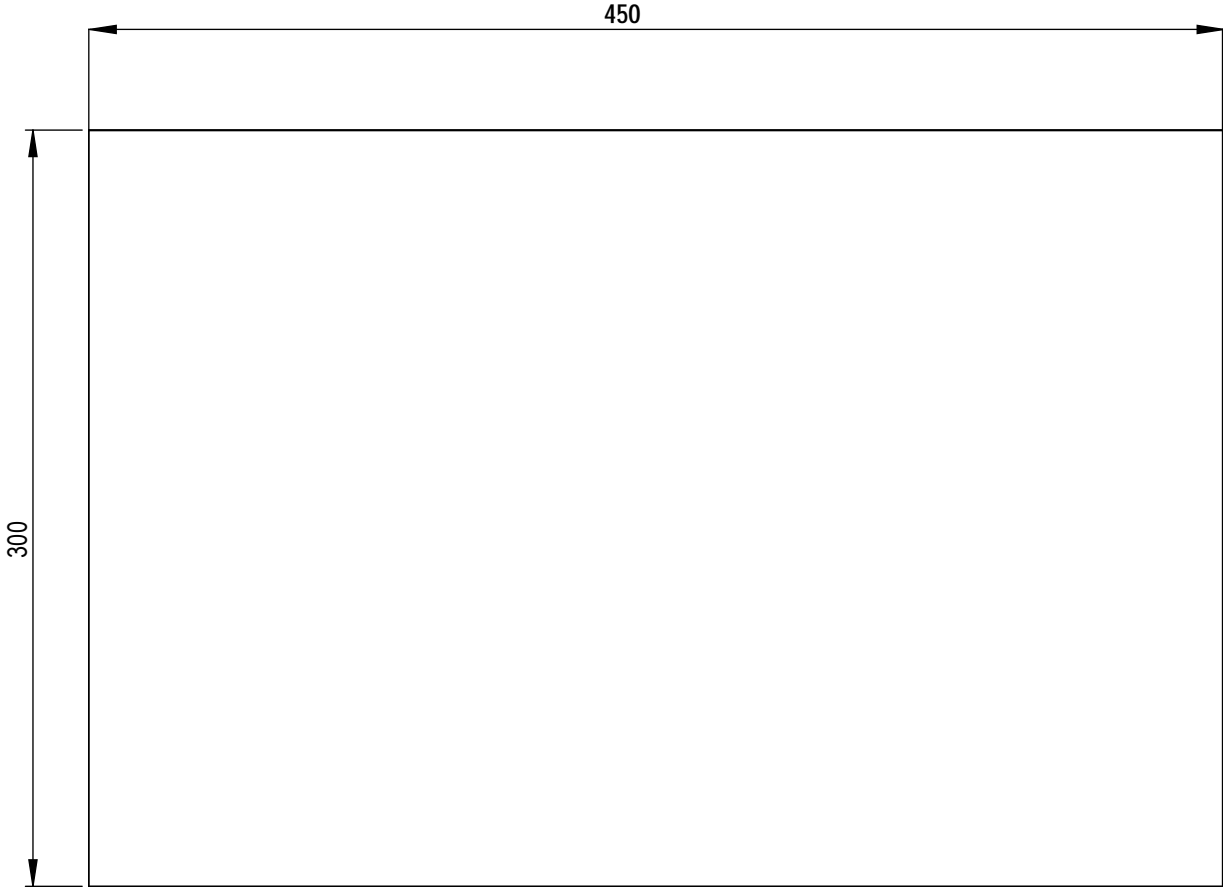
3M VHB TAPE



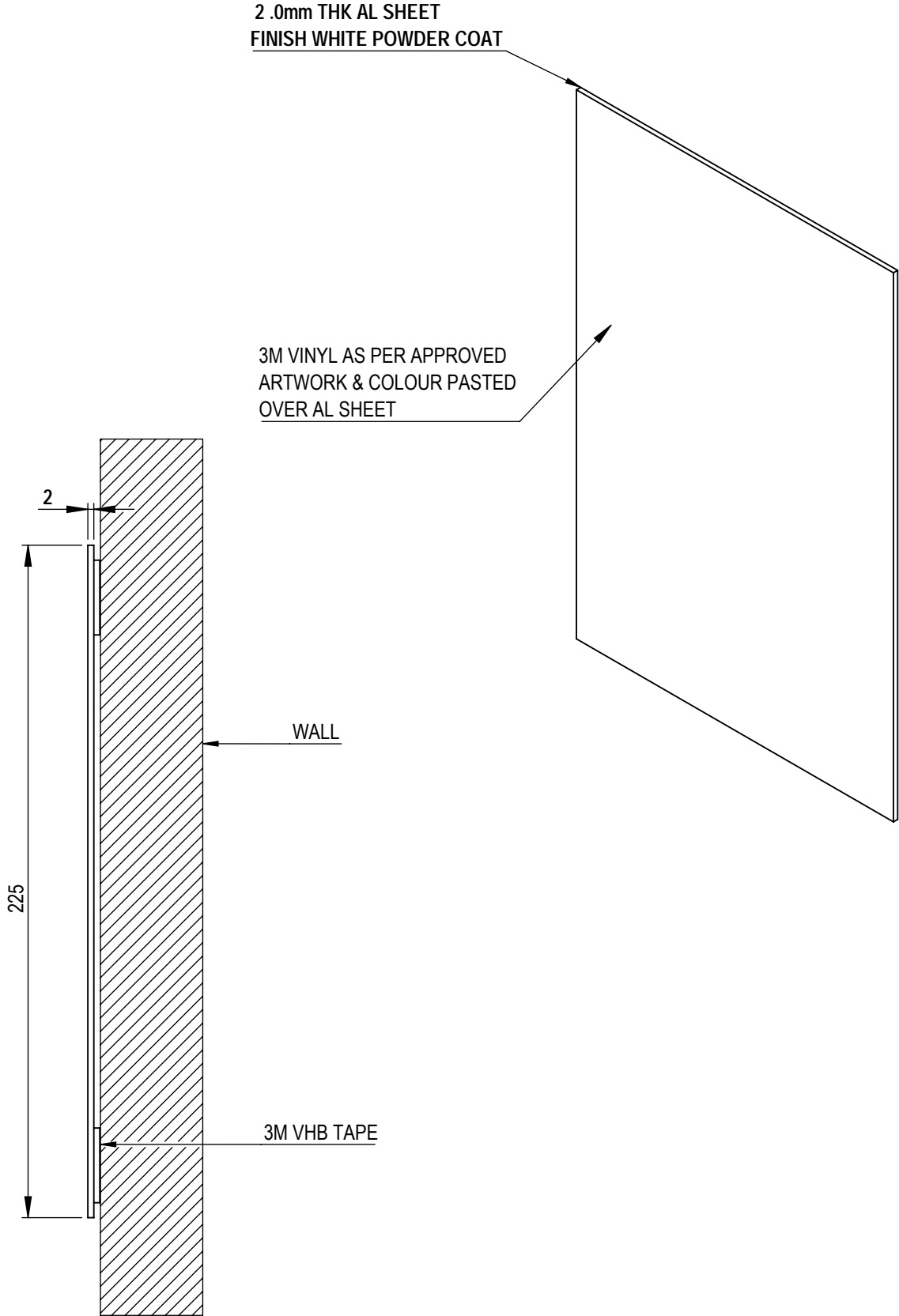
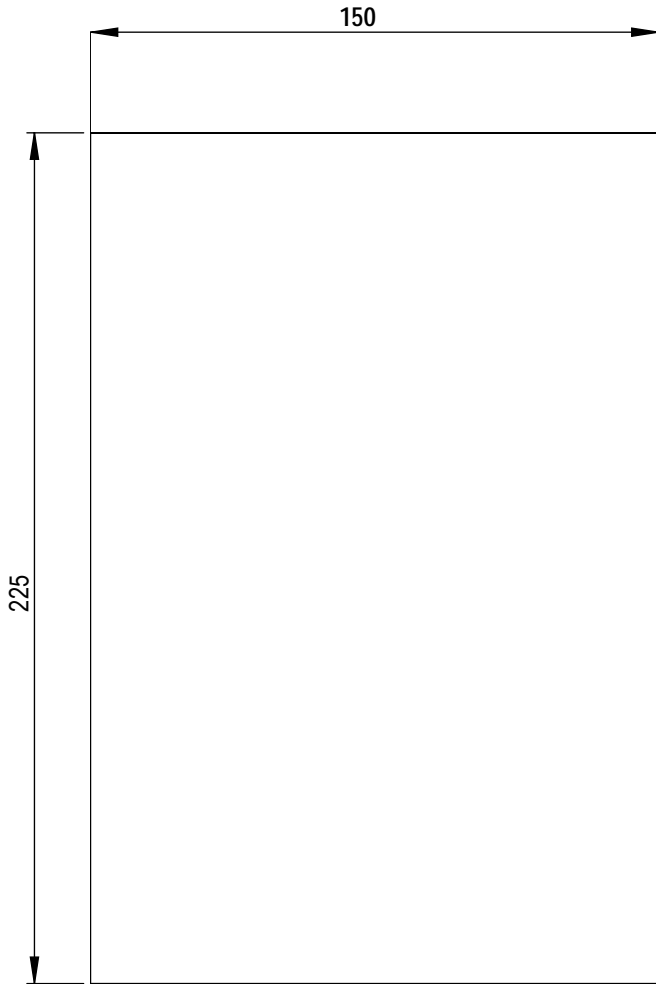
**450X300 (2.1.3c)
PLATE SIGN**

2.0mm THK AL SHEET
FINISH WHITE POWDER COAT

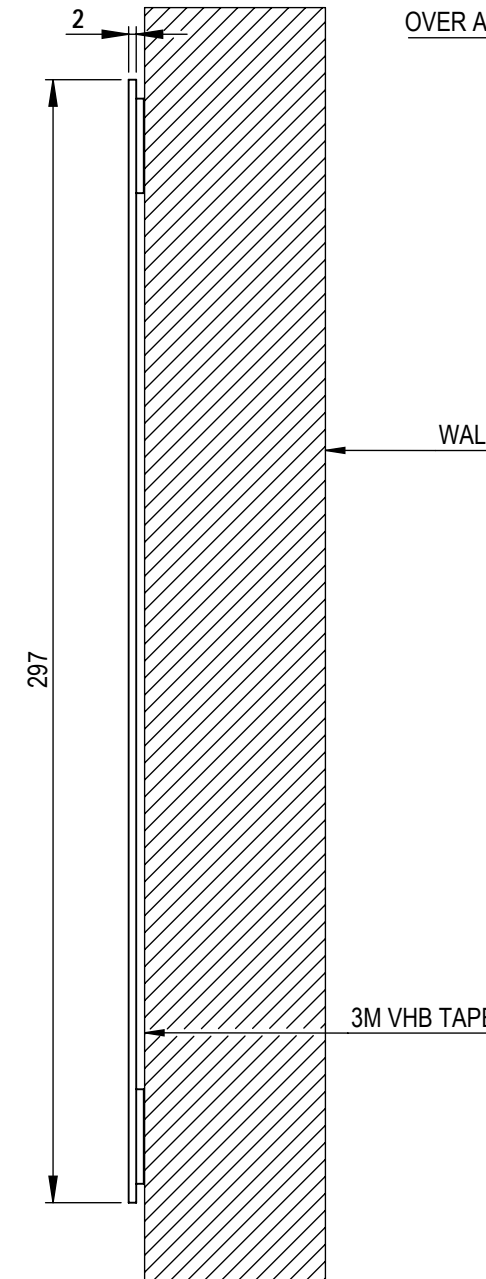
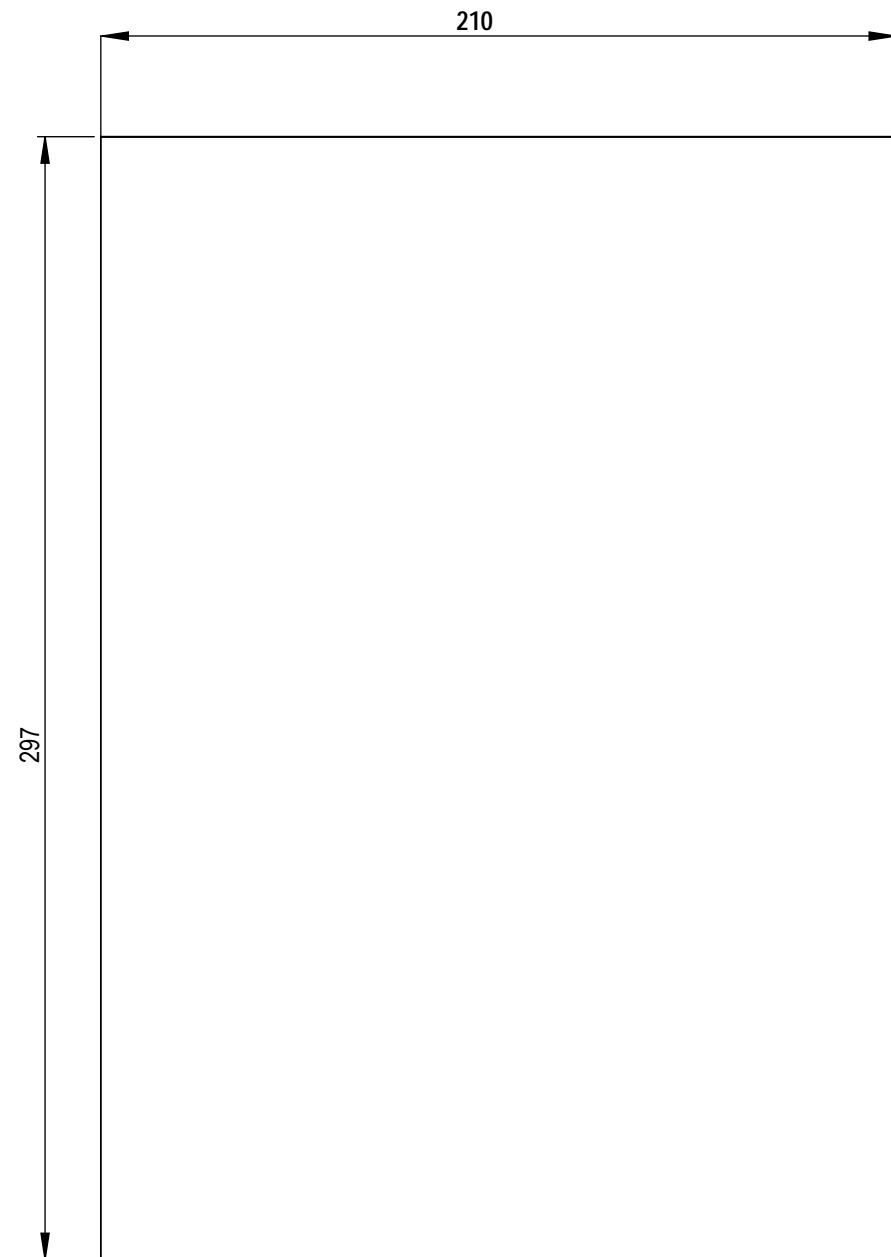
3M VINYL AS PER APPROVED
ARTWORK & COLOUR PASTED
OVER AL SHEET



150X225 (2.1.4a)
PLATE SIGN



210X297 (2.1.4b)
PLATE SIGN



2.0mm THK AL SHEET
FINISH WHITE POWDER COAT

3M VINYL AS PER APPROVED
ARTWORK & COLOUR PASTED
OVER AL SHEET

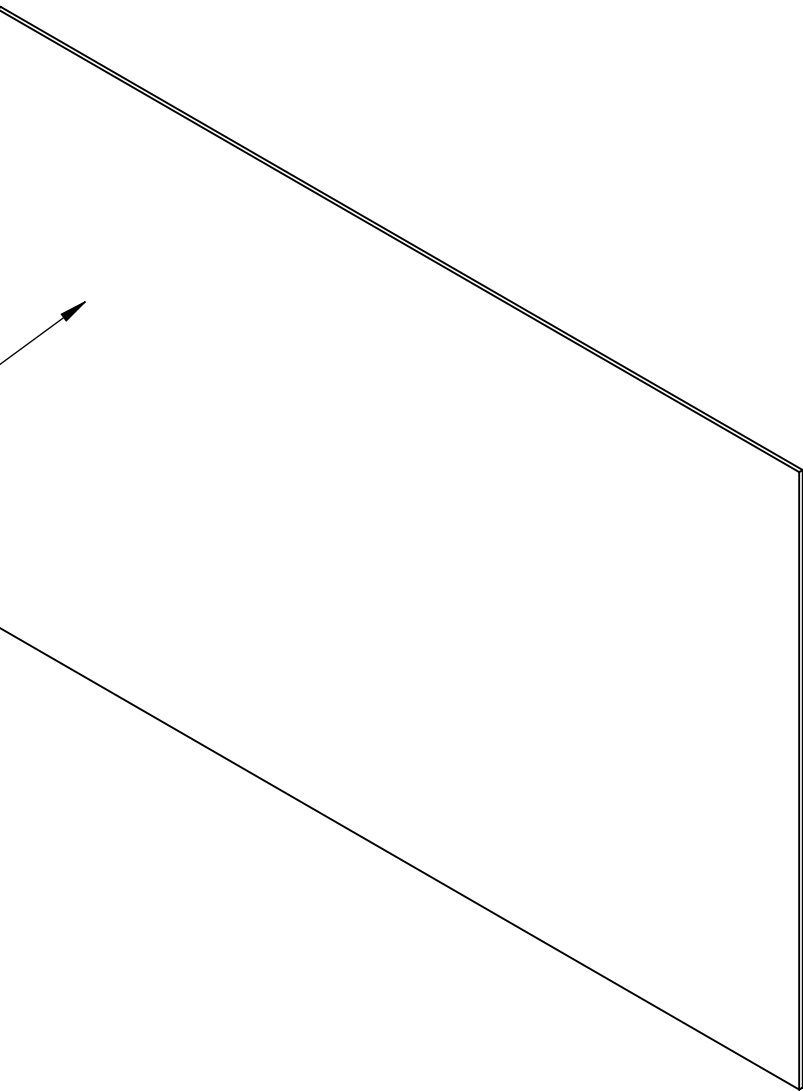
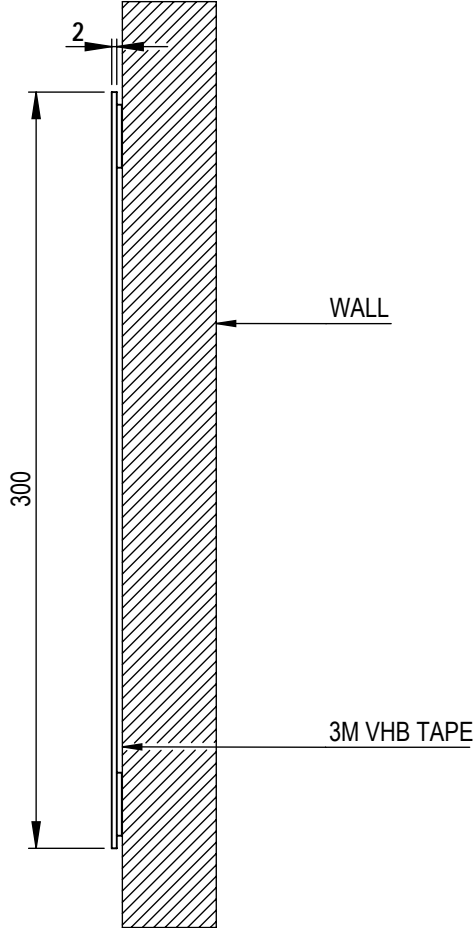
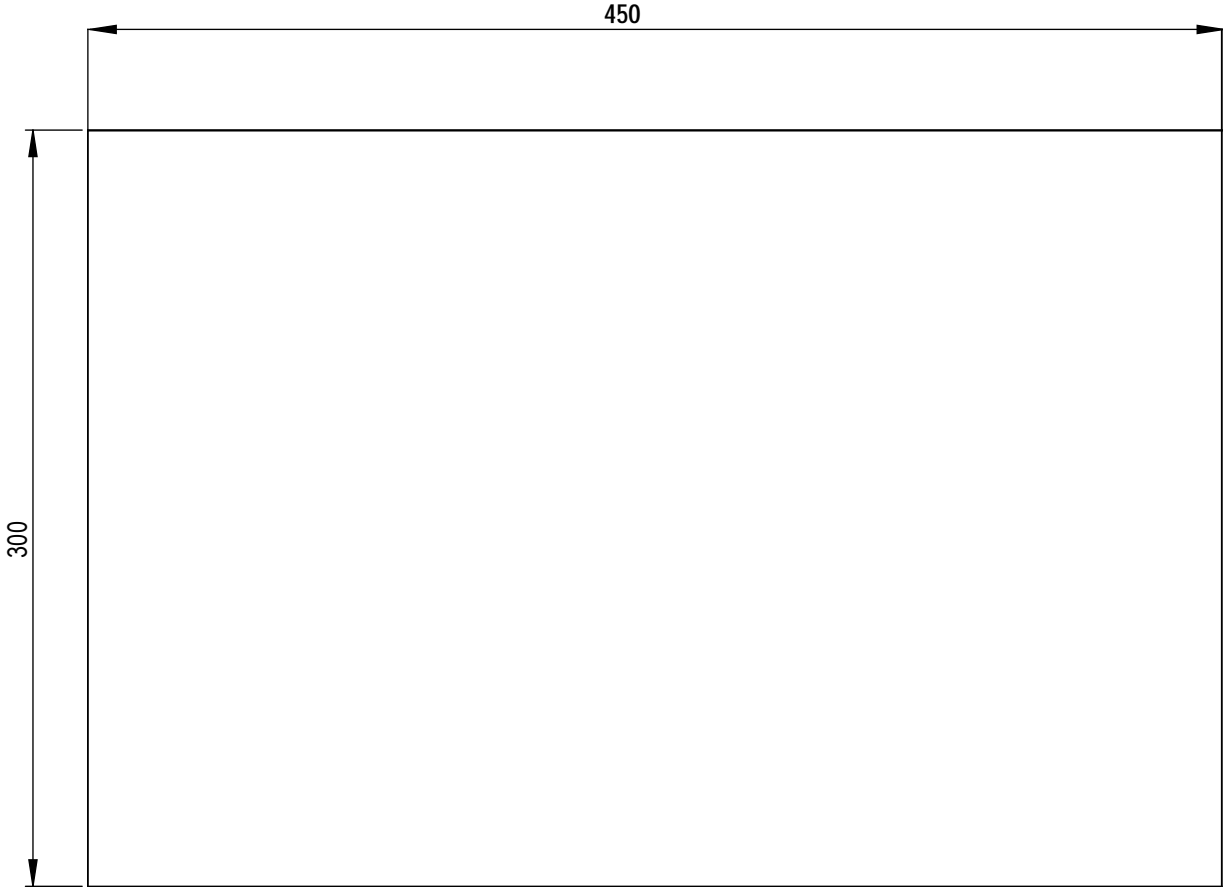
WALL

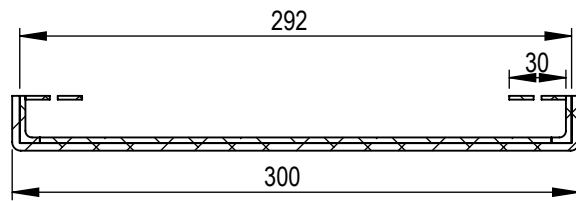
3M VHB TAPE

**450X300 (2.1.4c)
PLATE SIGN**

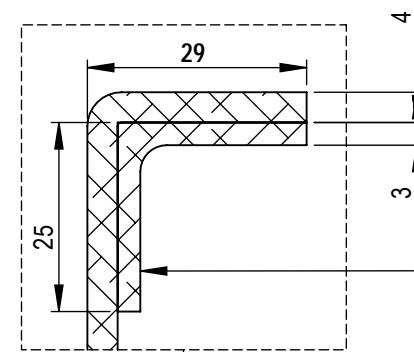
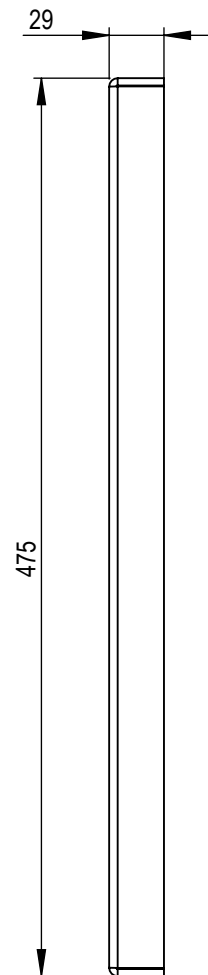
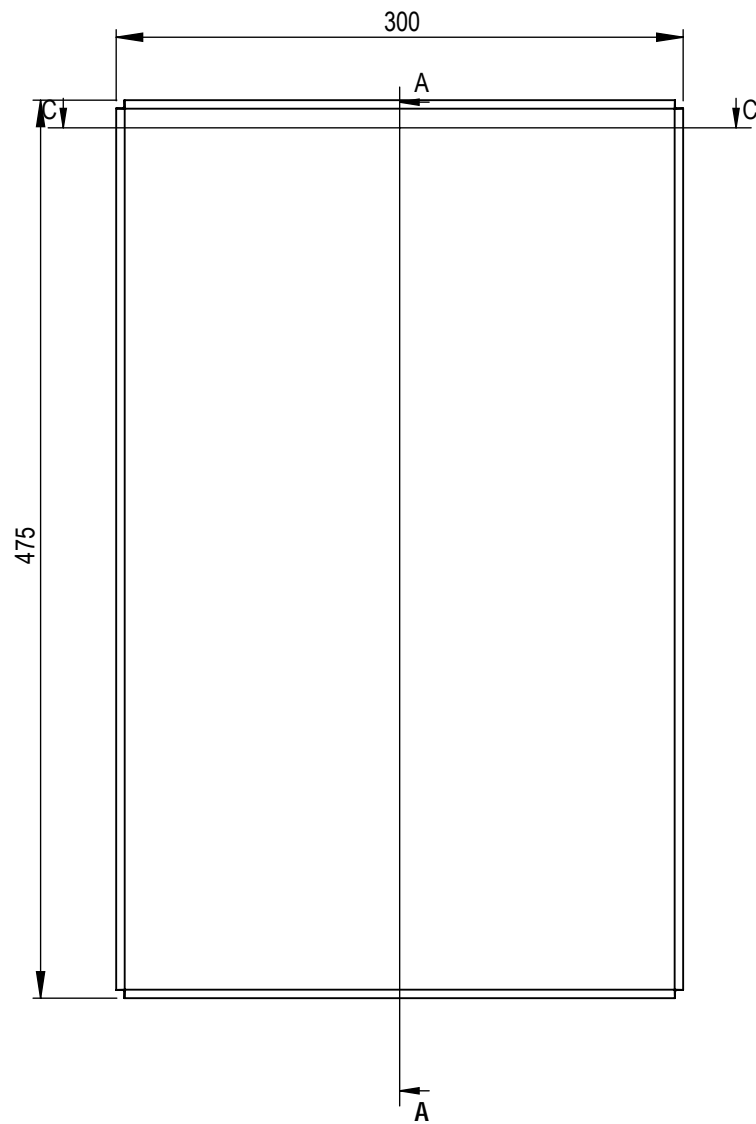
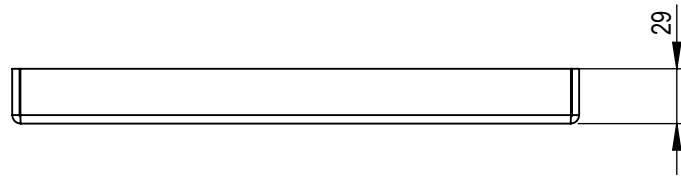
2.0mm THK AL SHEET
FINISH WHITE POWDER COAT

3M VINYL AS PER APPROVED
ARTWORK & COLOUR PASTED
OVER AL SHEET



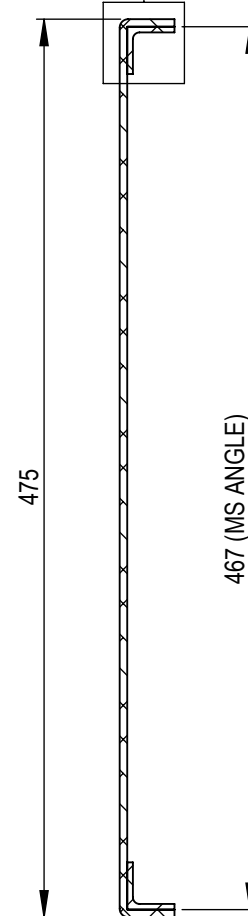
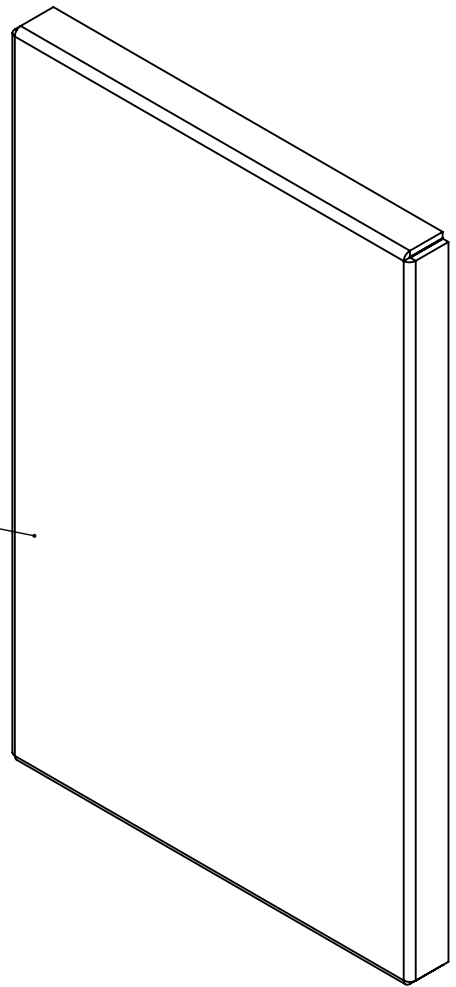


SECTION C-C
SCALE 1 : 4

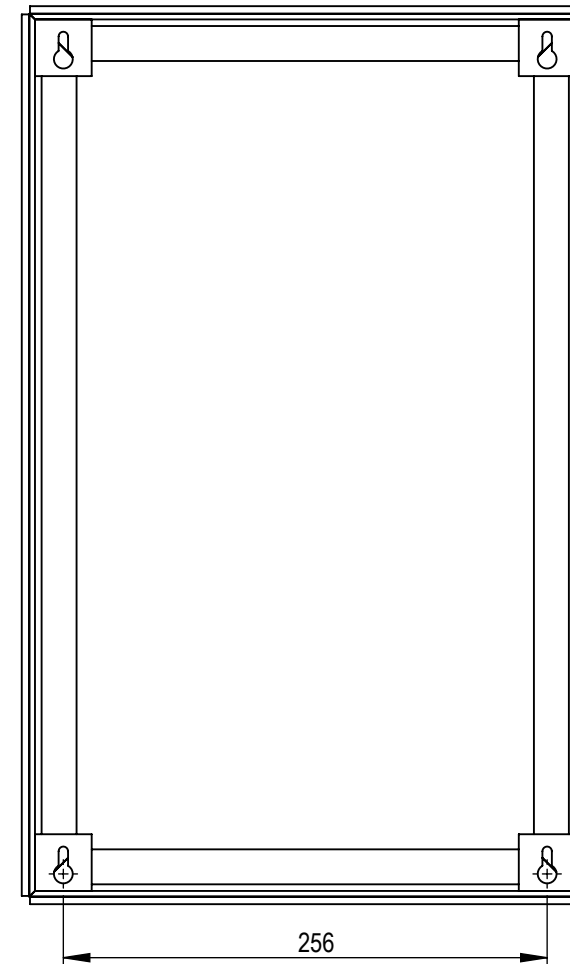


25X25X3.0mm THK MS ANGLE
FINISH RAL CLASSIC 7046 PC

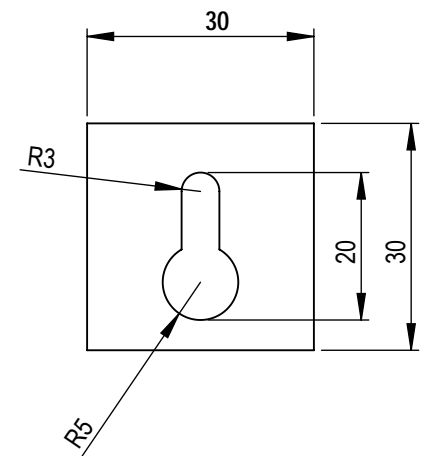
4.0mm THK ACP SHEET FIXED ON
MS ANGLE FRAME BY CSK SCREW
APPROVED VINYL PASTED OVER IT

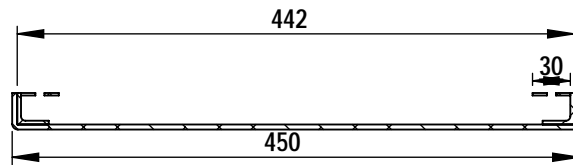


SECTION A-A
SCALE 1 : 4



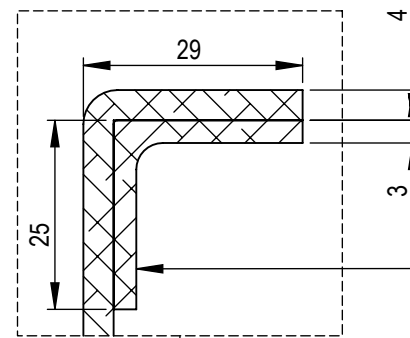
2.0MM THK MS 30X30 SQ
WELD WITH MS ANGLE FRAME





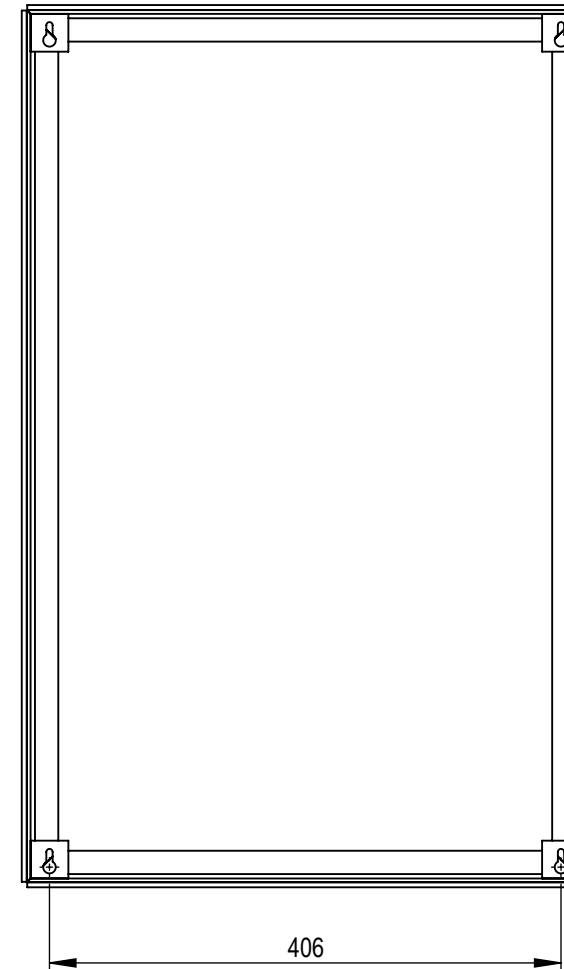
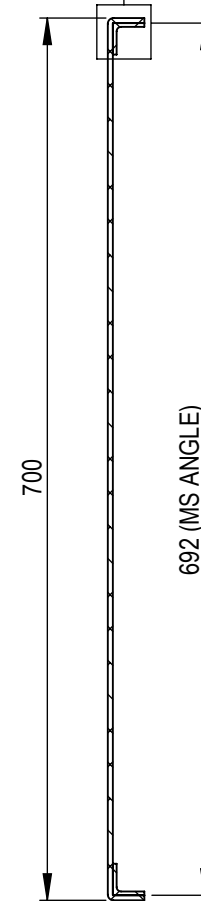
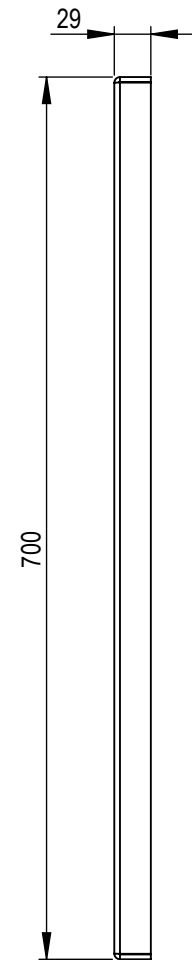
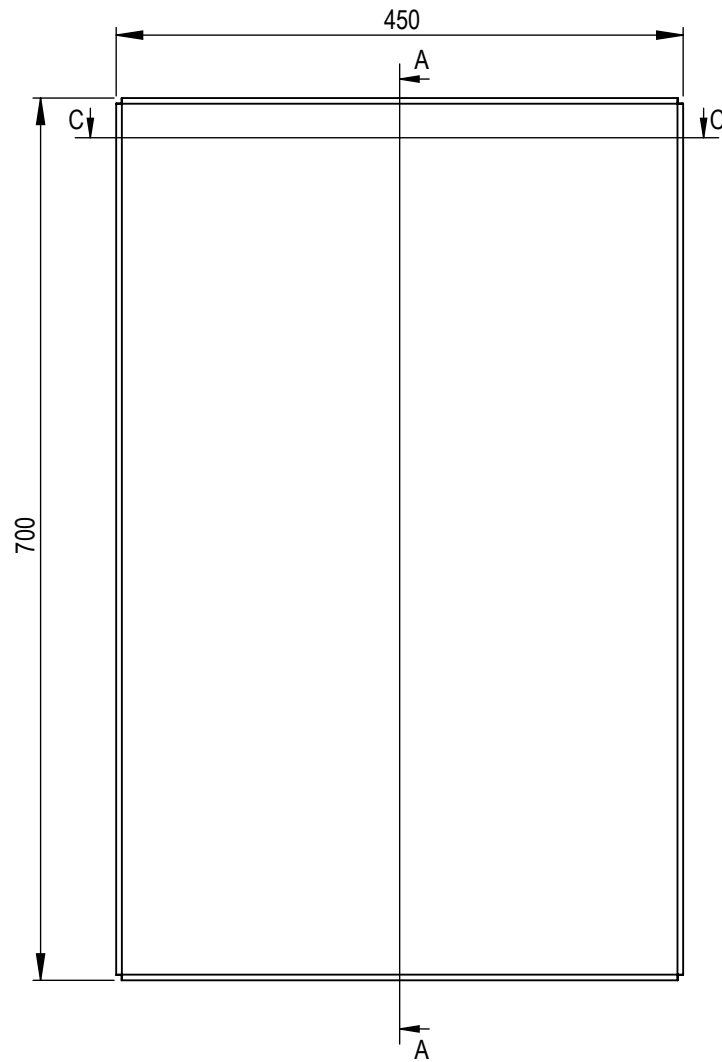
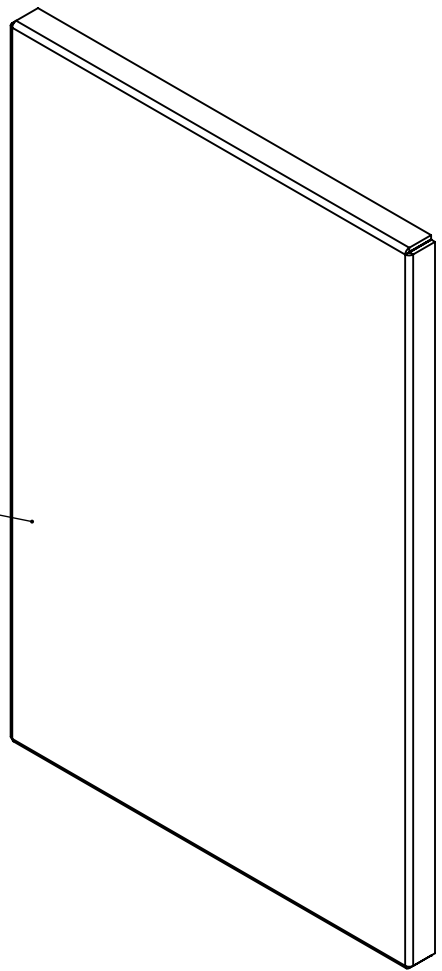
SECTION C-C
SCALE 1 : 6

450X700
(2.1.5b)
NON -LIT SIGN

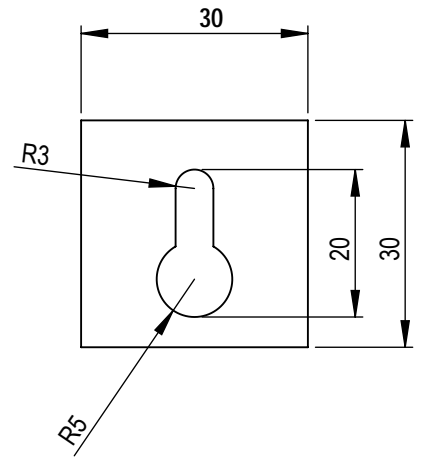


25X25X3.0mm THK MS ANGLE
FINISH RAL CLASSIC 7046 PC

4.0mm THK ACP SHEET FIXED ON
MS ANGLE FRAME BY CSK SCREW
APPROVED VINYL PASTED OVER IT

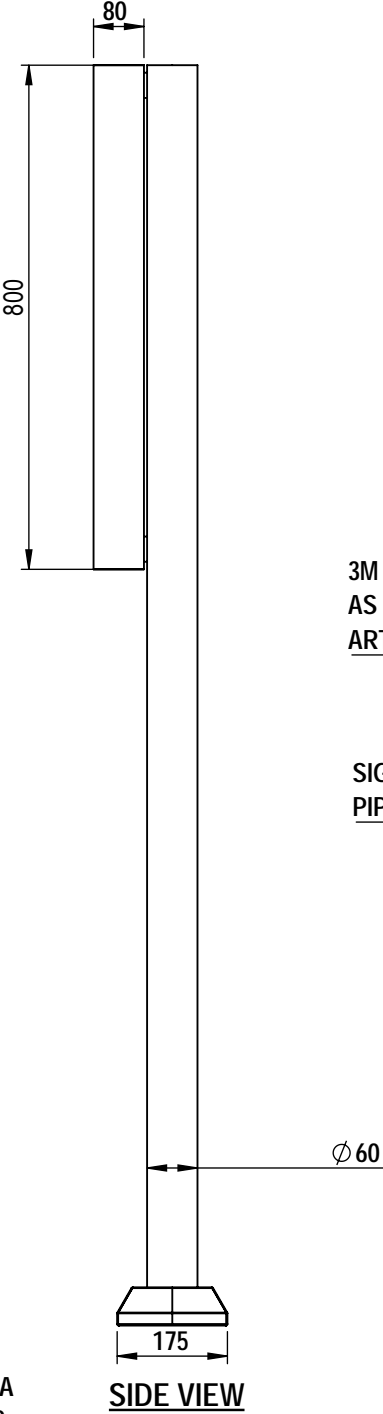
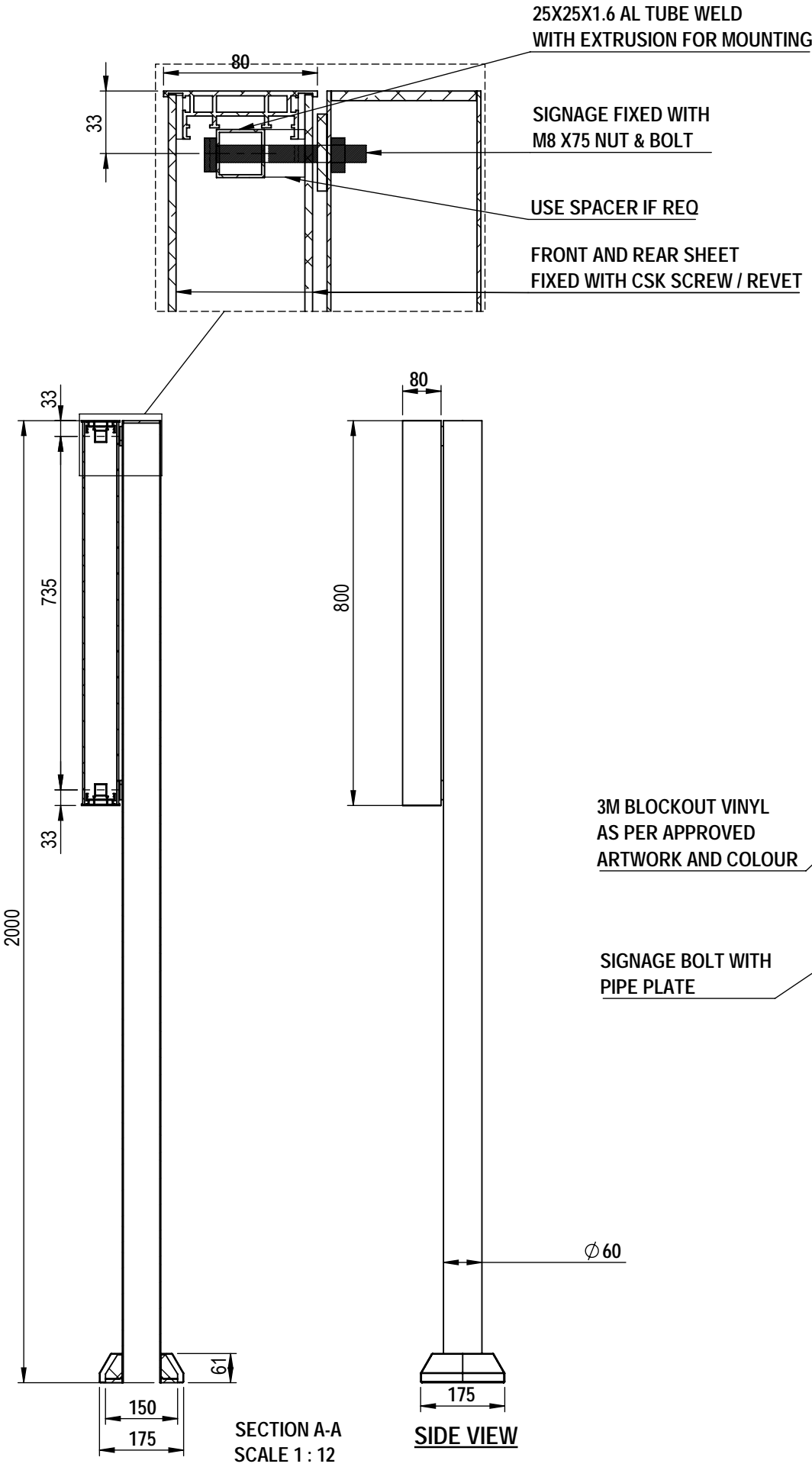
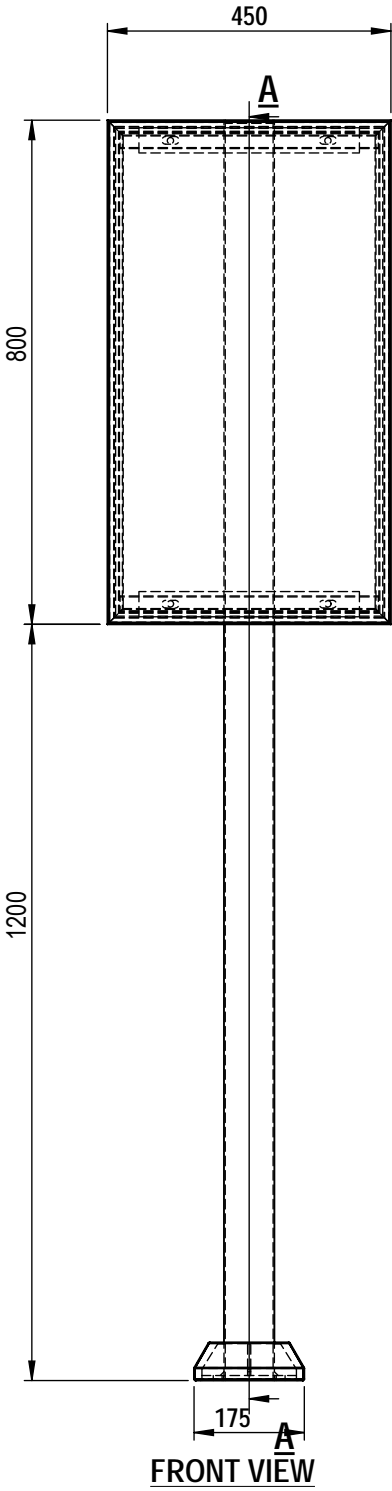
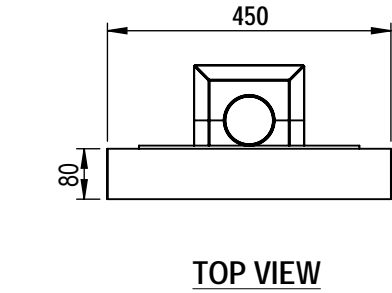


2.0MM THK MS 30X30 SQ
WELD WITH MS ANGLE FRAME



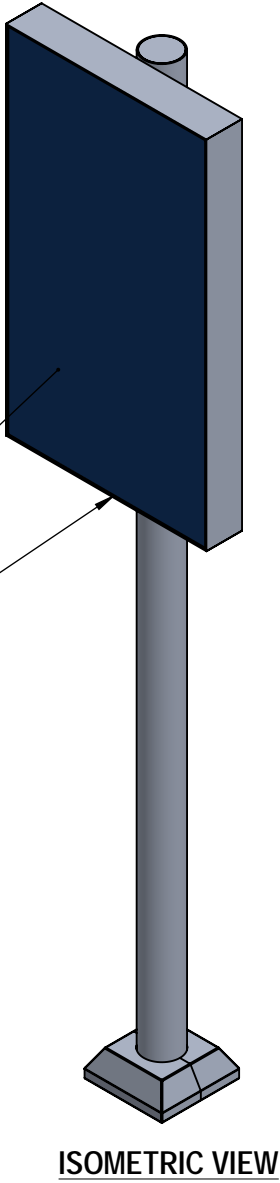
SECTION A-A
SCALE 1 : 6

3.1.1c

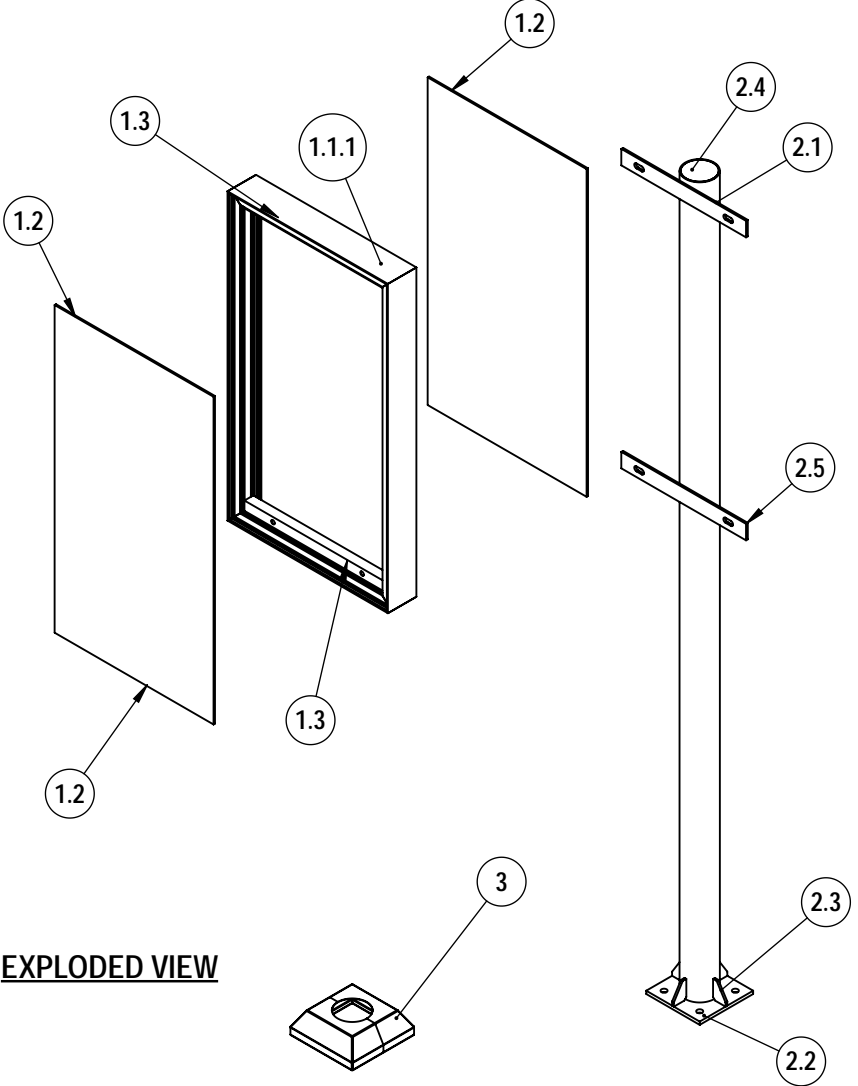


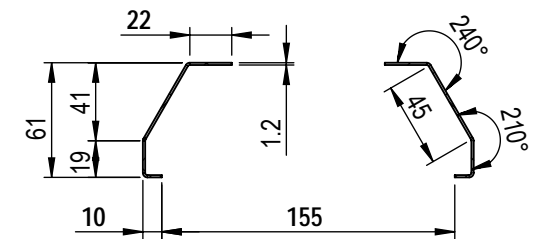
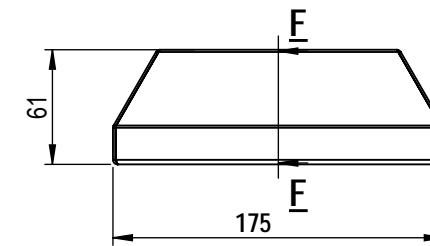
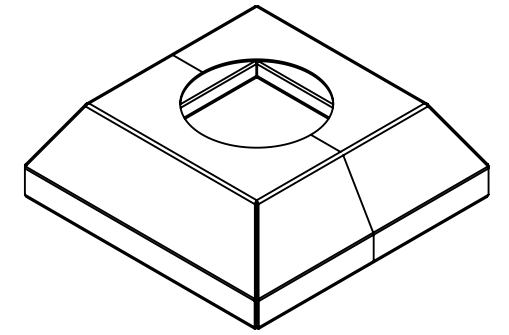
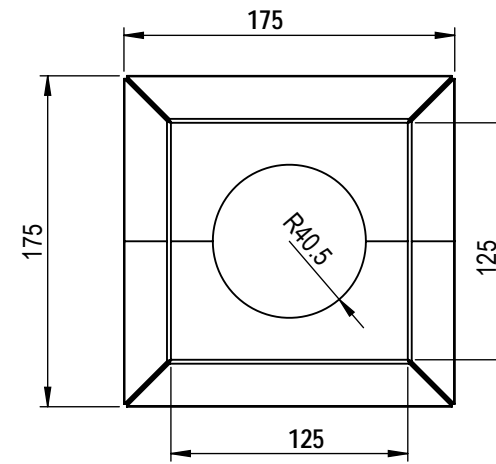
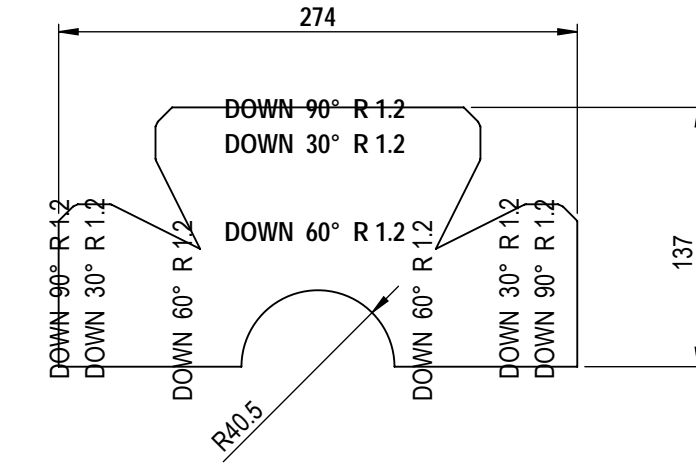
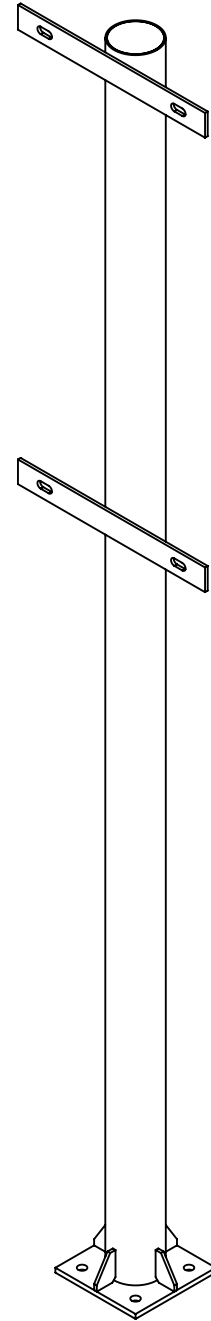
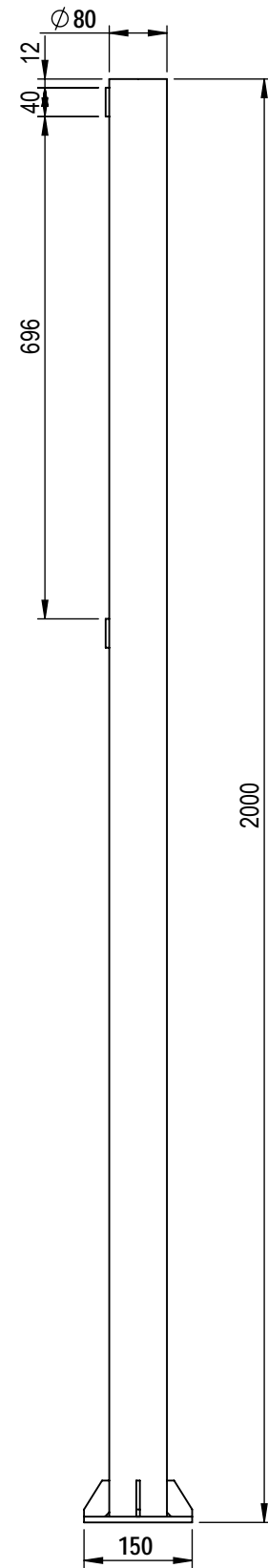
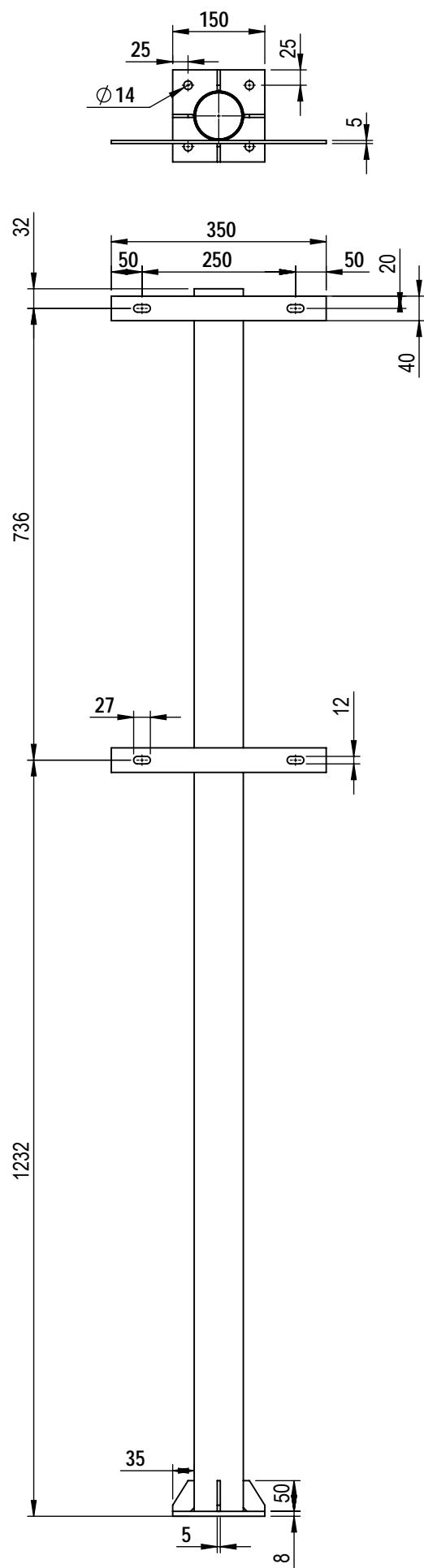
3M BLOCKOUT VINYL
AS PER APPROVED
ARTWORK AND COLOUR

SIGNAGE BOLT WITH
PIPE PLATE



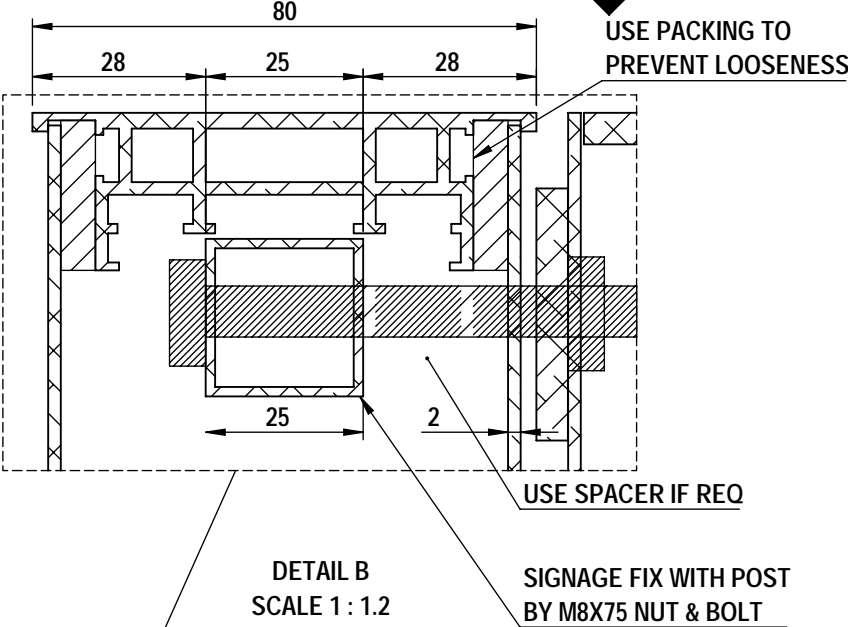
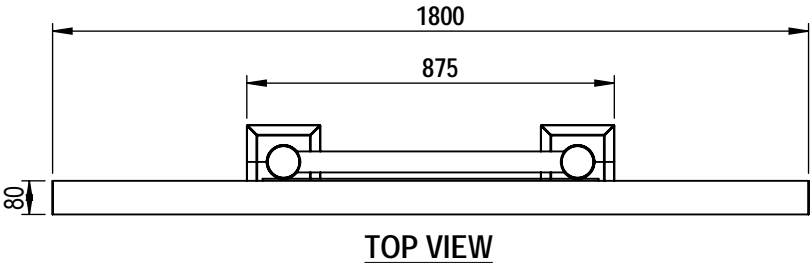
ITEM NO.	DESCRIPTION	LENGTH	FINISH	QTY.
1	SIGNAGE ASSEMBLY			1
1.1	AL EXTRUSION FRAME			1
1.1.1	80mm AL EXTRUSION PROFILE	450	RAL CLASSIC 7046 PC	2
1.1.2	80mm AL EXTRUSION PROFILE	800	RAL CLASSIC 7046 PC	2
1.2	4 MM THK ACP			2
1.3	25X25X1.6 AL TUBE WELD WITH EXTRUSION			2
2	POST ASSEMBLY		SS 316 GRADE	1
2.1	SS PIPE DIA 60 X 2 THK	2000	SS 316	1
2.2	150 X 150 X 8 SS BASE PLATE		SS 316	1
2.3	35 X50 X 5 RIB		SS 316	4
2.4	END CAP		SS 316	1
2.5	350X40X5.0mm THK STRIP WELD WITH PIPE		SS 316	2
3	1.2mm THK COVER PLATE		SS 316	1



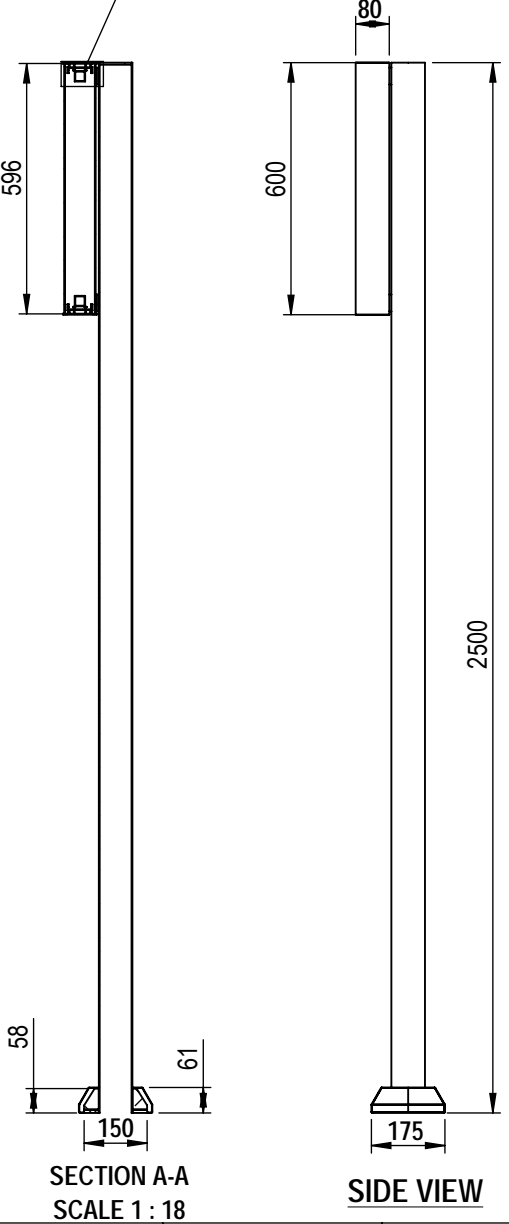
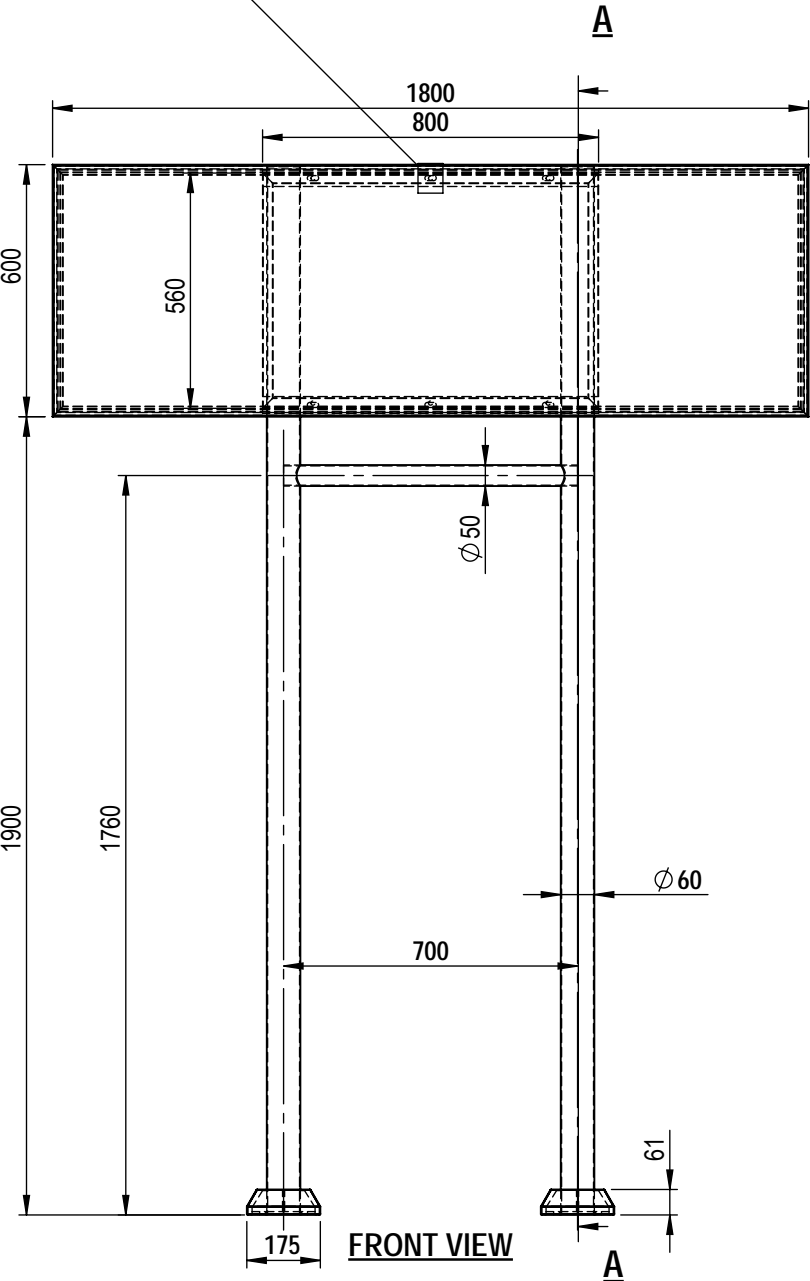


SECTION F-F
SCALE 1 : 4

3.1.1.d



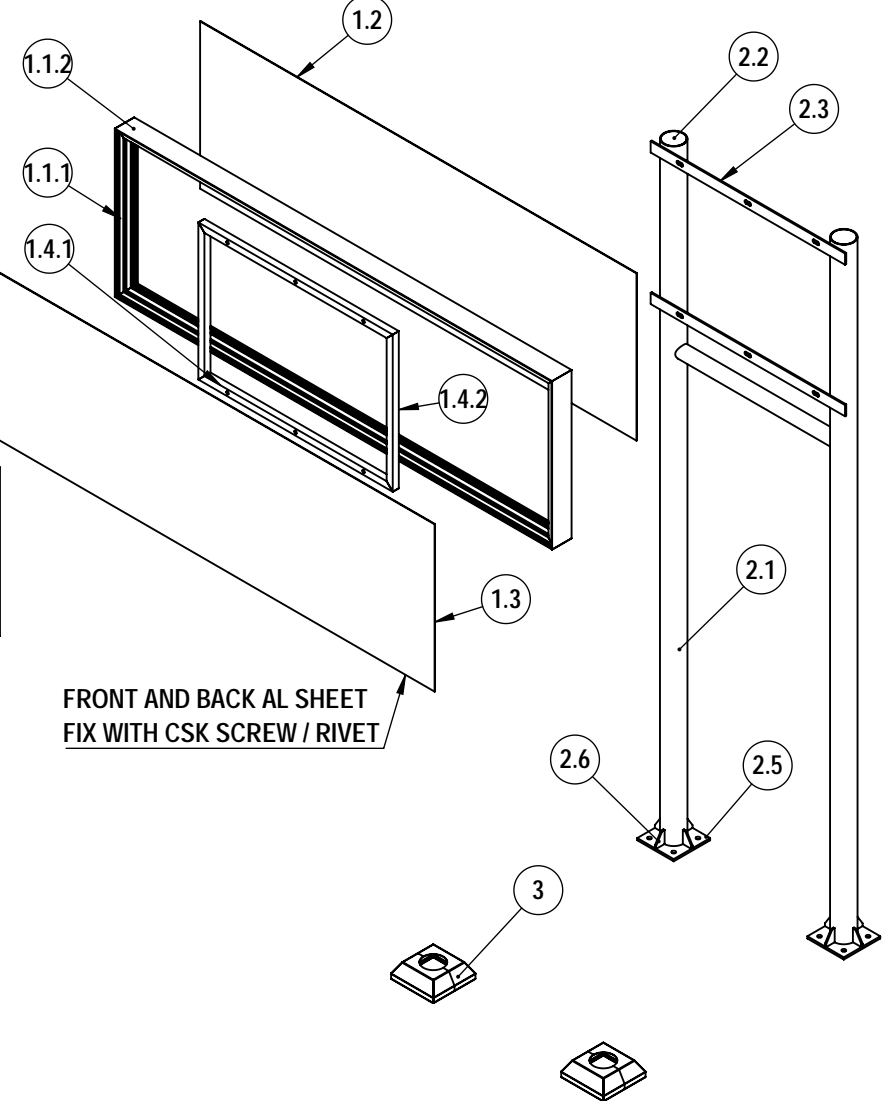
ITEM NO.	DESCRIPTION	LENGTH	FINISH	QTY.
1	SIGNAGE ASSEMBLY			1
1.1	AL EXTRUSION FRAME			1
1.1.1	80mm AL EXTRUSION PROFILE	600	RAL CLASSIC 7046 PC	2
1.1.2	80mm AL EXTRUSION PROFILE	1800	RAL CLASSIC 7046 PC	2
1.2	2 MM THK AL SHEET AT FRONT		RAL 9010 WHITE PC	1
1.3	2.0mm THK AL SHEET AT REAR		RAL CLASSIC 7046 PC	1
1.4	25X25X1.6 AL FRAME WELD WITH EXTRUSION			1
1.4.1	25X25X1.6 AL PIPE	800	RAL CLASSIC 7046 PC	2
1.4.2	25X25X1.6 AL PIPE	560	RAL CLASSIC 7046 PC	2
2	POST ASSEMBLY			1
2.1	DIA 60X2mm THK SS 316 GRADE PIPE	2500		2
2.2	3.0mm THK SS 316 GRADE END CAP			2
2.3	800X40X5.0mm SS 316 GRADE STRIP WELD WITH PIPE			2
2.4	DIA 50X2mm THK SS 316 GRADE PIPE	700		1
2.5	150X150X8.0mm THK SS 316 GRADE BASE PLATE			2
2.6	50X35X5.0mm THK SS 316 GRADE GUSSET PLATE			8
3	1.2mm THK COVER PLATE		SS 316	2



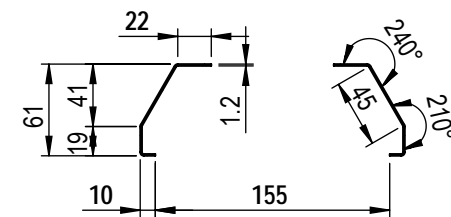
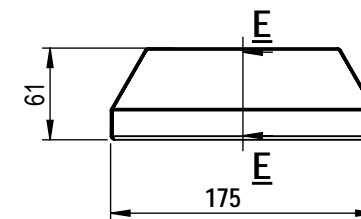
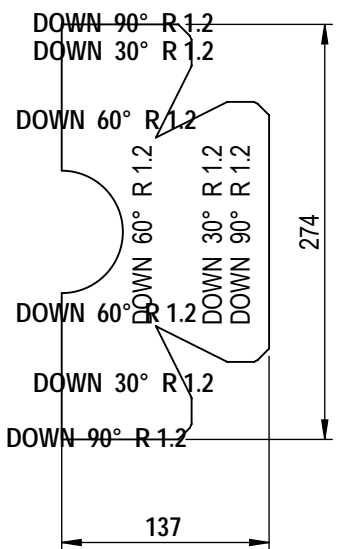
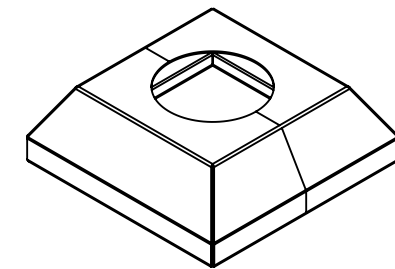
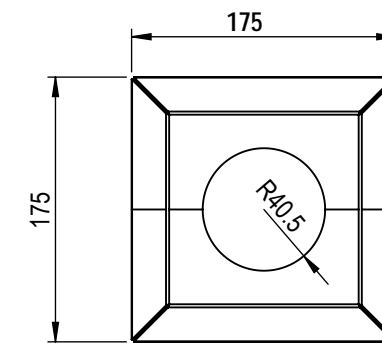
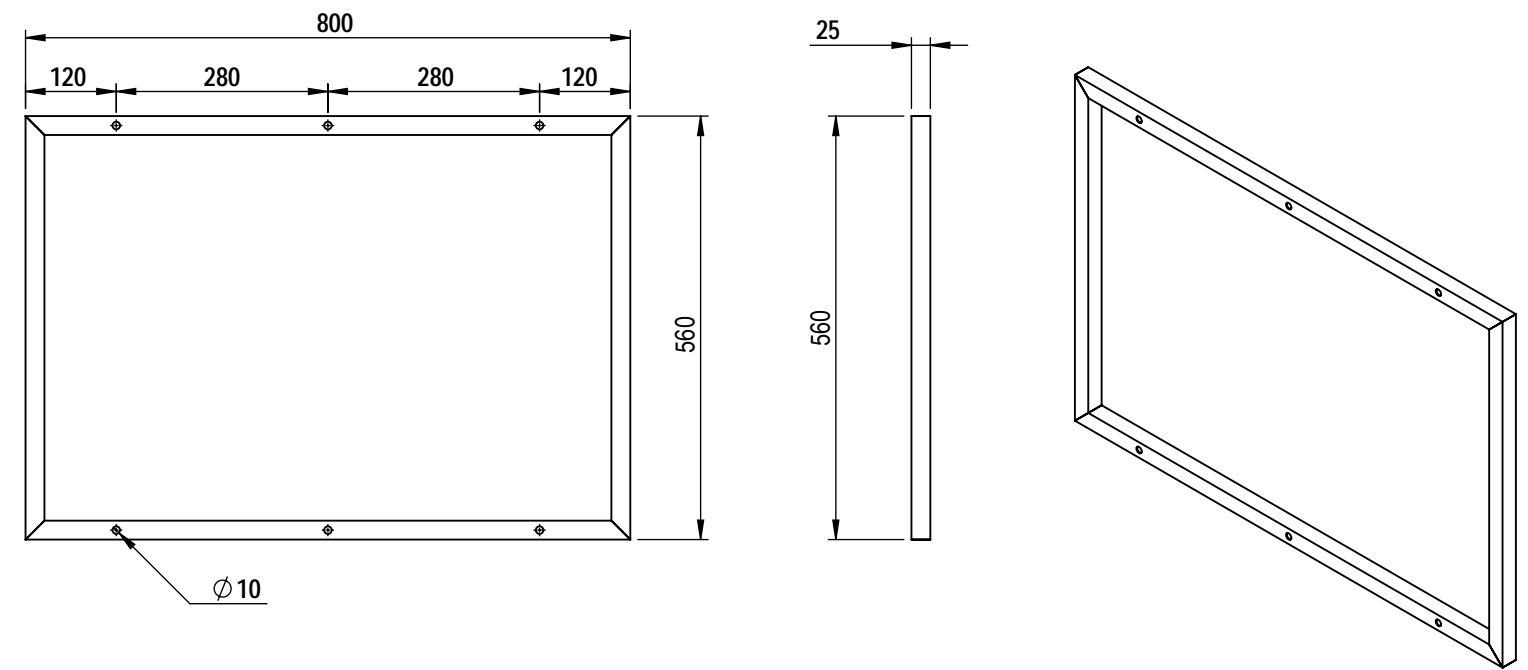
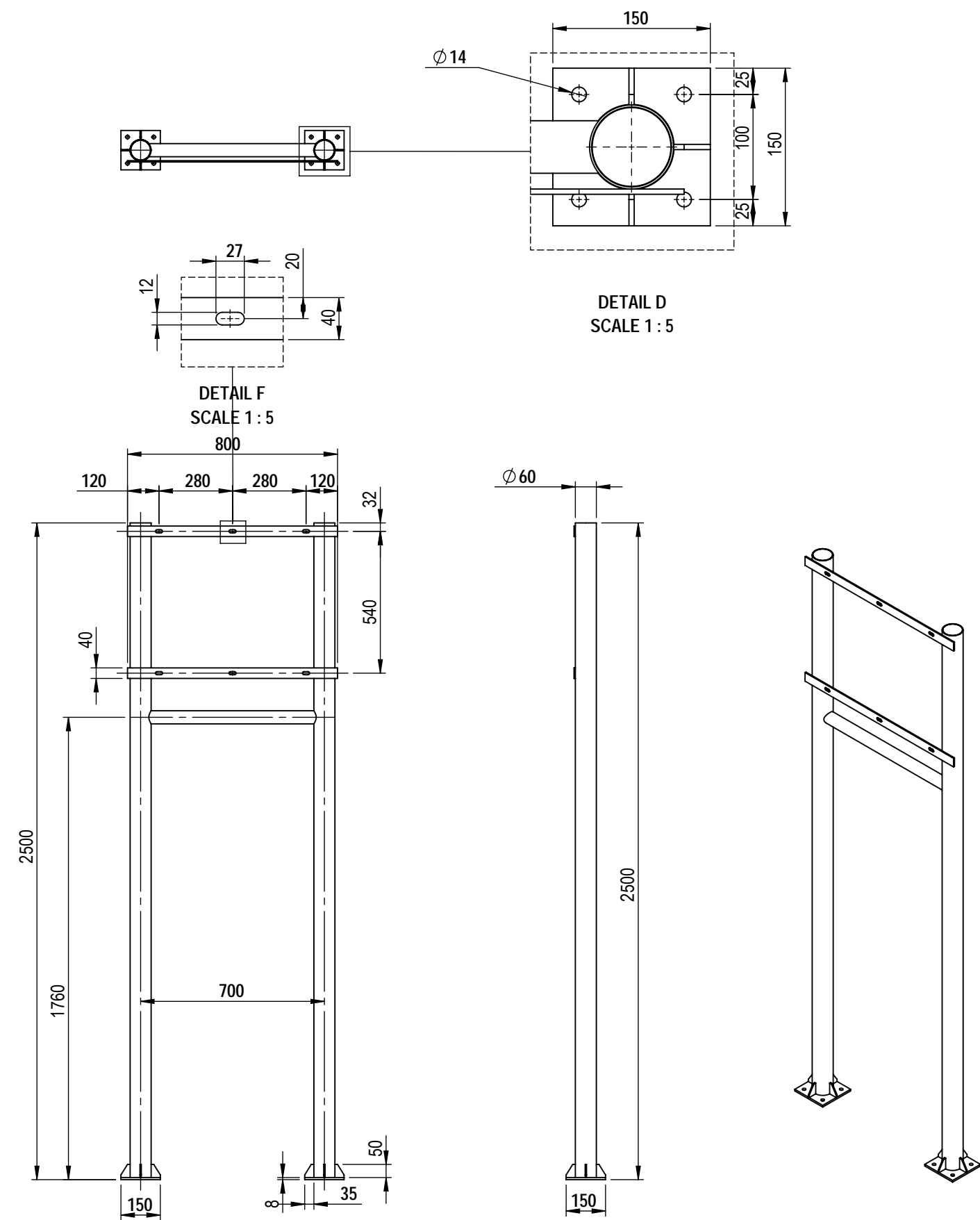
3M BLOCKOUT VINYL
AS PER APPROVED
ARTWORK AND COLOUR

SIGNAGE BOLT WITH
PIPE PLATE

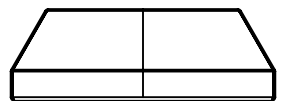
ISOMETRIC VIEW



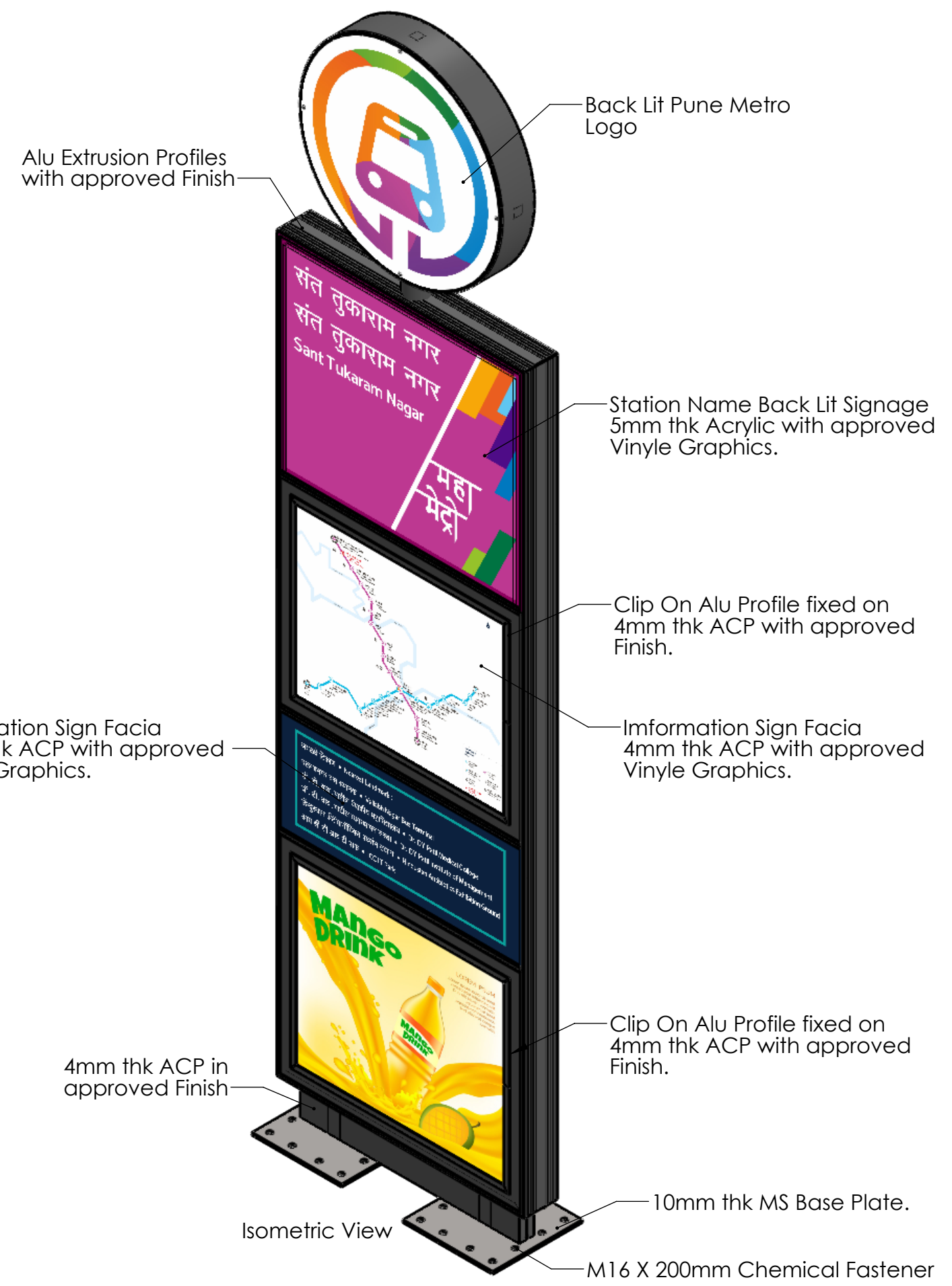
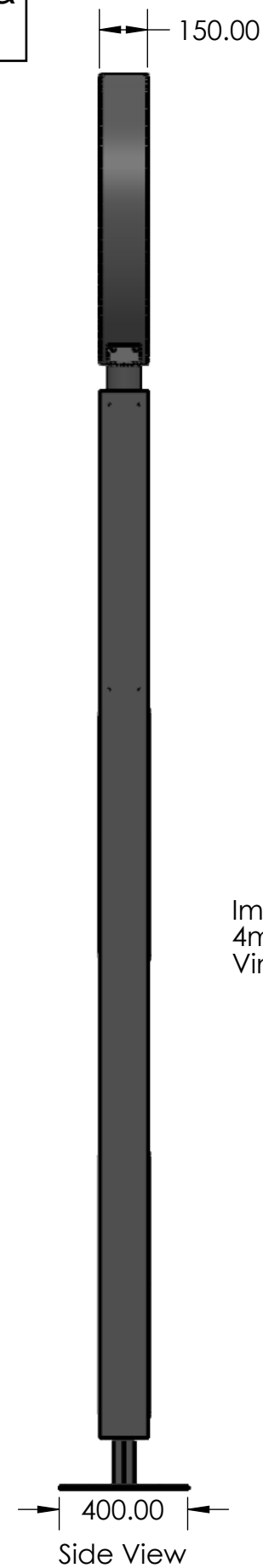
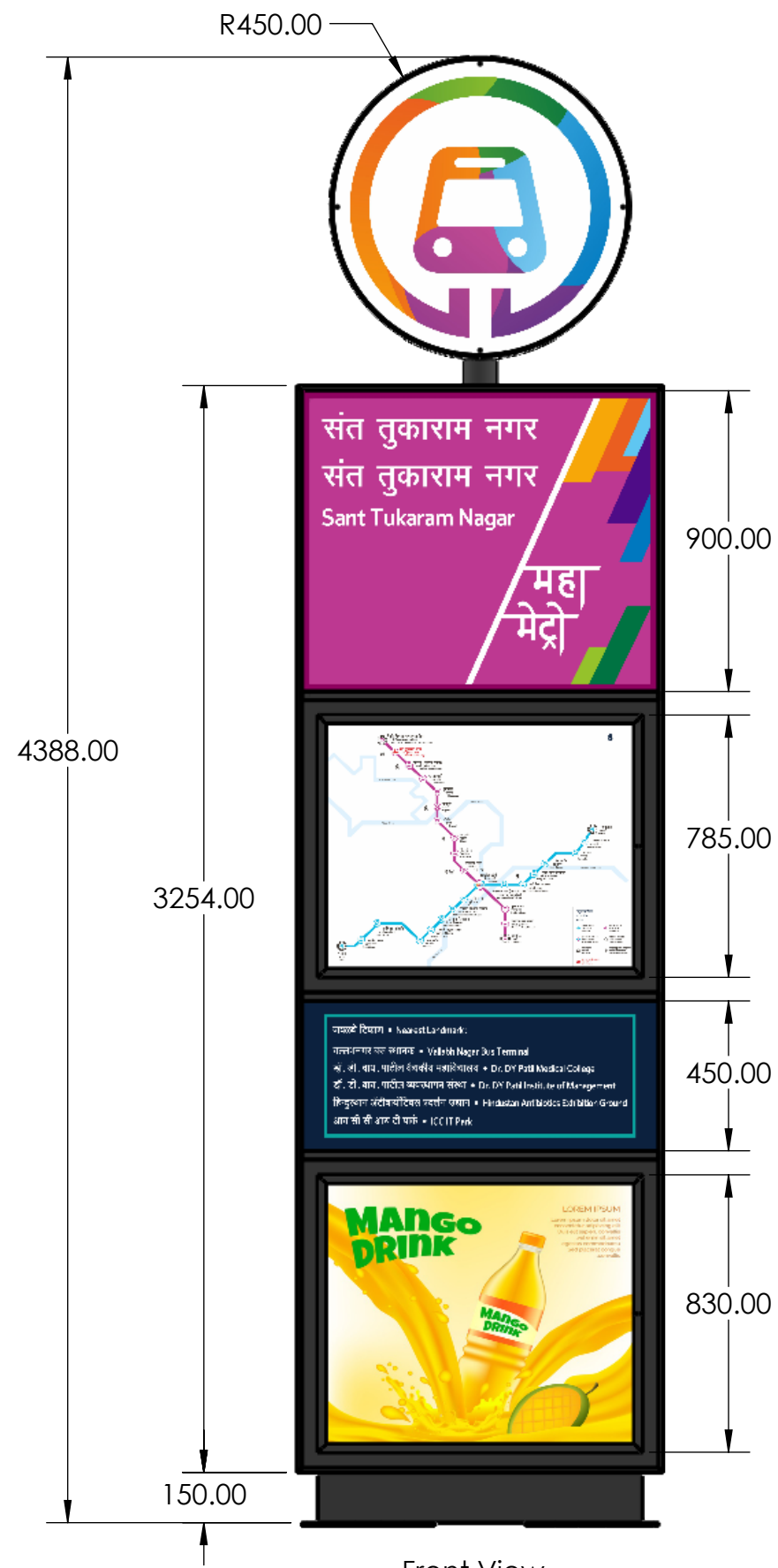
EXPLODED VIEW



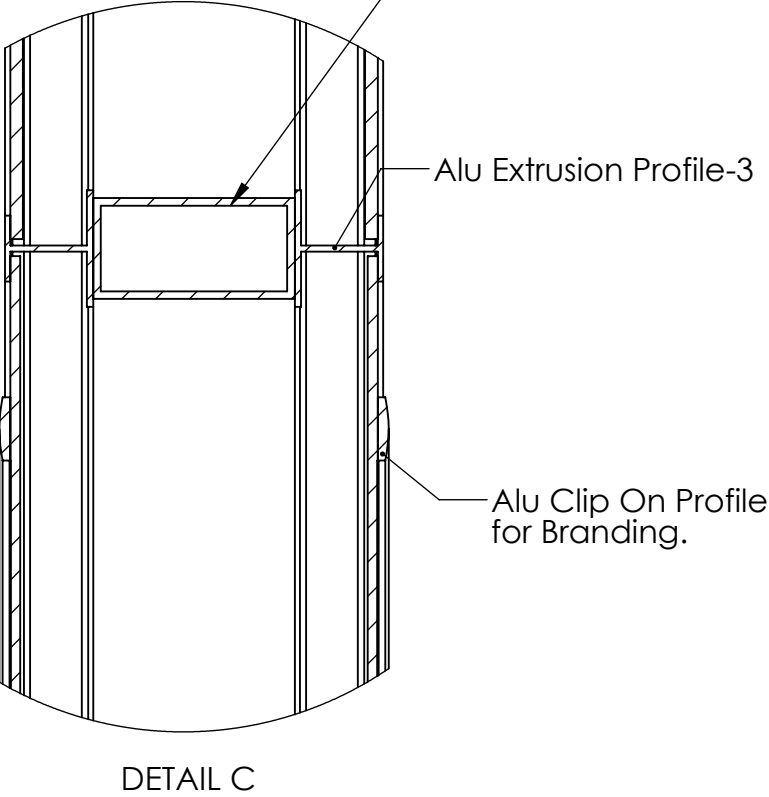
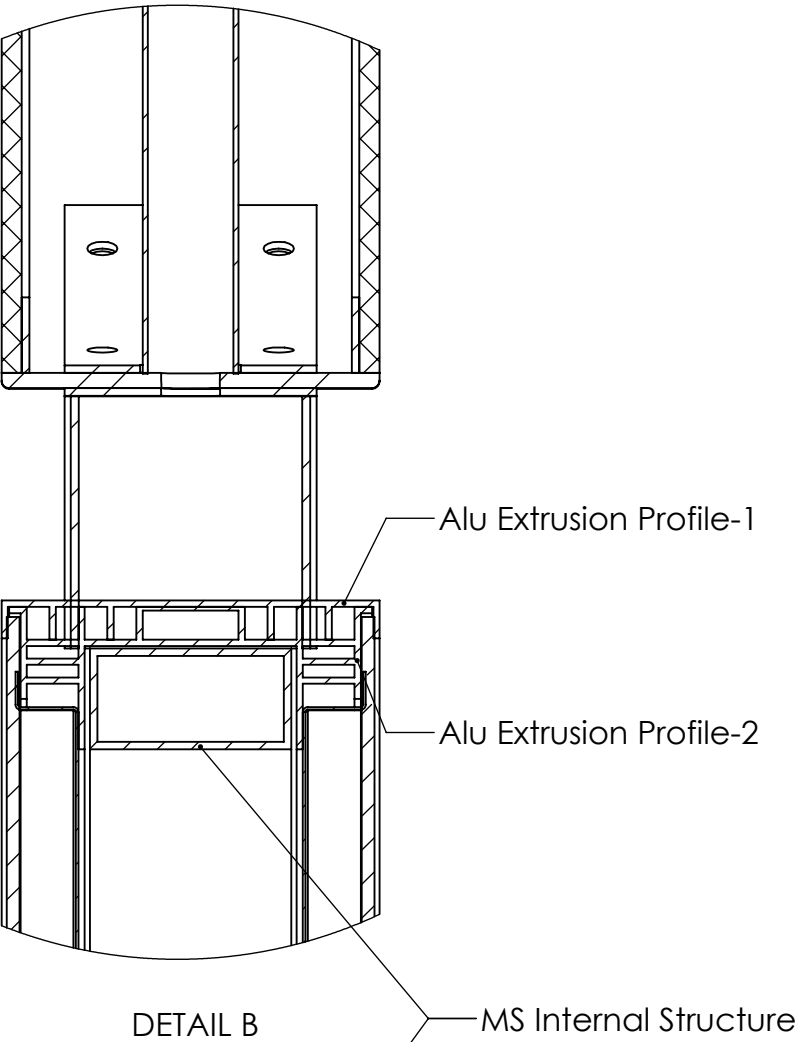
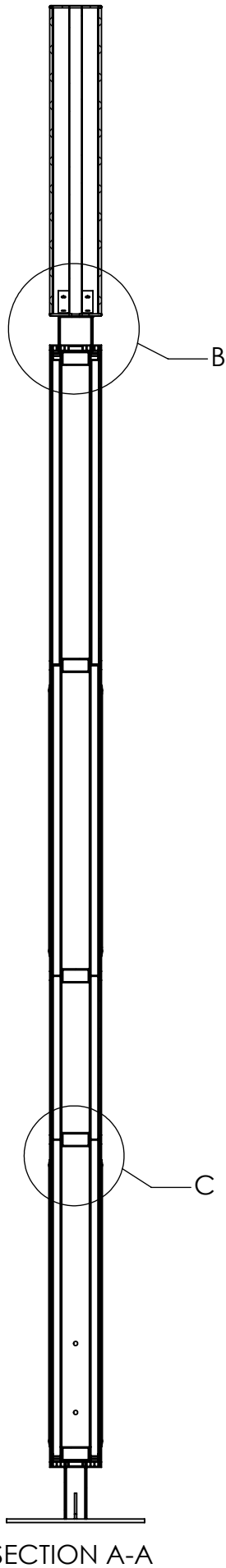
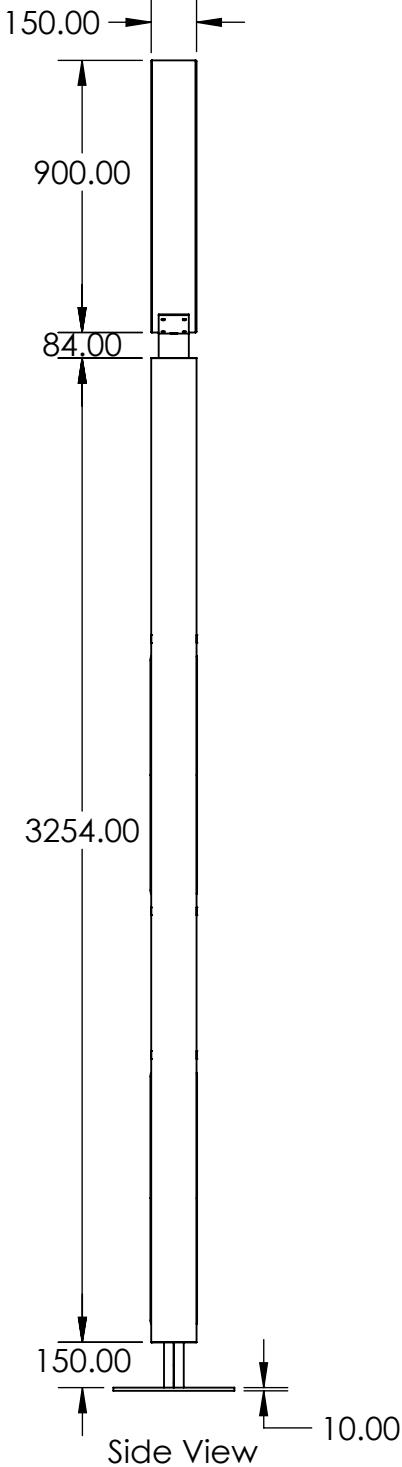
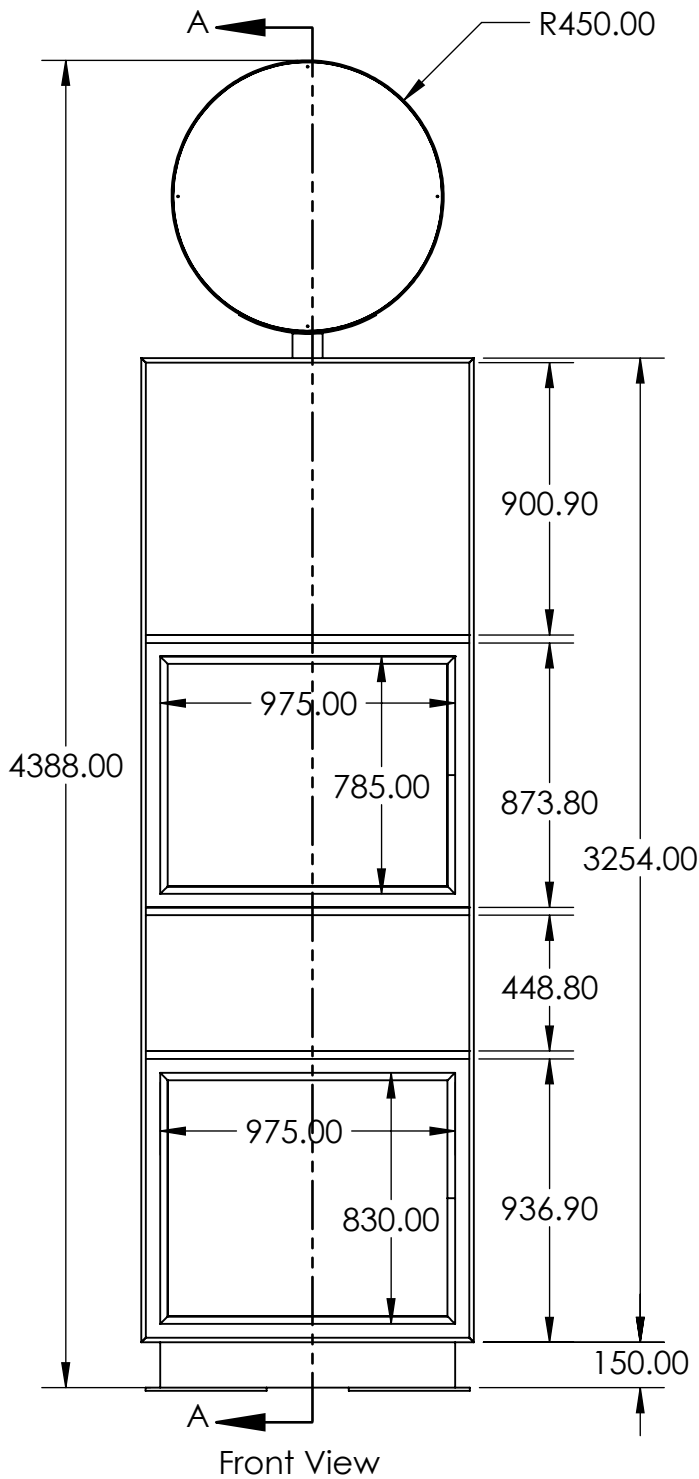
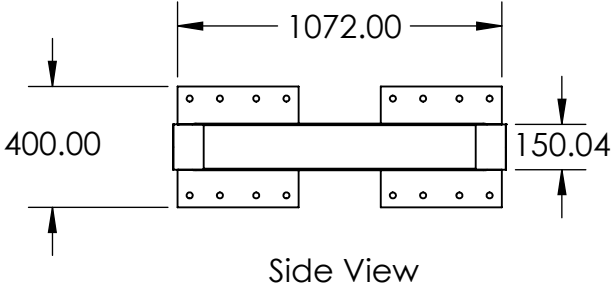
SECTION E-E
SCALE 1 : 5



5.1.2a

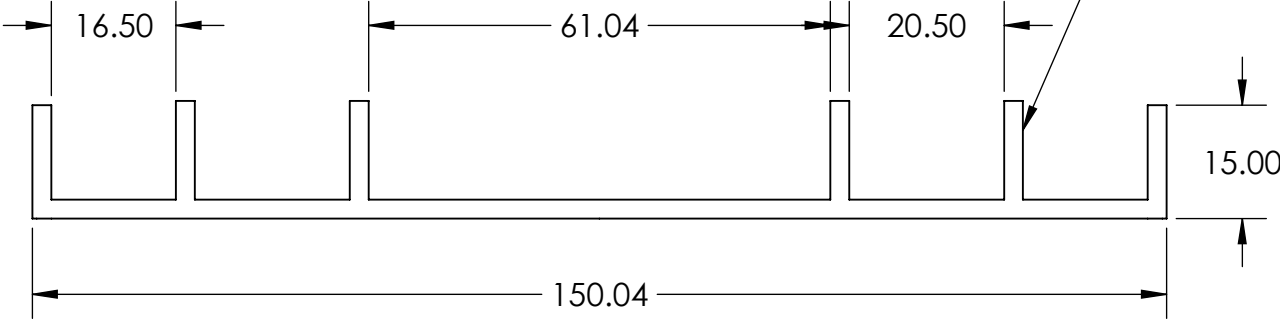


5.1.2a

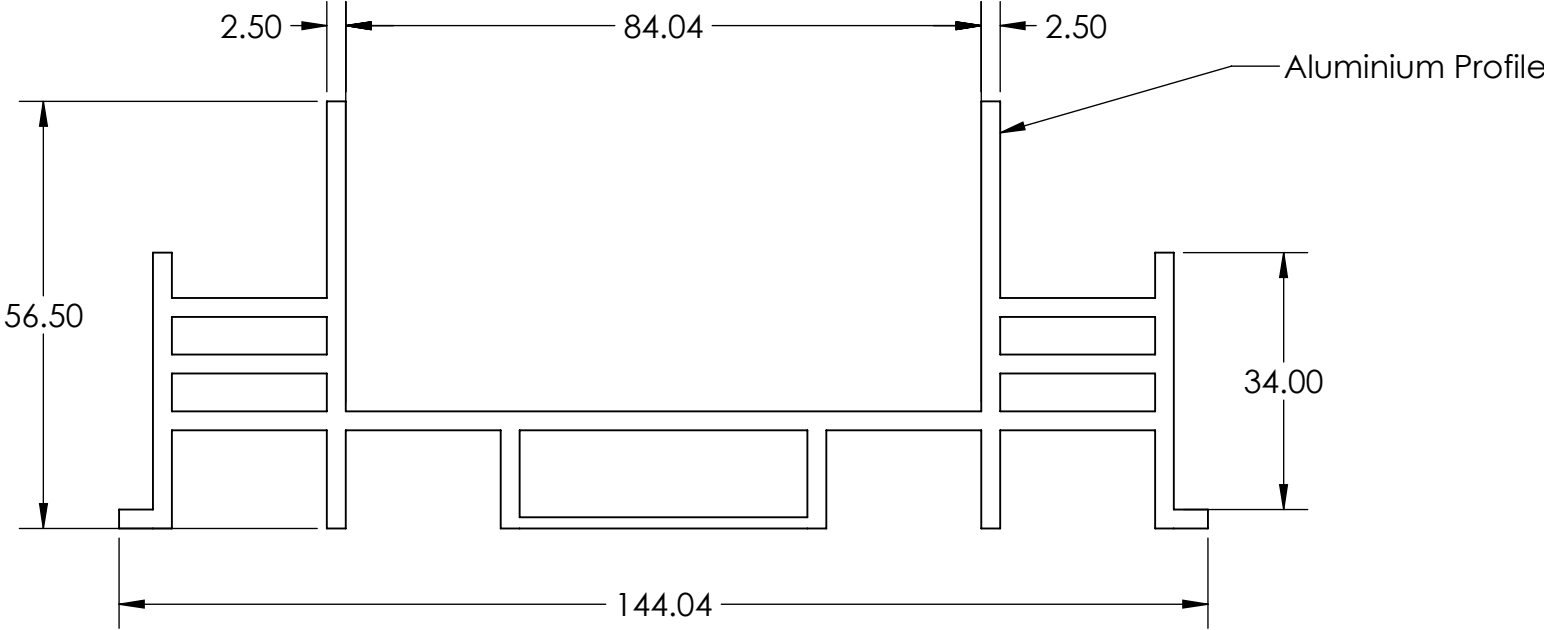


5.1.2a

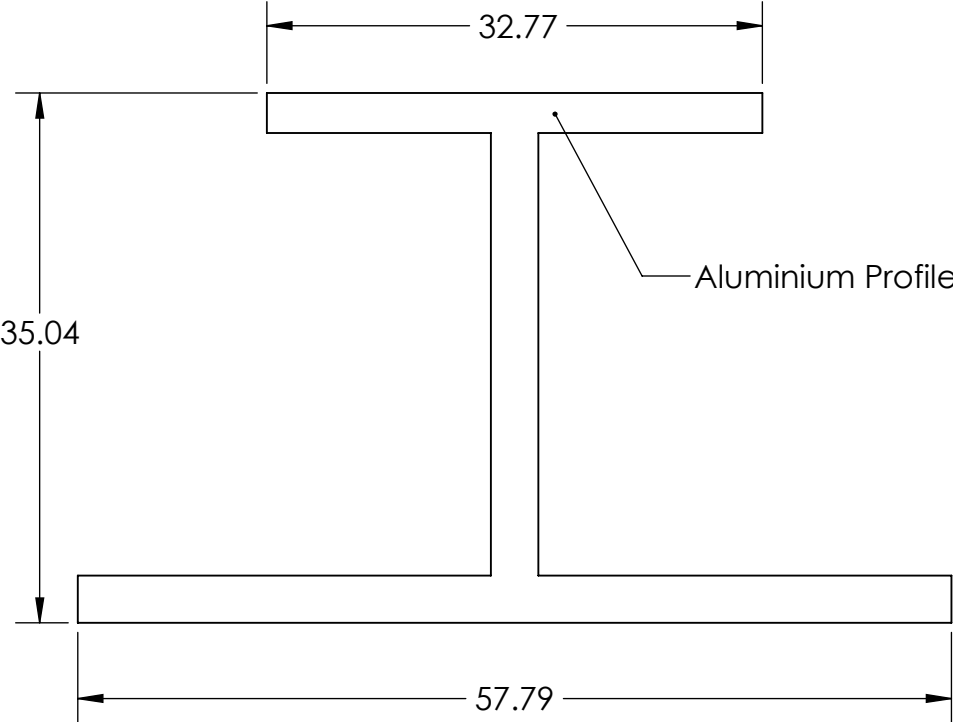
Aluminium Profile



PROFILE - 1



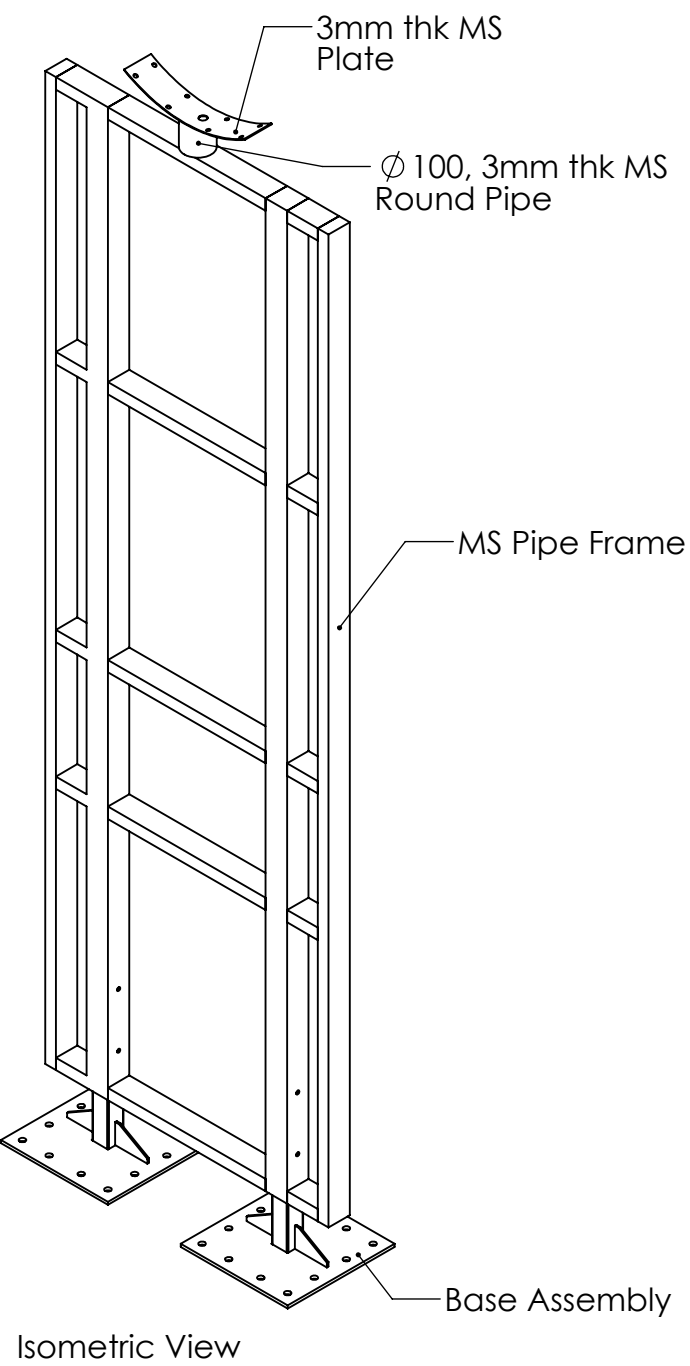
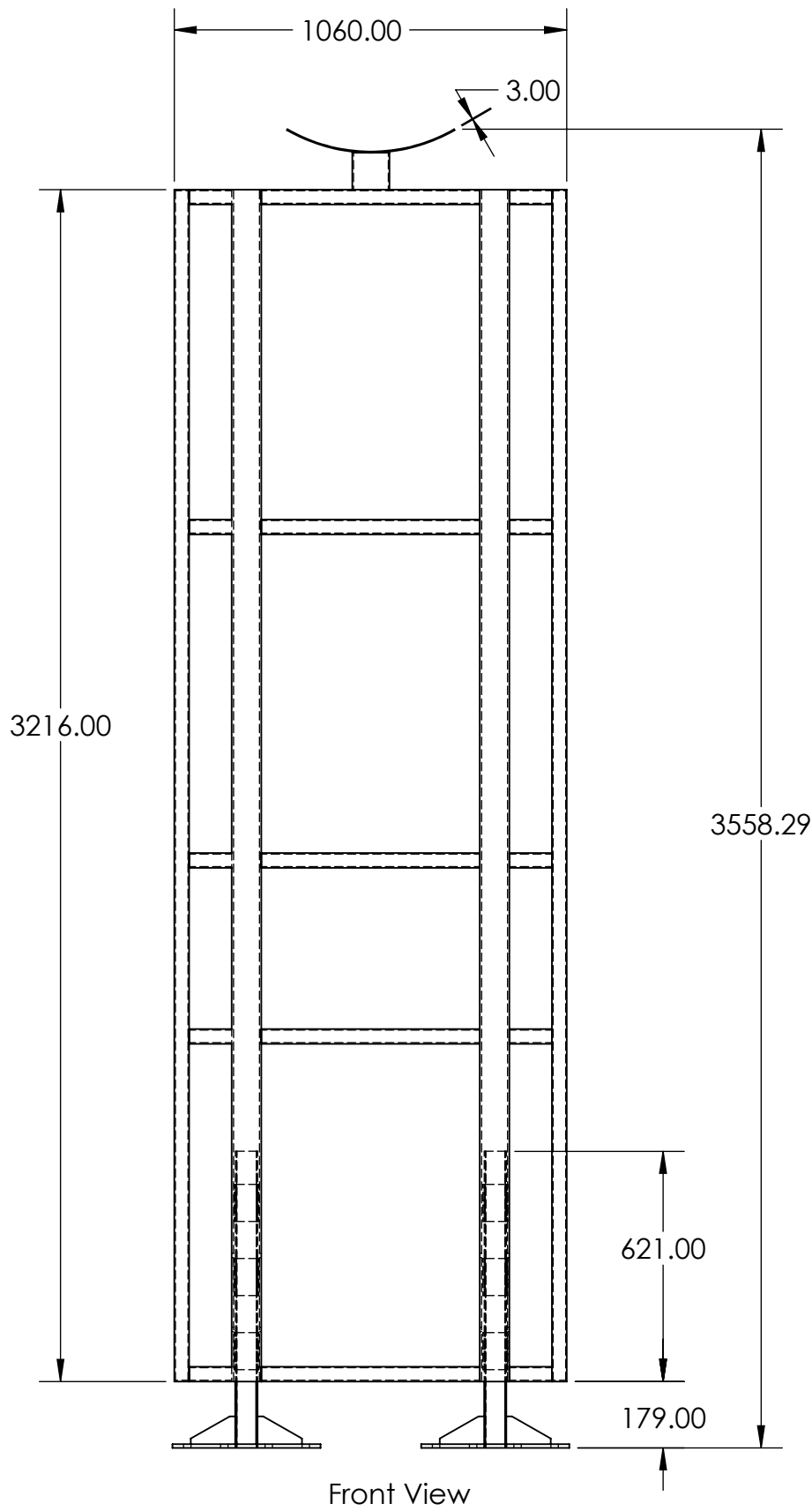
PROFILE - 2



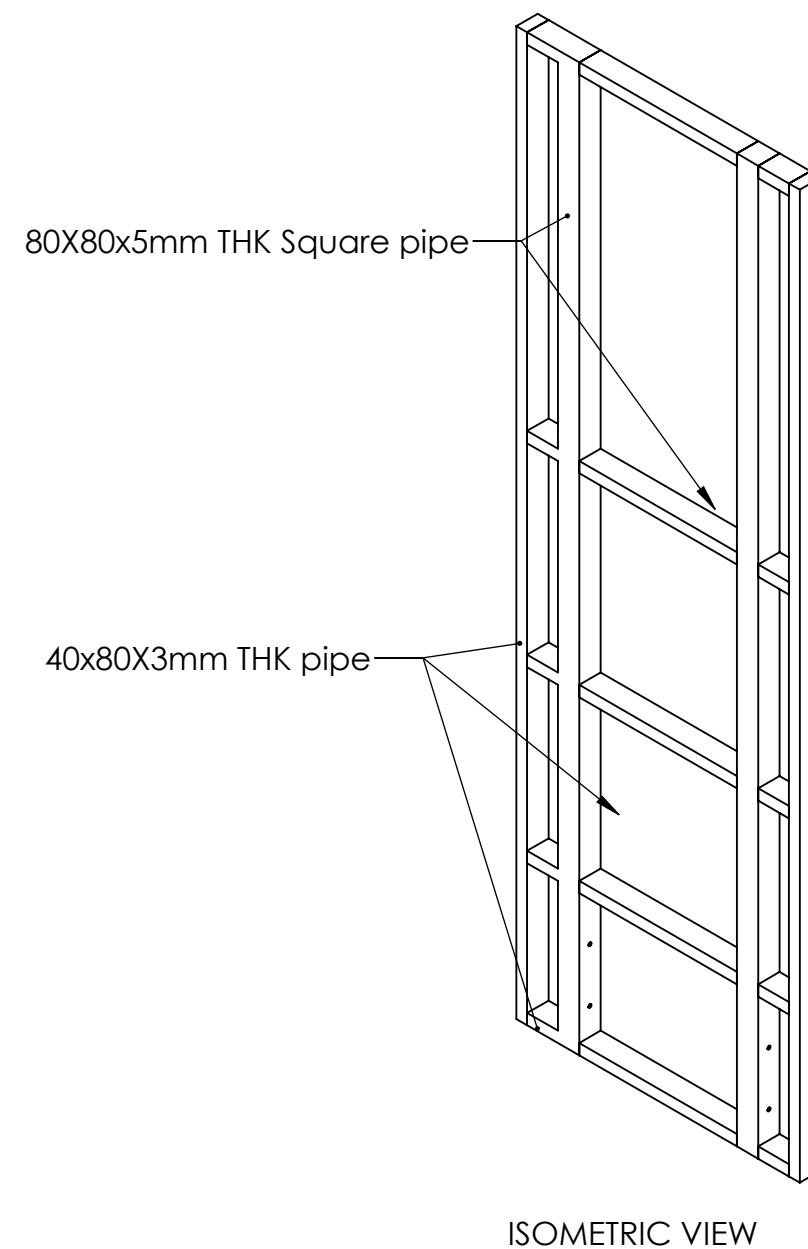
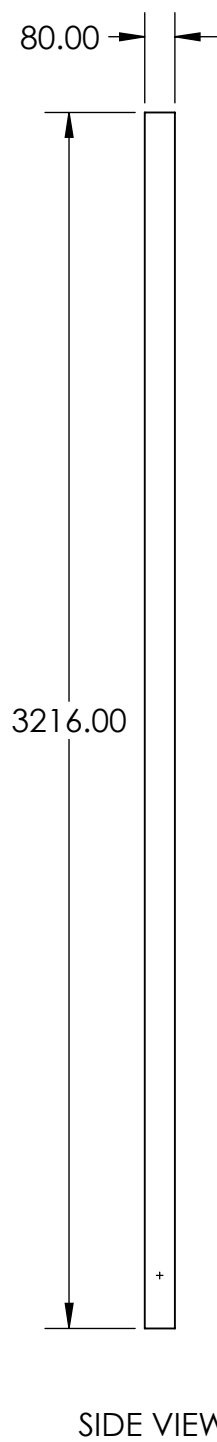
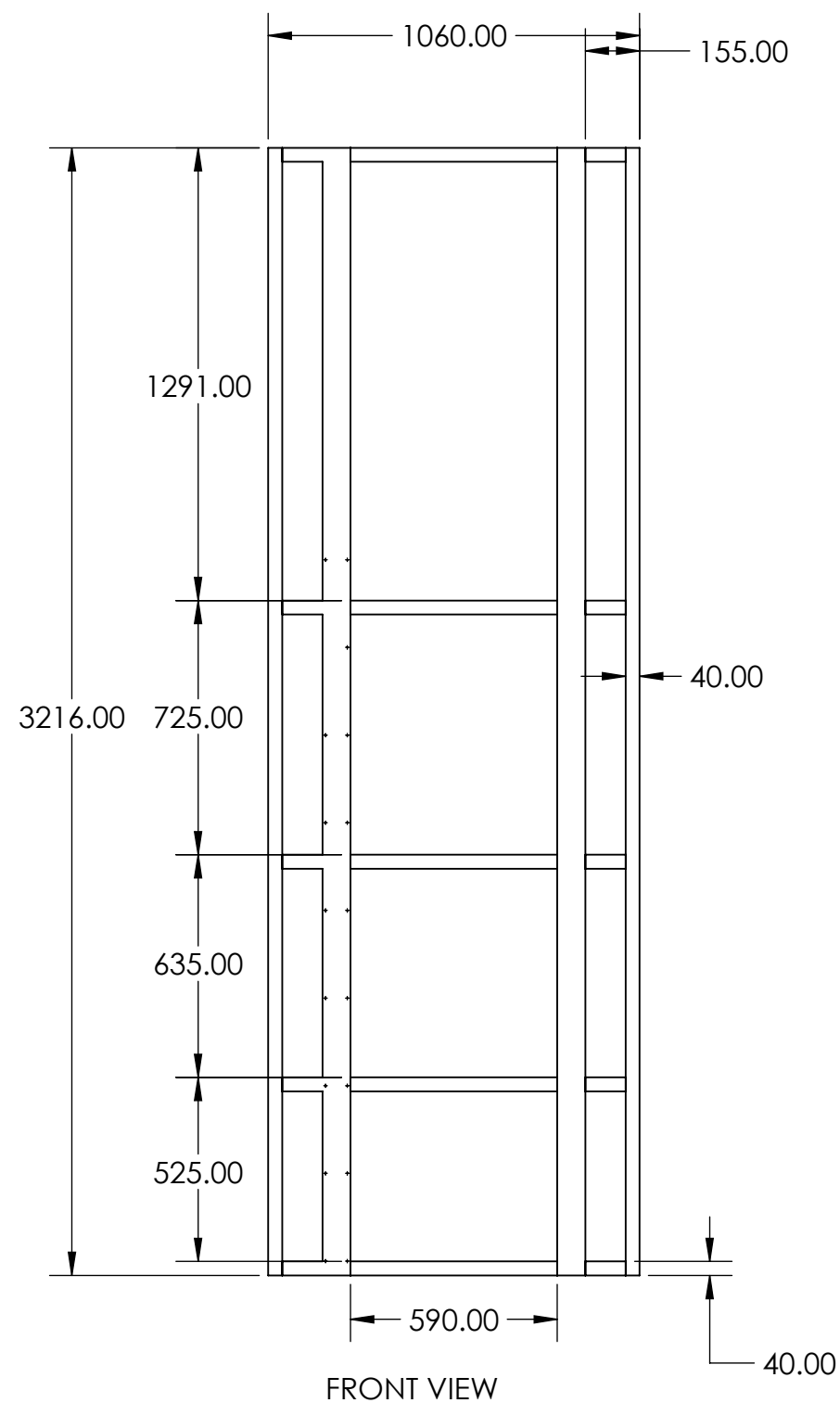
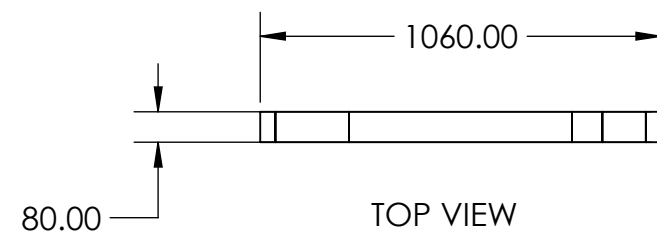
PROFILE - 3

Internal MS Structure

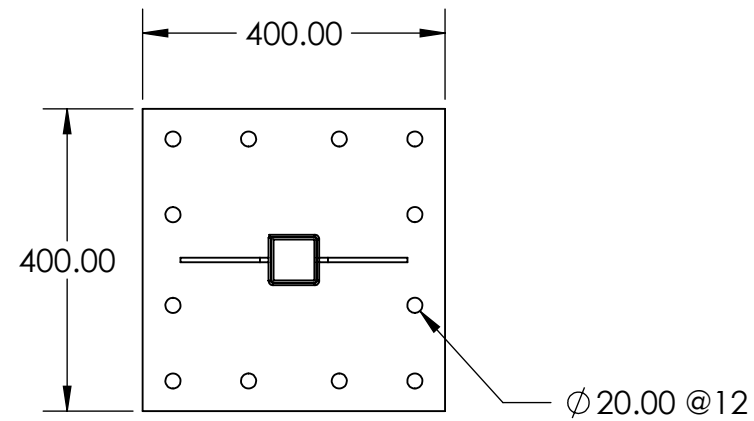
5.1.2a



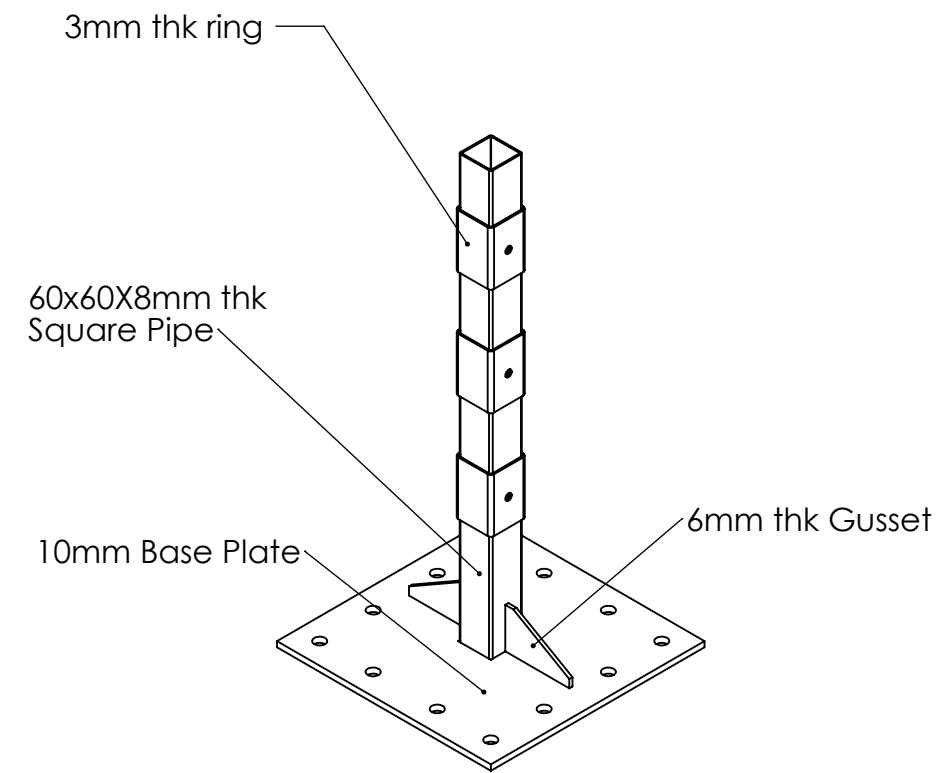
5.1.2a



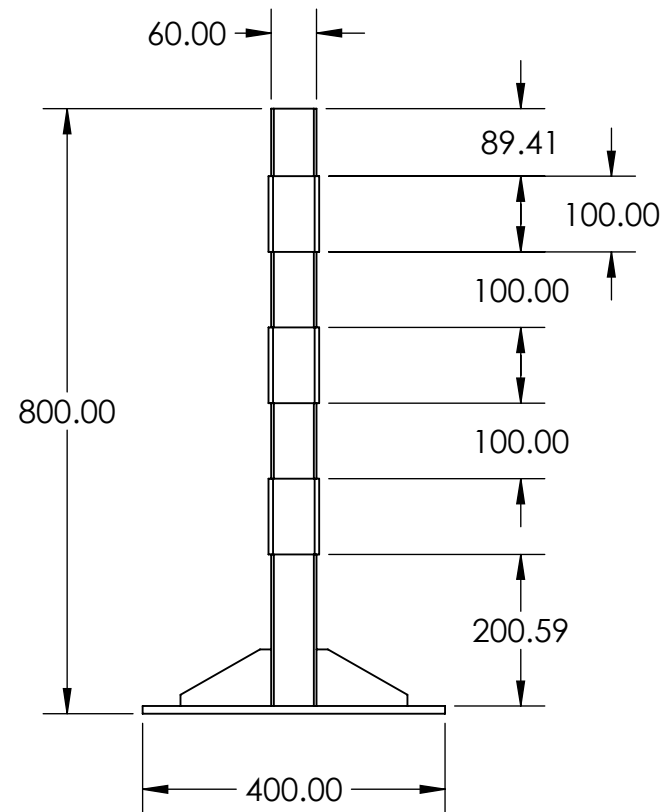
5.1.2a



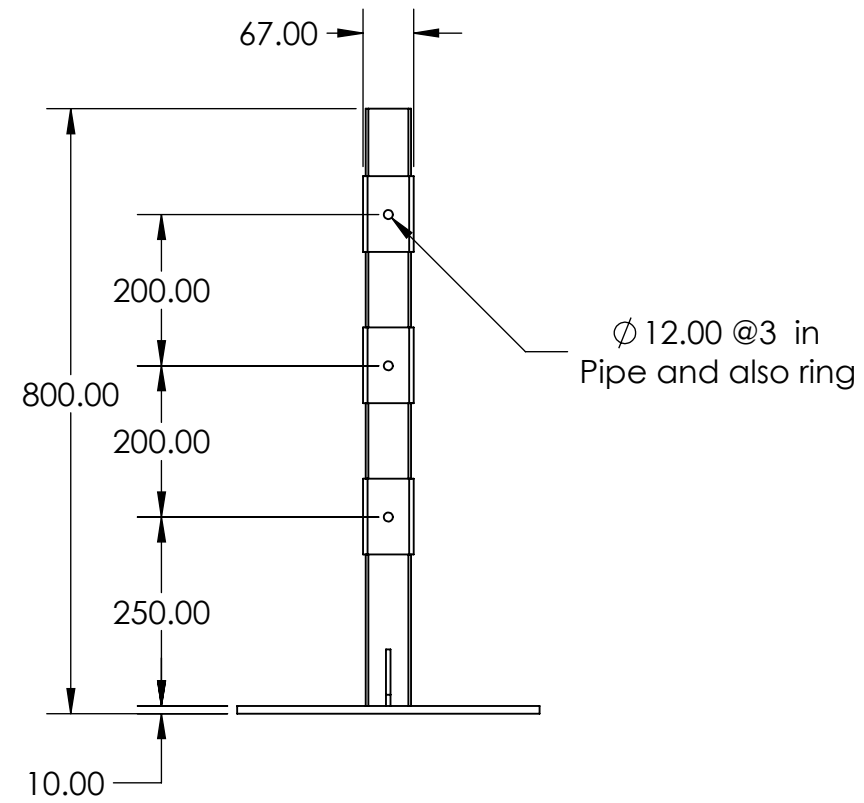
Top View



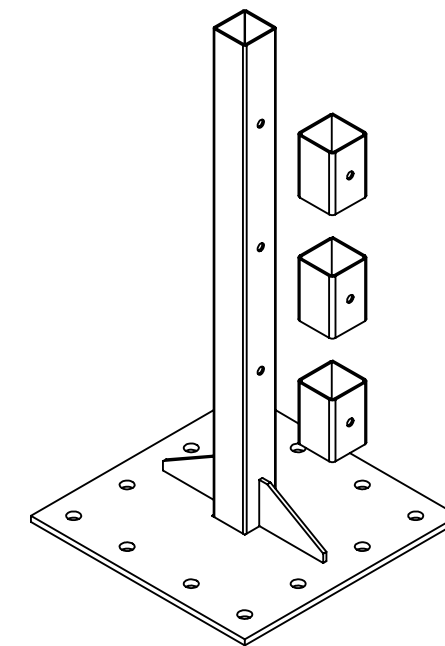
Isometric View



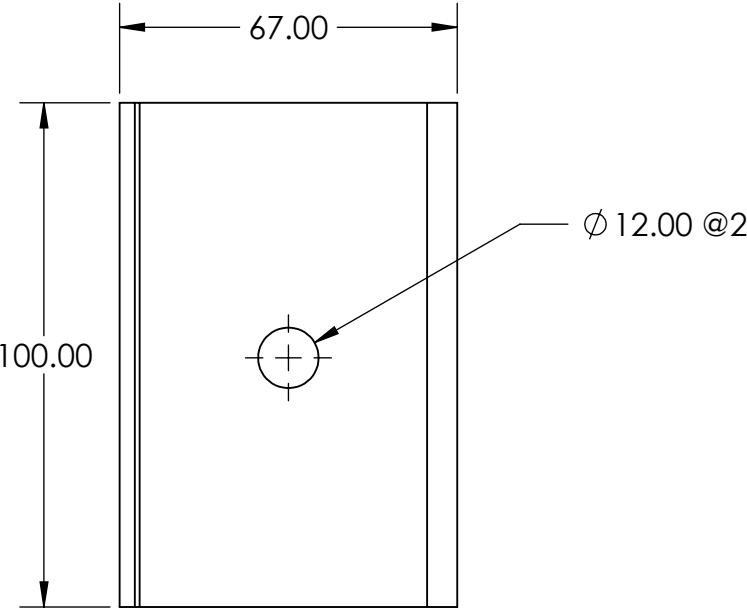
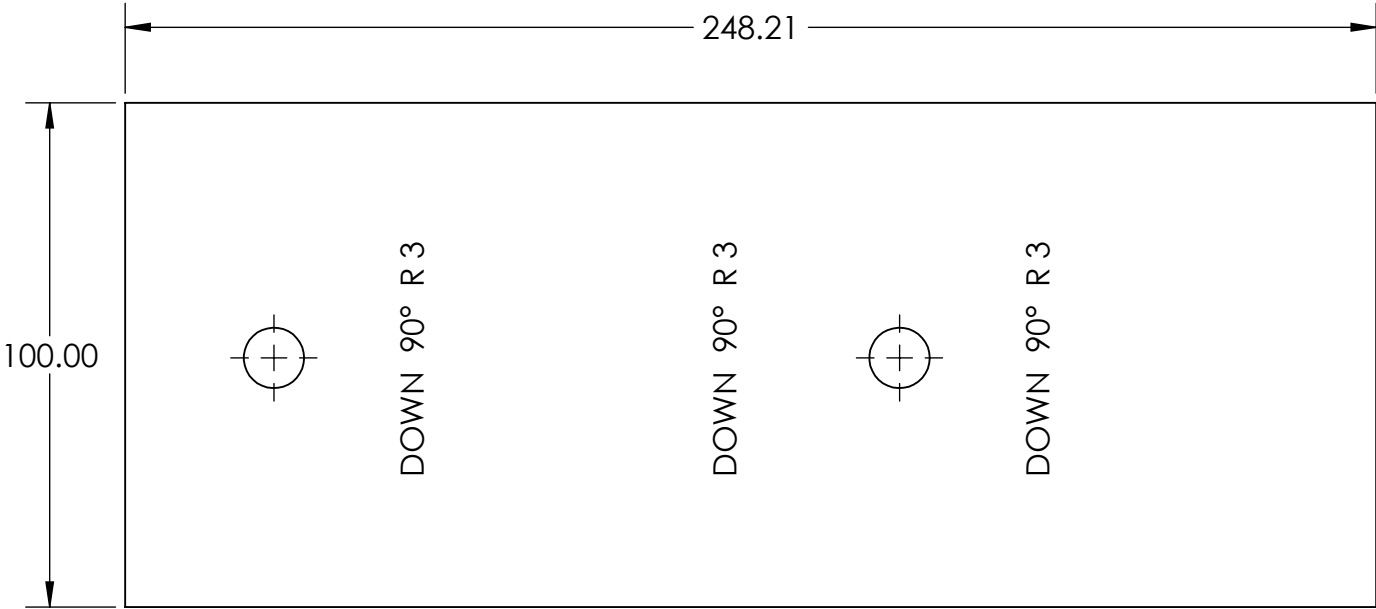
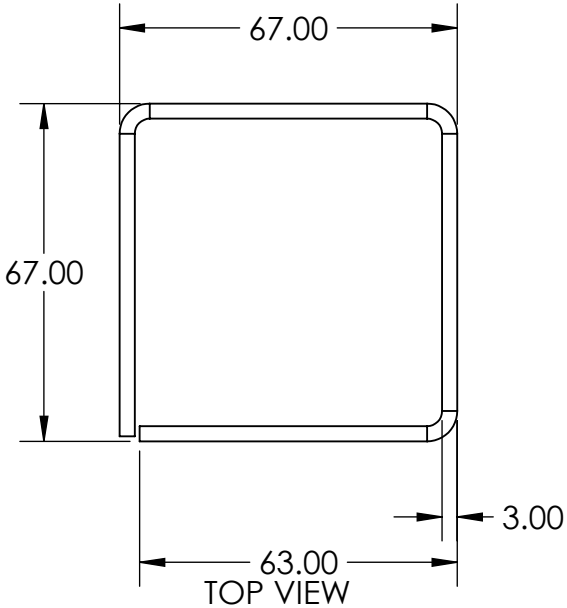
Front View



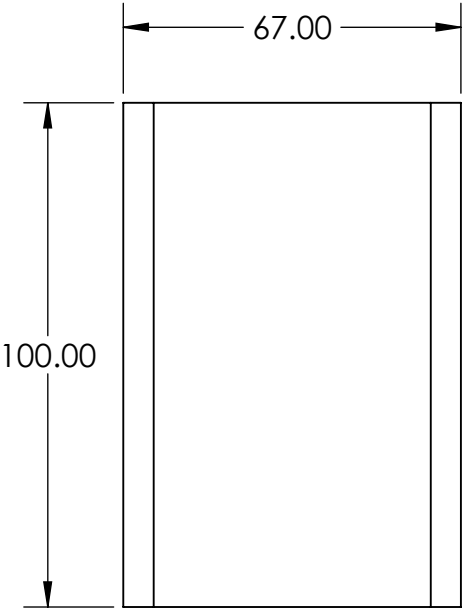
Side View



Exploded View



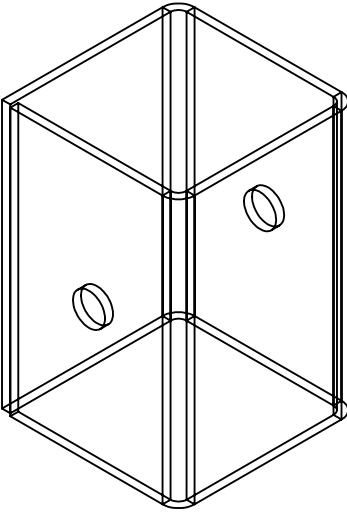
FRONT VIEW

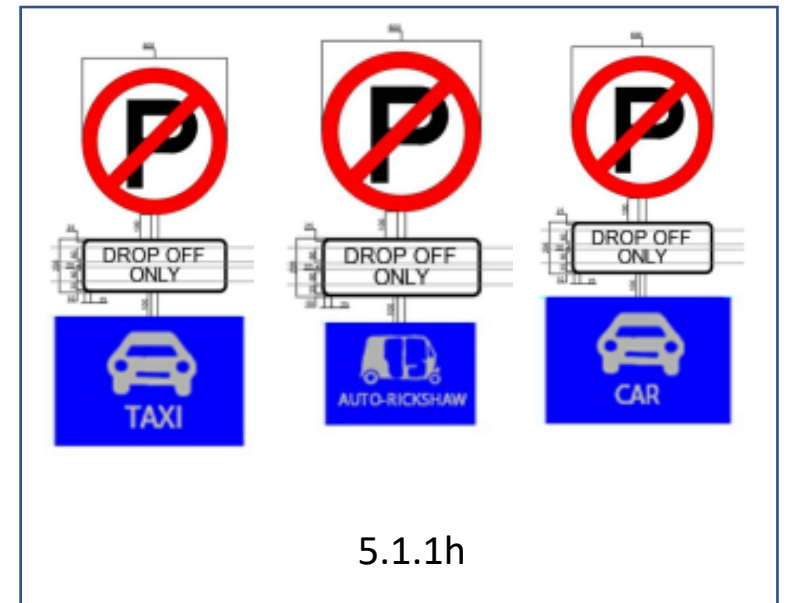
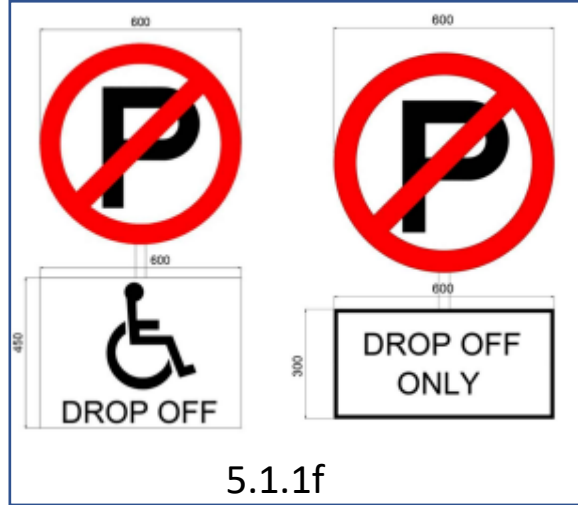
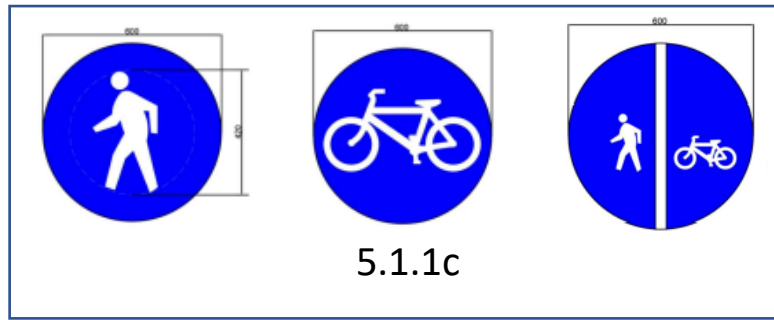


SIDE VIEW






FLAT VIEW

3mm THIK MS Sheet

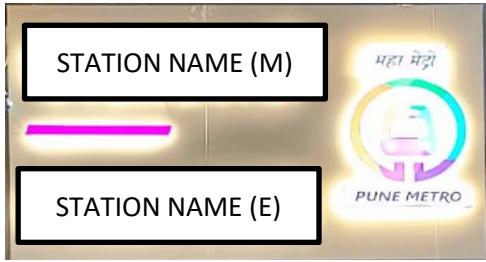









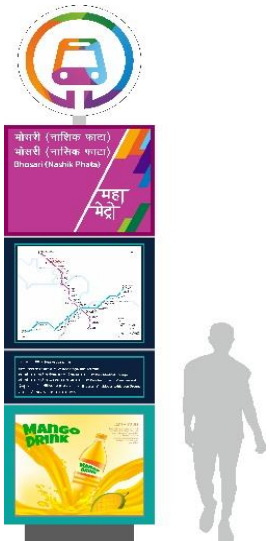


Street Signage Graphics





SIGNAGE GRAPHIC SCHEDULE					TYPICAL STATION		
Ground Level (Identification Signages)							
DATE - 11-11-2021 REV. - 1							
SIGN NO.	SIZE IN MM	SIGN TYPE AS PER BOQ	FIXING	FACE TYPE	ARTWORK	REMARKS	ILLUMI- NATION
ID01	297x210	2.1.3a	FACE	1 SIDED			NI
ID02	297x210	2.1.3a	FACE	1 SIDED			NI
ID03	297x210	2.1.3a	FACE	1 SIDED			NI
ID04	297x210	2.1.3a	FACE	1 SIDED			NI
ID05	297x210	2.1.3a	FACE	1 SIDED			NI



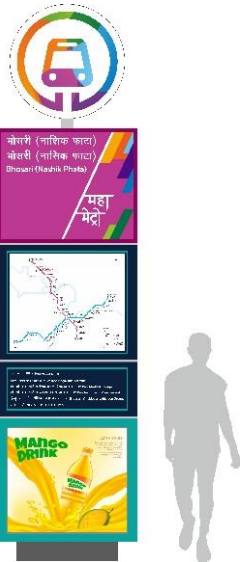
ID06	297x210	2.1.3a	FACE	1 SIDED	डी.जी कक्ष डी.जी कक्ष D.G Room		NI
ID07	297x210	2.1.3a	FACE	1 SIDED	प्लंबिंग कूप प्लंबिंग शाफ्ट Plumbing Shaft		NI
ID08	297x210	2.1.3a	FACE	1 SIDED	प्लंबिंग कूप प्लंबिंग शाफ्ट Plumbing Shaft		NI
ID09	297x210	2.1.3a	FACE	1 SIDED	सेवा कूप सर्विस शाफ्ट Service Shaft		NI
ID10	1500x300	2.1.2a	FACE	1 SIDED	 प्रवासी प्रांगणाकडे कॉनकोर्स की ओर • To Concourse 		NI
ID11	297x210	2.1.3a	FACE	1 SIDED	सेवा कूप सर्विस शाफ्ट Service Shaft		NI
ID12	1500x300	2.1.2a	FACE	1 SIDED	 प्रवासी प्रांगणाकडे कॉनकोर्स की ओर • To Concourse 		NI





ID13	3600x1800	2.1.7a	FACE	1 SIDED	<p>Only for Reference</p> 	Quantity as per actual	IL
Ground Level (Way Finding Signages)							
SIGN NO.	SIZE IN MM	SIGN TYPE AS PER BOQ	FIXING	FACE TYPE	ARTWORK		ILLUMI- NATION
WF01	1800x300	1.1.1c	SUSPENDED	2 SIDED			IL
WF02	1500x300	1.1.1b	PROJECTED	2 SIDED			IL
WF03	1800x300	1.1.1c	SUSPENDED	2 SIDED			IL

WF04	1500x300	1.1.1b	PROJECTED	2 SIDED			IL
WF05	1800x300	1.1.1c	SUSPENDED	2 SIDED			IL
Ground Level (Information Signages)							
SIGN NO.	SIZE IN MM	SIGN TYPE AS PER BOQ	FIXING	FACE TYPE	ARTWORK		ILLUMI- NATION
IN01	500x500	5.1.1a	POST	2 SIDED			NI

IN02	1100x4200	5.1.2a	TOTEM	2 SIDED			IL
IN03	1189X841	3.1.1a	POST	1 SIDED		ONLY FOR REFERENCE	NI
IN04	1189X841	3.1.1a	POST	1 SIDED			NI


IN05	1189X841	3.1.1a	POST	1 SIDED		ONLY FOR REFERENCE	NI
IN06	1189X841	3.1.1a	POST	1 SIDED			NI
IN07	500x500	5.1.1a	POST	2 SIDED			NI
IN08	500x500	5.1.1a	POST	2 SIDED			NI



IN09	1189X841	3.1.1a	POST	1 SIDED		ONLY FOR REFERENCE	NI
IN10	1189X841	3.1.1a	POST	1 SIDED			NI
IN11	1100x4200	5.1.2a	TOTEM	2 SIDED			IL

IN12	500x500	5.1.1a	POST	2 SIDED			NI
IN13	1189X841	3.1.1a	POST	1 SIDED		ONLY FOR REFERENCE	NI
IN14	1189X841	3.1.1a	POST	1 SIDED			NI
IN15	500x500	5.1.1a	POST	2 SIDED			NI

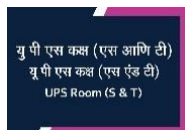
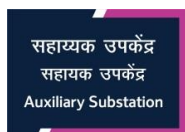



IN16	1100x4200	5.1.2a	TOTEM	2 SIDED			IL
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Ground Level (Statutory Signages)

SIGN NO.	SIZE IN MM	SIGN TYPE AS PER BOQ	FIXING	FACE TYPE	ARTWORK		ILLUMI- NATION
ST01	297x210	2.1.3a	FACE	1 SIDED			NI
ST02	297x210	2.1.3a	FACE	1 SIDED			NI







ST03	297x210	2.1.3a	FACE	1 SIDED	<div> <div> <p>फक्त अधिकृत कर्मचार्याकरिता केवल अधिकृत कर्मचारी Authorized Personnel Only</p> </div> </div>		NI
ST04	297x210	2.1.3a	FACE	1 SIDED	<div> <div> <p>फक्त अधिकृत कर्मचार्याकरिता केवल अधिकृत कर्मचारी Authorized Personnel Only</p> </div> </div>		NI
ST05	297x210	2.1.3a	FACE	1 SIDED	<div> <div> <p>फक्त अधिकृत कर्मचार्याकरिता केवल अधिकृत कर्मचारी Authorized Personnel Only</p> </div> </div>		NI
ST06	150x225	2.1.4a	FACE	1 SIDED	<div> <div>  <p>आग लागल्यास फक्त आग लागल्यास वापर करू नको आग लागले पर Fire ६११ करोना न करे Do not use lift in case of fire</p> </div> </div>		NI
ST07	150x225	2.1.4a	FACE	1 SIDED	<div> <div>  <p>विश्यांगजन आणि ज्येष्ठ नागरिकांच्या अपंगात कळवी आवाजात वाणे विश्यांगजन व ज्येष्ठ नागरिकांको को लिफ्ट के लिए प्राथमिकता दे Handicapped and Elderly persons to get priority for lift</p> </div> </div>		NI
ST08	297x210	2.1.3a	FACE	1 SIDED	<div> <div> <p>फक्त अधिकृत कर्मचार्याकरिता केवल अधिकृत कर्मचारी Authorized Personnel Only</p> </div> </div>		NI

ST09	150x225	2.1.4a	FACE	1 SIDED	 <p>आग प्रमाणित उपकरणों का वापर कर नही आग लागने पर फिरेट को प्रयोग करे Do not use fire in case of fire</p>		NI
ST10	150x225	2.1.4a	FACE	1 SIDED	 <p>विशेषांगजन आणि ज्येष्ठ नागरिकांसाठी अवसाह-कालाठी प्राधान्य दाखवे विशेषांगजन व ज्येष्ठ नागरिकां को फिरेट के लिए प्राथमिकता दे Handicapped and Elderly persons to get priority for fire</p>		NI



SIGNAGE GRAPHIC SCHEDULE					TYPICAL STATION		
Concourse Level (Identification Signages)							
DATE - 11-11-2021 REV. - 1							
SIGN NO.	SIZE IN MM	SIGN TYPE AS PER BOQ	FIXING	FACE TYPE	ARTWORK	REMARKS	ILLUMI- NATION
ID01	297x210	2.1.3a	FACE	1 SIDED			NI
ID02	297x210	2.1.3a	FACE	1 SIDED			NI
ID03	297x210	2.1.3a	FACE	1 SIDED			NI
ID04	297x210	2.1.3a	FACE	1 SIDED			NI
ID05	297x210	2.1.3a	FACE	1 SIDED			NI

ID06	450x700	1.1.3a	SUSPENDED	1 SIDED	 स्वयंचालित टिकीट यंत्र टिकट वेडिंग मशीन Ticket Vending Machine		NI
ID07	297x210	2.1.3a	FACE	1 SIDED	 बाल कालजी कक्ष शिशु देखभाल कक्ष Baby Care Room		NI
ID08	2100x300	2.1.1b	FACE	1 SIDED	 ग्राहक सेवा • ग्राहक सेवा • Customer Care 		IL
ID09	297x210	2.1.3a	FACE	1 SIDED	 एस आणि टी कूप एस एंड टी शाफ्ट S & T Shaft		NI
ID10	297x210	2.1.3a	FACE	1 SIDED	 प्लंबिंग कूप प्लंबिंग शाफ्ट Plumbing Shaft		NI
ID11	1500x300	2.1.2a	FACE	1 SIDED	 फ्लाटा कडे प्लेटफॉर्म की ओर • To Platform 		NI
ID12	297x210	2.1.3a	FACE	1 SIDED	 विद्युत कूप विद्युत शाफ्ट Electrical Shaft		NI

ID13	210x297	2.1.3a	FACE	1 SIDED			NI
ID14	1500x300	2.1.2a	FACE	1 SIDED			NI
ID15	297x210	2.1.3a	FACE	1 SIDED			NI
ID16	297x210	2.1.3a	FACE	1 SIDED			NI
ID17	297x210	2.1.3a	FACE	1 SIDED			NI
ID18	297x210	2.1.3a	FACE	1 SIDED			NI
ID19	2100x300	2.1.1b	FACE	1 SIDED			IL

ID20	297x210	2.1.3a	FACE	1 SIDED			NI
ID21	297x210	2.1.3a	FACE	1 SIDED			NI
ID22	AS/ SITE	2.1.6a	FACE	1 SIDED		only for refrence	VINYL
ID23	1500x300	2.1.1a	FACE	1 SIDED			IL
ID24	AS/ SITE	2.1.6a	FACE	1 SIDED		only for refrence	VINYL
ID25	297x210	2.1.3a	FACE	1 SIDED			NI
ID26	297x210	2.1.3a	FACE	1 SIDED			NI

ID27	1500x300	2.1.2a	FACE	1 SIDED			NI
ID28	297x210	2.1.3a	FACE	1 SIDED			NI
ID29	1500x300	2.1.2a	FACE	1 SIDED			NI
ID30	450x700	1.1.3a	SUSPENDED	1 SIDED			NI
ID31	297x210	2.1.3a	FACE	1 SIDED			NI
ID32	297x210	2.1.3a	FACE	1 SIDED			NI
ID33	1500x300	2.1.2a	FACE	1 SIDED			NI

ID34	297x210	2.1.3a	FACE	1 SIDED	एस आणि टी कूप एस एंड टी शाफ्ट S & T Shaft		NI
ID35	297x210	2.1.3a	FACE	1 SIDED	प्लंबिंग कूप प्लंबिंग शाफ्ट Plumbing Shaft		NI
ID36	210x297	2.1.3a	FACE	1 SIDED			NI
ID37	297x210	2.1.3a	FACE	1 SIDED	प्लंबिंग कूप प्लंबिंग शाफ्ट Plumbing Shaft		NI
ID38	210x297	2.1.3a	FACE	1 SIDED			NI
ID39	297x210	2.1.3a	FACE	1 SIDED	प्लंबिंग कूप प्लंबिंग शाफ्ट Plumbing Shaft		NI
ID40	297x210	2.1.3a	FACE	1 SIDED	अतिरिक्त भाडे कार्यालय अतिरिक्त किराया कार्यालय Excess Fare Office		NI

ID41	297x210	2.1.3a	FACE	1 SIDED			NI
ID42	1500x300	2.1.1a	FACE	1 SIDED			IL
ID43	AS/ SITE	2.1.6a	FACE	1 SIDED		only for refrence	VINYL
ID44	297x210	2.1.3a	FACE	1 SIDED			NI
ID45	297x210	2.1.3a	FACE	1 SIDED			NI

Concourse Level (Way Finding Signages)



SIGN NO.	SIZE IN MM	SIGN TYPE AS PER BOQ	FIXING	FACE TYPE	ARTWORK		ILLUMI- NATION
WF01	1500x300	1.1.1b	SUSPENDED	2 SIDED			IL
WF02	1500x300	1.1.1b	SUSPENDED	2 SIDED			IL
WF03	1500x300	1.1.1b	SUSPENDED	2 SIDED			IL
WF04	1500x300	1.1.1b	SUSPENDED	2 SIDED			IL
WF05	1500x300	1.1.1b	SUSPENDED	2 SIDED			IL
WF06	1500x300	1.1.1b	SUSPENDED	2 SIDED			IL

WF07	1500x300	1.1.1b	SUSPENDED	2 SIDED			IL
WF08	1500x300	1.1.1b	SUSPENDED	2 SIDED			IL
WF09	1500x300	1.1.1b	SUSPENDED	2 SIDED			IL
WF10	1800x300	1.1.1c	SUSPENDED	2 SIDED			IL
WF11	1800x300	1.1.1c	SUSPENDED	2 SIDED			IL
WF12	1800x300	1.1.1c	SUSPENDED	2 SIDED			IL
WF13	1500x300	1.1.1b	PROJECTED	2 SIDED			IL





WF14	1800x300	1.1.1c	SUSPENDED	2 SIDED			IL
WF15	1800x300	1.1.1c	SUSPENDED	2 SIDED			IL
WF16	1500x300	1.1.1b	PROJECTED	2 SIDED			IL
WF17	1800x300	1.1.1c	SUSPENDED	2 SIDED			IL
WF18	1500x300	1.1.1b	SUSPENDED	2 SIDED			IL
WF19	1500x300	1.1.1b	SUSPENDED	2 SIDED			IL
WF20	1800x300	1.1.1c	SUSPENDED	2 SIDED			IL

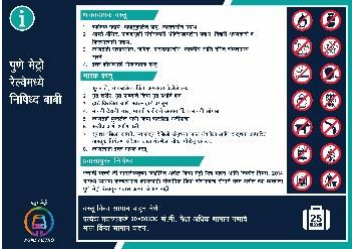

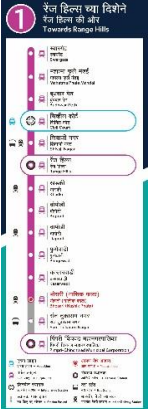
WF21	1800x300	1.1.1c	SUSPENDED	2 SIDED			IL
WF22	1800x300	1.1.1c	SUSPENDED	2 SIDED			IL
WF23	1800x300	1.1.1c	SUSPENDED	2 SIDED			IL
WF24	1500x300	1.1.1b	SUSPENDED	2 SIDED			IL
WF25	1500x300	1.1.1b	SUSPENDED	2 SIDED			IL
WF26	1500x300	1.1.1b	SUSPENDED	2 SIDED			IL
WF27	1500x300	1.1.1b	SUSPENDED	2 SIDED			IL

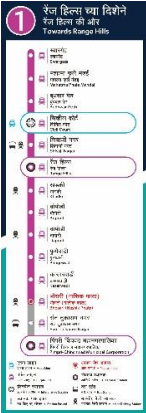
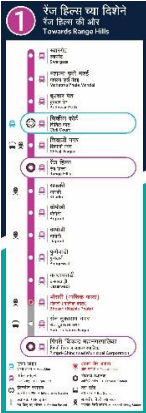
WF28	1800x300	1.1.1c	SUSPENDED	2 SIDED		IL
WF29	1800x300	1.1.1c	SUSPENDED	2 SIDED		IL
WF30	1800x300	1.1.1c	SUSPENDED	2 SIDED		IL
WF31	1800x300	1.1.1c	SUSPENDED	2 SIDED		IL
WF32	1800x300	1.1.1c	SUSPENDED	2 SIDED		IL
WF33	1800x300	1.1.1c	SUSPENDED	2 SIDED		IL
WF34	1800x300	1.1.1c	SUSPENDED	2 SIDED		IL

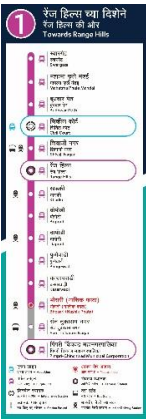
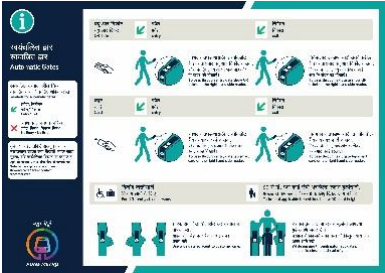

WF35	1800x300	1.1.1c	SUSPENDED	2 SIDED			IL
WF36	1500x300	1.1.1b	SUSPENDED	2 SIDED			IL
WF37	1500x300	1.1.1b	SUSPENDED	2 SIDED			IL
WF38	1800x300	1.1.1c	SUSPENDED	2 SIDED			IL
WF39	1800x300	1.1.1c	SUSPENDED	2 SIDED			IL
WF40	1800x300	1.1.1c	SUSPENDED	2 SIDED			IL
WF41	1500x300	1.1.1b	PROJECTED	2 SIDED			IL





WF42	1800x300	1.1.1c	SUSPENDED	2 SIDED			IL
WF43	1800x300	1.1.1c	SUSPENDED	2 SIDED			IL
WF44	1500x300	1.1.1b	PROJECTED	2 SIDED			IL
WF45	1800x300	1.1.1c	SUSPENDED	2 SIDED			IL
WF46	1500x300	1.1.1b	SUSPENDED	2 SIDED			IL
WF47	1500x300	1.1.1b	SUSPENDED	2 SIDED			IL
Concourse Level (Information Signages)							
SIGN NO.	SIZE IN MM	SIGN TYPE AS PER BOQ	FIXING	FACE TYPE	ARTWORK		ILLUMINATION

IN01	1189X841	3.1.1a	POST	1 SIDED		ONLY FOR REFERENCE	NI
IN02	1189X841	3.1.1a	POST	1 SIDED			NI
IN03	1189X841	2.1.2b	FACE	1 SIDED		Design under approval (In English Language)	NI
IN04	1189X841	2.1.2b	FACE	1 SIDED		Design under approval (In Hindi Language)	NI

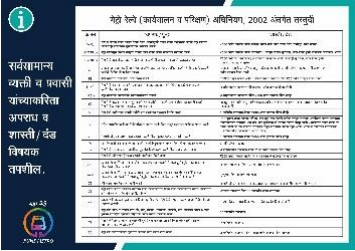


IN05	1189X841	2.1.2b	FACE	1 SIDED		Design under approval (In Marathi Language)	NI
IN07	AS/ SITE	2.1.6a	FACE	1 SIDED		ONLY FOR REFERENCE	VINYL
IN08	600x1800	3.1.1b	POST	1 SIDED			NI

IN09	600x1800	3.1.1b	POST	1 SIDED		NI
IN10	600x1800	3.1.1b	POST	1 SIDED		NI

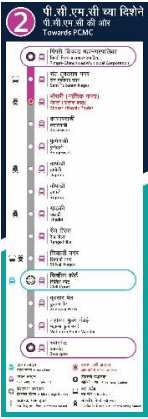
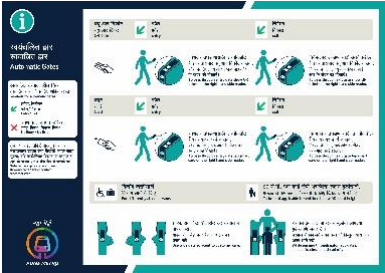
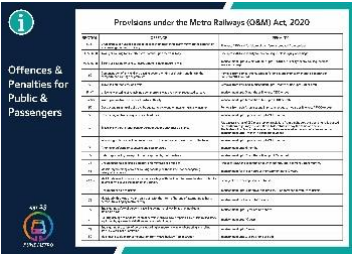
IN11	600x1800	3.1.1b	POST	1 SIDED			NI
IN12	1189X841	3.1.1a	POST	1 SIDED		Design under approval	NI
IN14	1189X841	3.1.1a	POST	1 SIDED		ONLY FOR REFERENCE	NI

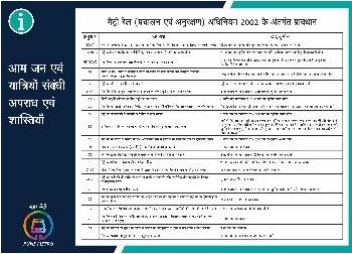
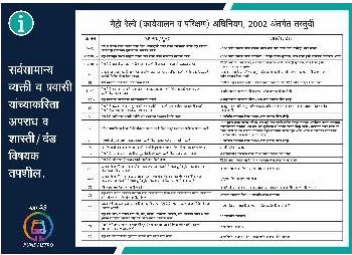


IN15	1189X841	3.1.1a	POST	1 SIDED			NI
IN16	1189X841	3.1.1a	POST	1 SIDED		ONLY FOR REFERENCE	NI
IN17	1189X841	3.1.1a	POST	1 SIDED			NI
IN18	1189X841	2.1.2b	FACE	1 SIDED		Design under approval (In English Language)	NI




IN19	1189X841	2.1.2b	FACE	1 SIDED		Design under approval (In Hindi Language)	NI
IN20	1189X841	2.1.2b	FACE	1 SIDED		Design under approval (In Marathi Language)	NI
IN21	1189X841	2.1.2b	FACE	1 SIDED		Design under approval (In English Language)	NI
IN22	1189X841	2.1.2b	FACE	1 SIDED		Design under approval (In Hindi Language)	NI






IN23	1189X841	2.1.2b	FACE	1 SIDED		Design under approval (In Marathi Language)	NI
IN24	AS/ SITE	2.1.6a	FACE	1 SIDED		ONLY FOR REFERENCE	VINYL
IN25	600x1800	3.1.1b	POST	1 SIDED			NI

IN26	600x1800	3.1.1b	POST	1 SIDED		NI
IN27	600x1800	3.1.1b	POST	1 SIDED		NI

IN28	600x1800	3.1.1b	POST	1 SIDED			NI
IN29	1189X841	3.1.1a	POST	1 SIDED		Design under approval	NI
IN30	1189X841	2.1.2b	FACE	1 SIDED		Design under approval (In English Language)	NI

IN31	1189X841	2.1.2b	FACE	1 SIDED		Design under approval (In Hindi Language)	NI
IN32	1189X841	2.1.2b	FACE	1 SIDED		Design under approval (In Marathi Language)	NI
Concourse Level (Statutory Signages)							
SIGN NO.	SIZE IN MM	SIGN TYPE AS PER BOQ	FIXING	FACE TYPE	ARTWORK		ILLUMINATION
ST 01	297x210	2.1.3a	FACE	1 SIDED			NI
ST 02	297x210	2.1.3a	FACE	1 SIDED			NI

ST 03	297x210	2.1.3a	FACE	1 SIDED			NI
ST 04	297x210	2.1.3a	FACE	1 SIDED			NI
ST 05	450x700	2.1.5b	FACE	1 SIDED			NI
ST 06	210x300	2.1.3b	FACE	1 SIDED			NI
ST 07	297x210	2.1.3a	FACE	1 SIDED			NI

ST 08	150x225	2.1.4a	FACE	1 SIDED			NI
ST 09	150x225	2.1.4a	FACE	1 SIDED			NI
ST 10	297x210	2.1.3a	FACE	1 SIDED			NI
ST 11	297x210	2.1.3a	FACE	1 SIDED			NI
ST 12	297x210	2.1.3a	FACE	1 SIDED			NI

ST 13	450x700	2.1.5b	FACE	1 SIDED		NI
ST 14	297x210	2.1.3a	FACE	1 SIDED		NI
ST 15	297x210	2.1.3a	FACE	1 SIDED		NI
ST 16	297x210	2.1.3a	FACE	1 SIDED		NI
ST 17	150x225	2.1.4a	FACE	1 SIDED		NI







ST 18	150x225	2.1.4a	FACE	1 SIDED			NI
ST 19	297x210	2.1.3a	FACE	1 SIDED			NI
ST 20	150x225	2.1.4a	FACE	1 SIDED			NI
ST 21	150x225	2.1.4a	FACE	1 SIDED			NI
ST 22	210x300	2.1.3b	FACE	1 SIDED			NI

ST 23	450x700	2.1.5b	FACE	1 SIDED			NI
ST 24	210x300	2.1.3b	FACE	1 SIDED			NI
ST 25	450x700	2.1.5b	FACE	1 SIDED			NI
ST 26	297x210	2.1.3a	FACE	1 SIDED			NI








ST 27	150x225	2.1.4a	FACE	1 SIDED			NI
ST 28	150x225	2.1.4a	FACE	1 SIDED			NI
ST 29	297x210	2.1.3a	FACE	1 SIDED			NI
ST 30	297x210	2.1.3a	FACE	1 SIDED			NI
ST 31	297x210	2.1.3a	FACE	1 SIDED			NI
ST 32	297x210	2.1.3a	FACE	1 SIDED			NI




ST 33	450x700	2.1.5b	FACE	1 SIDED			NI
ST 34	210x300	2.1.3b	FACE	1 SIDED			NI
ST 35	450x700	2.1.5b	FACE	1 SIDED			NI
ST 36	297x210	2.1.3a	FACE	1 SIDED			NI
ST 37	297x210	2.1.3a	FACE	1 SIDED			NI

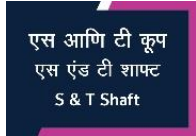




Concourse Level (Fire Signages)

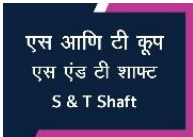


SIGN NO.	SIZE IN MM	SIGN TYPE AS PER BOQ	FIXING	FACE TYPE	ARTWORK		ILLUMI- NATION
FI 01	600x300	2.1.1c	FACE	1 SIDED			IL
FI 02	600x300	2.1.1c	FACE	1 SIDED			IL
FI 03	600x300	2.1.1c	FACE	1 SIDED			IL
FI 04	600x300	2.1.1c	FACE	1 SIDED			IL
FI 05	600x300	1.1.1d	SUSPENDED	2 SIDED	 		IL







FI 06	1189X841	3.1.1a	POST	1 SIDED		ONLY FOR REFERENCE	NI
FI 07	600x300	1.1.1d	SUSPENDED	2 SIDED			IL
FI 08	600x300	1.1.1d	SUSPENDED	2 SIDED			IL
FI 09	1189X841	3.1.1a	POST	1 SIDED		ONLY FOR REFERENCE	NI

FI 10	600x300	1.1.1d	SUSPENDED	2 SIDED	 		IL
FI 11	600x300	2.1.1c	FACE	1 SIDED			IL
FI 12	600x300	1.1.1d	SUSPENDED	2 SIDED	 		IL
FI 13	1189X841	3.1.1a	POST	1 SIDED		ONLY FOR REFERENCE	NI
FI 14	1189X841	3.1.1a	POST	1 SIDED		ONLY FOR REFERENCE	NI





FI 15	600x300	1.1.1d	SUSPENDED	2 SIDED			IL
FI 16	600x300	2.1.1c	FACE	1 SIDED			IL
FI 17	600x300	2.1.1c	FACE	1 SIDED			IL

SIGNAGE GRAPHIC SCHEDULE					TYPICAL STATION		
Platform Level (Identification Signages)							
DATE - 11-11-2021 REV. - 1							
SIGN NO.	SIZE IN MM	SIGN TYPE AS PER BOQ	FIXING	FACE TYPE	ARTWORK	REMARKS	ILLUMI- NATION
ID01	297x210	2.1.3a	FACE	1 SIDED			NI
ID02	297x210	2.1.3a	FACE	1 SIDED			NI
ID03	1500x300	2.1.2a	FACE	1 SIDED			NI
ID04	297x210	2.1.3a	FACE	1 SIDED			NI
ID05	297x210	2.1.3a	FACE	1 SIDED			NI


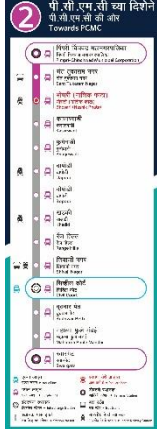


ID06	1500x300	2.1.2a	FACE	1 SIDED			NI
ID07	297x210	2.1.3a	FACE	1 SIDED			NI
ID08	297x210	2.1.3a	FACE	1 SIDED			NI
Platform Level (Way Finding Signages)							
SIGN NO.	SIZE IN MM	SIGN TYPE AS PER BOQ	FIXING	FACE TYPE	ARTWORK		ILLUMI- NATION
WF01	1200x300	1.1.1a	SUSPENDED	2 SIDED			IL
WF02	1200x300	1.1.1a	SUSPENDED	2 SIDED			IL

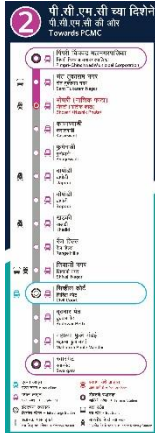
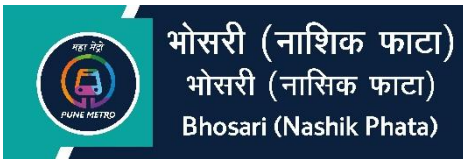

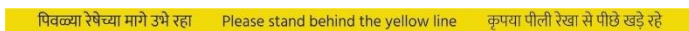
WF03	1200x300	1.1.1a	PROJECTED	2 SIDED			IL
WF04	1200x300	1.1.1a	SUSPENDED	2 SIDED			IL
WF05	1200x300	1.1.1a	SUSPENDED	2 SIDED			IL
WF06	1200x300	1.1.1a	SUSPENDED	2 SIDED			IL
WF07	1200x300	1.1.1a	PROJECTED	2 SIDED			IL
WF08	1200x300	1.1.1a	SUSPENDED	2 SIDED			IL






Platform Level (Information Signages)

SIGN NO.	SIZE IN MM	SIGN TYPE AS PER BOQ	FIXING	FACE TYPE	ARTWORK	ILLUMINATION
IN01	1800x600	3.1.1d	POST	1 SIDED	 भोसरी (नाशिक फाटा) भोसरी (नाशिक फाटा) Bhosari (Nashik Phata)	NI
IN02	600x1800	3.1.1b	POST	1 SIDED		NI
IN03	450x450	1.1.2b	SUSPENDED	2 SIDED		NI
IN04	450x450	1.1.2b	SUSPENDED	2 SIDED		NI





IN05	600x1800	3.1.1b	POST	1 SIDED			NI
IN06	1800x600	3.1.1d	POST	1 SIDED			NI
IN07	1200x300	1.1.2a	SUSPENDED	2 SIDED			NI
IN08	1200x300	1.1.2a	SUSPENDED	2 SIDED			NI





IN09	1800x600	3.1.1d	POST	1 SIDED	 भोसरी (नाशिक फाटा) भोसरी (नाशिक फाटा) Bhosari (Nashik Phata)		NI
IN10	600x1800	3.1.1b	POST	1 SIDED			NI
IN11	450x450	1.1.2b	SUSPENDED	2 SIDED			NI
IN12	450x450	1.1.2b	SUSPENDED	2 SIDED			NI






IN13	600x1800	3.1.1b	POST	1 SIDED			NI
IN14	1800x600	3.1.1d	POST	1 SIDED			NI
Platform Level (Statutory Signages)							
SIGN NO.	SIZE IN MM	SIGN TYPE AS PER BOQ	FIXING	FACE TYPE	ARTWORK		ILLUMINATION
ST01	450x300	2.1.3c	FACE	1 SIDED			NI
ST02	140500x100	4.1.1b	FACE	1 SIDED			FLOOR VINYL






ST03	450x800	3.1.1c	POST	1 SIDED			NI
ST04	210x300	2.1.3b	FACE	1 SIDED			NI
ST05	210x300	2.1.3b	FACE	1 SIDED			NI
ST06	300x300	5.3a	FACE	1 SIDED		Location as per metro door marking	FLOOR VINYL
ST07	297x210	2.1.3a	FACE	1 SIDED			NI




ST08	150x225	2.1.4a	FACE	1 SIDED			NI
ST09	150x225	2.1.4a	FACE	1 SIDED			NI
ST10	297x210	2.1.3a	FACE	1 SIDED			NI
ST11	300x475	2.1.5a	FACE	1 SIDED			NI
ST12	300x300	5.3a	FACE	1 SIDED		Location as per metro door marking	FLOOR VINYL





ST13	210x300	2.1.3b	FACE	1 SIDED	 <p>पूरे 25000 वोल्टों की विद्युत लाइन की ओर कृपया पानी की छिड़काव न करें। वाटर जेट्स के मुँह को 25000 वोल्ट्स पावरलाइन की ओर न करें। Do not point water jet towards the 25000 volts power line.</p>		NI
ST14	210x300	2.1.3b	FACE	1 SIDED	 <p>अग्निशमन नलिका अग्निशमक पाइप Fire Hose</p>		NI
ST15	450x800	3.1.1c	POST	1 SIDED	 <p>विद्युत के खतरा होने पर यहाँ रुकना पीछे पीछे रहें। Please stand behind the yellow line</p> <p>है स्टेशन सुरक्षा निगरानी के तहत है। This station is under surveillance</p> <p>पुच्छ न करें No Spitting</p> <p>कचरा न फेंकें Do not litter</p> <p>धूम्रपान न करें No Smoking</p>		NI
ST16	450x300	2.1.3c	FACE	1 SIDED	 <p>प्रतिबंधित प्रवेश Restricted Entry</p> <p>धोखा : बिजली उच्च दाब 24000 वोल्ट खतरा : उच्च वोल्टेज Danger : High Voltage 25000 Volts</p>		NI





ST17	450x300	2.1.3c	FACE	1 SIDED	 <p>प्रतिबंधित प्रवेश Restricted Entry</p> <p>धोखा : विजेचा उच्च दाब २५००० वोल्ट खतरा : उच्च वोल्टेज 25000 वोल्ट्स Danger : High Voltage 25000 Volts</p>		NI
ST18	450x800	3.1.1c	POST	1 SIDED	 <p>विषयवस्तु वेध्या मागे उभे रहा कुण्या भीती रेखा से पीछे खडे रहें Please stand behind the yellow line</p> <p>हे स्थानक सुरक्षा संमिरीक्षणालाही आहे हा स्टेशन सुरक्षा निगरानी के वल्ले में है This station is under surveillance</p> <p>धुंक नये मुँके नहीं No Spitting</p> <p>कचरा वारु नला काला न फैलाए Do not litter</p> <p>धूमपान नमनाई आहे धुमपान मना है No Smoking</p>		NI
ST19	210x300	2.1.3b	FACE	1 SIDED	 <p>पुढे २५००० वोल्टांपर विद्युत वाहिनी आहे. कृपया घ्या दिसेले पाणी सोडू नये। खतरा जेट्स के मुँह को 25000 वोल्ट्स पावरलाइन की ओर न करे। Do not point water jet towards the 25000 volts power line.</p>		NI
ST20	210x300	2.1.3b	FACE	1 SIDED	 <p>अग्निशमन नलिका अग्निशामक पाइप Fire Hose</p>		NI



ST21	300x300	5.3a	FACE	1 SIDED		Location as per metro door marking	FLOOR VINYL
ST22	300x475	2.1.5a	FACE	1 SIDED			NI
ST23	297x210	2.1.3a	FACE	1 SIDED			NI
ST24	150x225	2.1.4a	FACE	1 SIDED			NI
ST25	150x225	2.1.4a	FACE	1 SIDED			NI

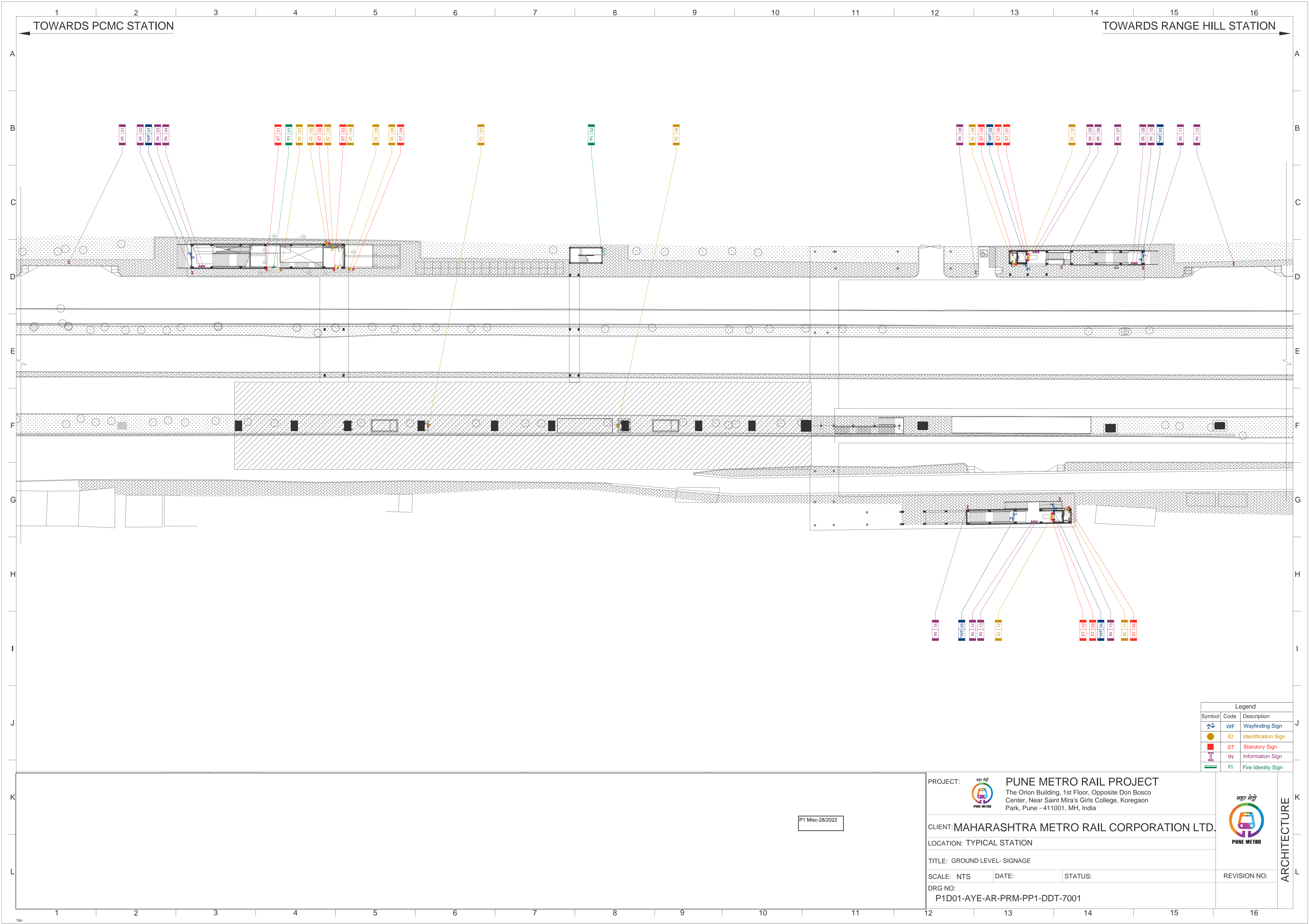
ST26	297x210	2.1.3a	FACE	1 SIDED			NI
ST27	300x300	5.3a	FACE	1 SIDED		Location as per metro door marking	FLOOR VINYL
ST28	210x300	2.1.3b	FACE	1 SIDED			NI
ST29	210x300	2.1.3b	FACE	1 SIDED			NI
ST30	450x800	3.1.1c	POST	1 SIDED			NI

ST31	140500x100	4.1.1b	FACE	1 SIDED	पिचळ्या रेषेच्या मागे उभे रहा। Please stand behind the yellow line कृपया पीली रेखा से पीछे खड़े रहे		FLOOR VINYL
ST32	450x300	2.1.3c	FACE	1 SIDED			NI
Platform Level (Fire Signages)							
SIGN NO.	SIZE IN MM	SIGN TYPE AS PER BOQ	FIXING	FACE TYPE	ARTWORK		ILLUMINATION
FI 01	600x300	1.1.1d	SUSPENDED	2 SIDED			IL
FI 02	1189X841	3.1.1a	POST	1 SIDED		ONLY FOR REFERENCE	NI

FI 03	600x300	1.1.1d	SUSPENDED	2 SIDED			IL
FI 04	1200x300	1.1.1e	SUSPENDED	2 SIDED			IL
FI 05	600x300	1.1.1d	SUSPENDED	2 SIDED			IL
FI 06	1189X841	3.1.1a	POST	1 SIDED		ONLY FOR REFERENCE	NI

FI 07	600x300	1.1.1d	SUSPENDED	2 SIDED			IL
FI 08	1189X841	3.1.1a	POST	1 SIDED		ONLY FOR REFERENCE	NI
FI 09	600x300	1.1.1d	SUSPENDED	2 SIDED			IL
FI 10	1200x300	1.1.1e	SUSPENDED	2 SIDED			IL

FI 11	600x300	1.1.1d	SUSPENDED	2 SIDED			IL
FI 12	1189X841	3.1.1a	POST	1 SIDED		ONLY FOR REFERENCE	NI




TOWARDS PCMC STATION

TOWARDS RANGE HILL STATION

Legend		
Symbol	Code	Description
	WF	Wayfinding Sign
	ID	Identification Sign
	ST	Statutory Sign
	IN	Information Sign
	FI	Fire Identity Sign

PROJECT:

**PUNE METRO RAIL PROJECT**
The Orion Building, 1st Floor, Opposite Don Bosco Center, Near Saint Mira's Girls College, Koregaon Park, Pune - 411001, MH, India


CLIENT:MAHARASHTRA METRO RAIL CORPORATION LTD.

LOCATION: TYPICAL STATION

TITLE: GROUND LEVEL- SIGNAGE

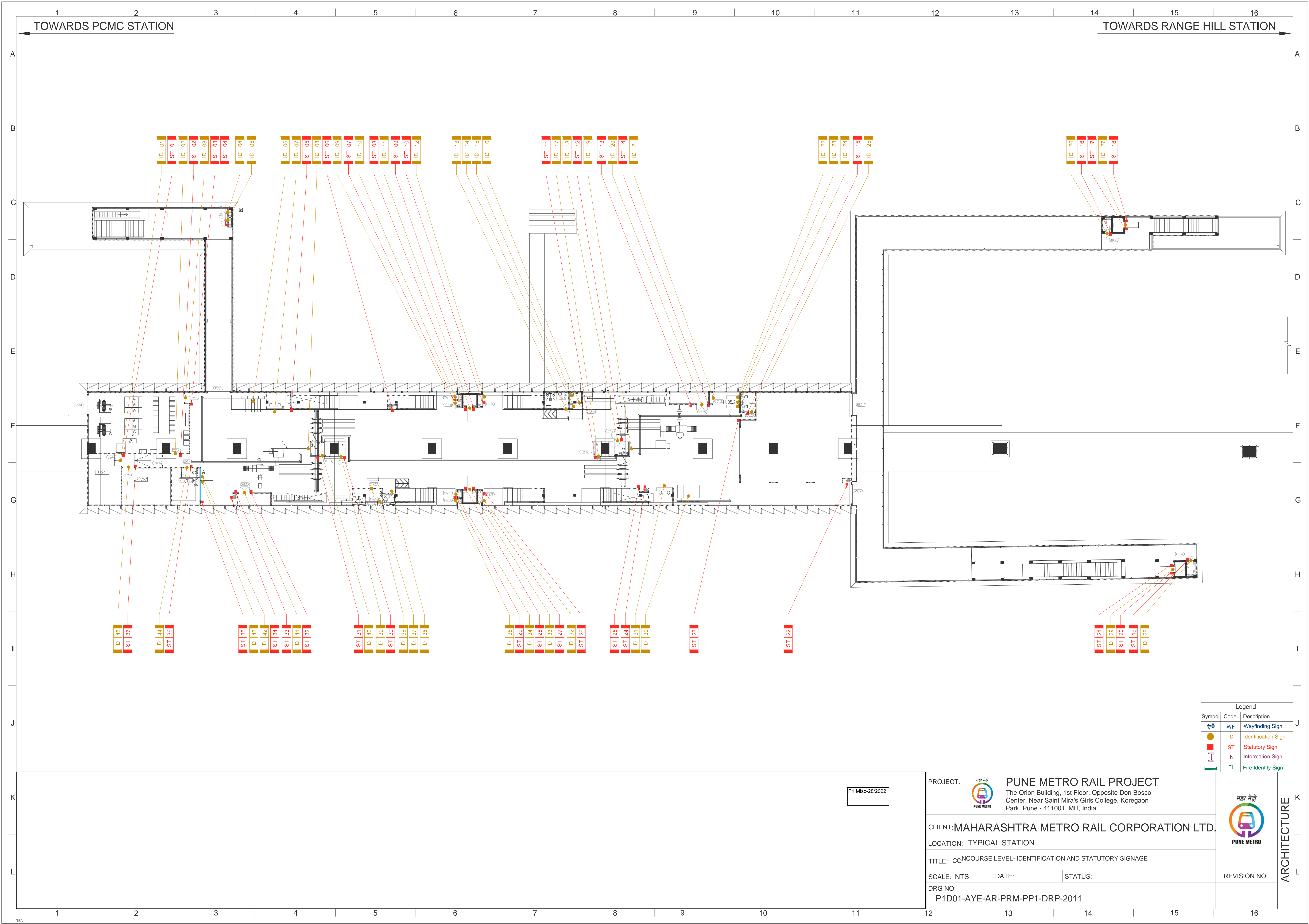
SCALE: NTS DATE: STATUS:

DRG NO:
P1D01-AYE-AR-PRM-PP1-DDT-7001

**महा मेट्रो**
PUNE METRO


REVISION NO:

ARCHITECTURE



Legend		
Symbol	Code	Description
	WF	Wayfinding Sign
	ID	Identification Sign
	ST	Statutory Sign
	IN	Information Sign
	FI	Fire Identity Sign

PROJECT:



PUNE METRO RAIL PROJECT

The Orion Building, 1st Floor, Opposite Don Bosco Center, Near Saint Mira's Girls College, Koregaon Park, Pune - 411001, MH, India

CLIENT:

MAHARASHTRA METRO RAIL CORPORATION LTD.

LOCATION:

TYPICAL STATION

TITLE:

coNcourse LEVEL- IDENTIFICATION AND STATUTORY SIGNAGE


SCALE: NTS

DATE:

STATUS:

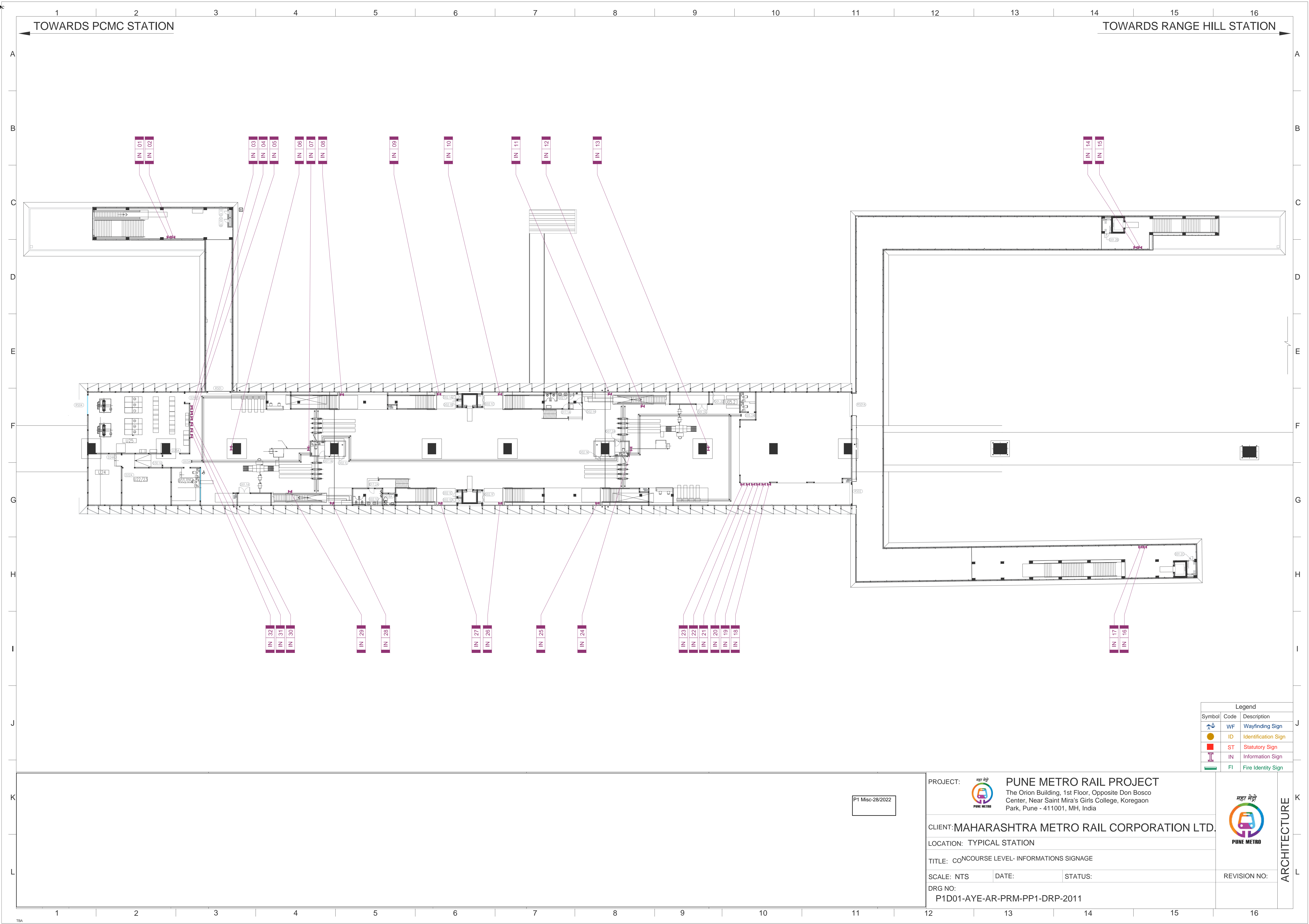
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P1D01-AYE-AR-PRM-PP1-DRP-2011




REVISION NO:

ARCHITECTURE



P1 Misc-28/2022

PROJECT:

**PUNE METRO RAIL PROJECT**
The Orion Building, 1st Floor, Opposite Don Bosco Center, Near Saint Mira's Girls College, Koregaon Park, Pune - 411001, MH, India






CLIENT:MAHARASHTRA METRO RAIL CORPORATION LTD.

LOCATION: TYPICAL STATION

TITLE: coNCOURSE LEVEL- INFORMATIONS SIGNAGE

SCALE: NTS DATE: STATUS:

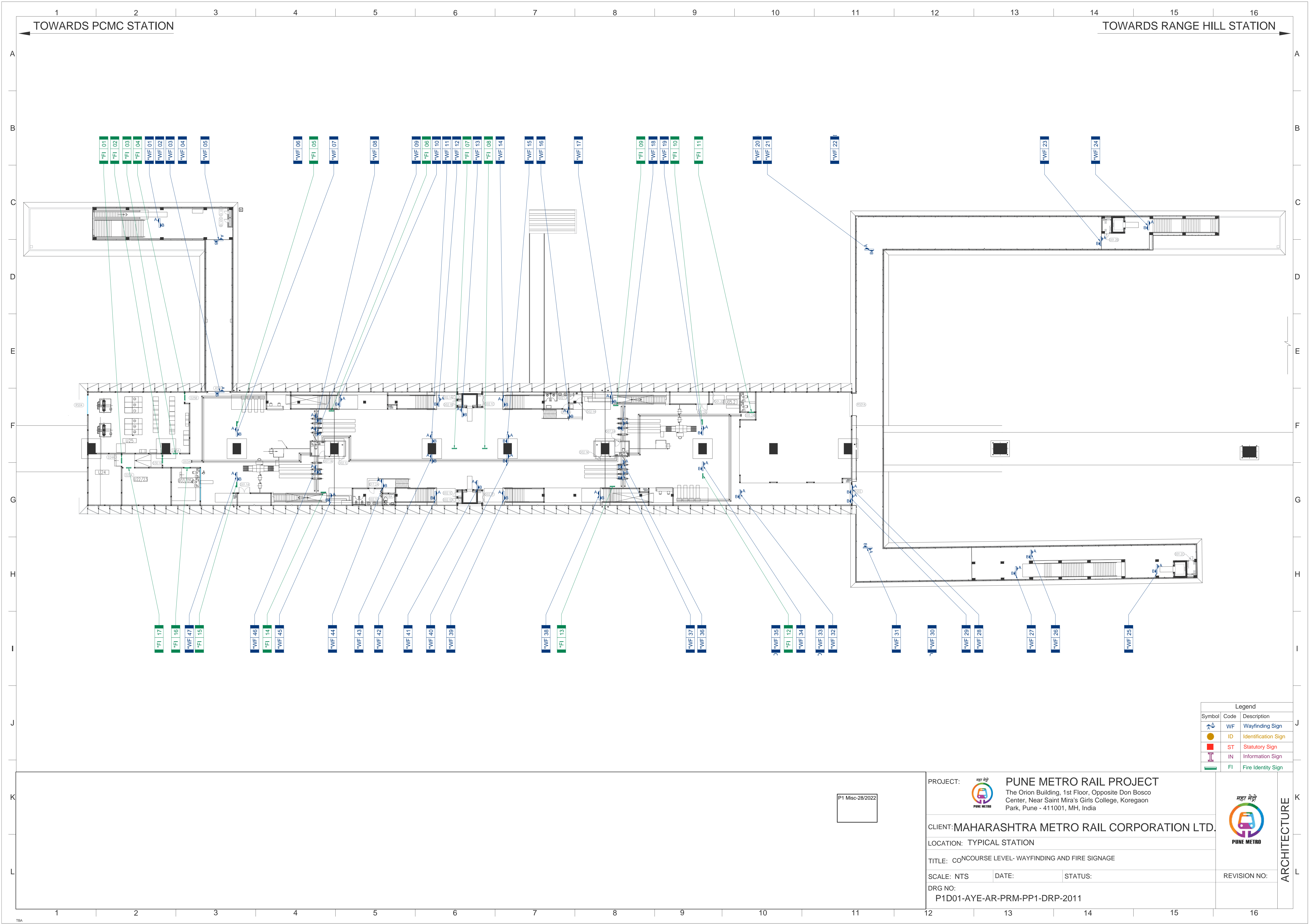
DRG NO:
P1D01-AYE-AR-PRM-PP1-DRP-2011

Legend		
Symbol	Code	Description
	WF	Wayfinding Sign
	ID	Identification Sign
	ST	Statutory Sign
	IN	Information Sign
	FI	Fire Identity Sign



REVISION NO:

ARCHITECTURE




TOWARDS PCMC STATION

TOWARDS RANGE HILL STATION

Legend		
Symbol	Code	Description
	WF	Wayfinding Sign
	ID	Identification Sign
	ST	Statutory Sign
	IN	Information Sign
	FI	Fire Identity Sign

PROJECT:

**PUNE METRO RAIL PROJECT**
The Orion Building, 1st Floor, Opposite Don Bosco Center, Near Saint Mira's Girls College, Koregaon Park, Pune - 411001, MH, India

CLIENT:MAHARASHTRA METRO RAIL CORPORATION LTD.

LOCATION: TYPICAL STATION

TITLE: coNCOURSE LEVEL- WAYFINDING AND FIRE SIGNAGE

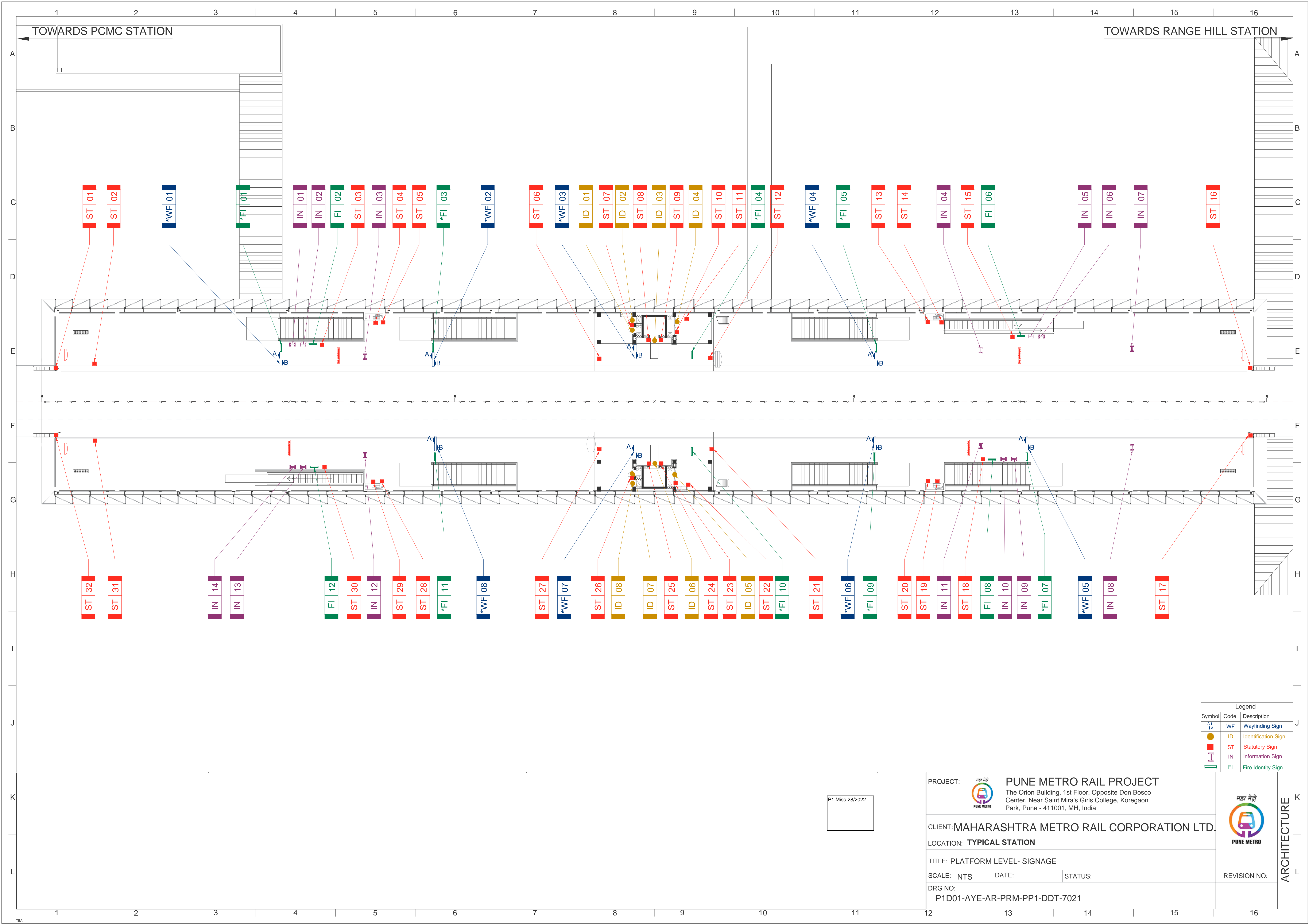
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DRG NO:
P1D01-AYE-AR-PRM-PP1-DRP-2011




ARCHITECTURE

REVISION NO:



Legend		
Symbol	Code	Description
	WF	Wayfinding Sign
	ID	Identification Sign
	ST	Statutory Sign
	IN	Information Sign
	FI	Fire Identity Sign

PROJECT:



PUNE METRO RAIL PROJECT
The Orion Building, 1st Floor, Opposite Don Bosco Center, Near Saint Mira's Girls College, Koregaon Park, Pune - 411001, MH, India


CLIENT:MAHARASHTRA METRO RAIL CORPORATION LTD.

LOCATION: **TYPICAL STATION**

TITLE: PLATFORM LEVEL- SIGNAGE

SCALE: NTS DATE: STATUS:

DRG NO:
P1D01-AYE-AR-PRM-PP1-DDT-7021



महा मेट्रो
PUNE METRO

REVISION NO:

ARCHITECTURE



MAHARASHTRA METRO RAIL CORPORATION LIMITED

Pune Metro Rail Project

Joint Venture of Govt. of India & Govt. of Maharashtra

CIN: U60100MH2015SGC262054

Date: 03 Aug 2022

CORRIGENDUM-I

Tender No.: P1Misc-28/2022 dated 26 July 2022

Name of Work: Design of Graphics, Fabrication, Supply, Installation, Testing and Commissioning of Signage of 4 stations viz. Dapodi, Bopadi, Khadki & Range Hill of Reach 01 and 4 stations viz. Deccan Gymkhana, Sambhaji Park, PMC & Civil Court Elevated of Reach 02 of Pune Metro Rail Project.

Reference: Further to **Tender Documents** dated 26 July 2022

The revised venue of pre-bid meeting shall be as follows:

SN	Activity	Date as per Tender	Revised Venue
1	Pre-bid Meeting	04/08/2022 at 11.00 Hours at Conference Hall, Maharashtra Metro Rail Corporation Limited, Inside Mahatma Phule Museum, Ghole Road, Shivaji Nagar, Pune – 411005, Maharashtra.	04/08/2022 at 11.00 Hours at Conference Hall – II, Pune Metro Rail Project, Block No. A3, FGSG, Near Civil Court, Next to Kamgar Putala Vasahat, Shivajinagar, Pune-411005 India.



[Signature]
DGM/Civil (Procurement & Contracts),

Pune Metro Rail Project,
Maharashtra Metro Rail Corporation Limited.



MAHARASHTRA METRO RAIL CORPORATION LIMITED

Pune Metro Rail Project

Joint Venture of Govt. of India & Govt. of Maharashtra

CIN: U60100MH2015SGC262054

Date: 03 Aug 2022

CORRIGENDUM-II

Tender No.: P1Misc-28/2022 dated 26 July 2022

Name of Work: Design of Graphics, Fabrication, Supply, Installation, Testing and Commissioning of Signage of 4 Stations viz. Dapodi, Bopodi, Khadki & Range Hill of Reach-01 and 4 Stations viz. Deccan Gymkhana, Sambhaji Park, PMC & Civil Court Elevated of Reach 02 of Pune Metro Rail Project

Reference: Further to **Tender Documents** dated 26 July 2022, Corrigendum I dated 03 Aug 2022

The revised bank detail for payment of bid security shall be as under: -

Activity	As per NIT	Revision
Bid Security Fees	Name of Beneficiary: MMRCL Pune Tender Fees and EMD Account No. 39212708855 IFSC Code: SBIN0000454 UPI ID: ptfemd@sbi	Name of Beneficiary: MMRCL-PUNE- TENDER FEES AND EMD Account No. 50200068854177 IFSC Code: HDFC0000104



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DGM/Civil (Procurement & Contracts),
Pune Metro Rail Project,
Maharashtra Metro Rail Corporation Limited.



MAHARASHTRA METRO RAIL CORPORATION LIMITED

Pune Metro Rail Project

Joint Venture of Govt. of India & Govt. of Maharashtra

CIN: U60100MH2015SGC262054

Date: 13 Aug 2022

CORRIGENDUM-III

Tender No.: P1Misc-28/2022 dated 26 July 2022

Name of Work: Design of Graphics, Fabrication, Supply, Installation, Testing and Commissioning of Signage of 4 stations viz. Dapodi, Bopadi, Khadki & Range Hill of Reach 01 and 4 stations viz. Deccan Gymkhana, Sambhaji Park, PMC & Civil Court Elevated of Reach 02 of Pune Metro Rail Project.

Reference: Further to **Tender Documents** dated 26 July 2022, Corrigendum No. I dated 03 Aug 2022 and Corrigendum No. II dated 03 Aug 2022

In continuation to tender documents, the following documents shall be part of Corrigendum III:

1. Annexure-A : Pre-Bid queries response (02 Pages)



DGM/Civil (Procurement & Contracts),
Pune Metro Rail Project,
Maharashtra Metro Rail Corporation Limited.

Corrigendum-III Reponse to Pre-Bid queries (Part-A)

Name of Work	Design of Graphics, Fabrication, Supply, Installation, Testing and Commissioning of Signage of 4 stations viz. Dapodi, Bopadi, Khadki & Range Hill of Reach 01 and 4 stations viz. Deccan Gymkhana, Sambhaji Park, PMC & Civil Court Elevated of Reach 02 of Pune Metro Rail Project.				
Tender No.	P1 Misc-28/2022				
Item No.	Volume No.	Tender Clause No.	Bid Condition	Bidder's queries	Reply to Bidder's queries
1	Part-I: Bidding Procedure	Section III. Evaluation and Qualification Criteria: 5.1	The Bidder must have valid Environmental Management Certificate ISO:140001 or equivalent.	The Bidder must have valid Environmental management certificate ISO:140001 Is it mandatory?	Tender Condition prevails.
2	Part-I: Bidding Procedure	Section III. Evaluation and Qualification Criteria: 5.1	The Bidder must have valid Quality Management Certificate ISO:9001 / DNV/ TUV/JAS-ANZ/ equivalent.	The Bidder must have valid Quality management certificate ISO:9001 Is it mandatory?	Tender Condition prevails.
3	Part-I: Bidding Procedure	Section III. Evaluation and Qualification Criteria: 5.1	The Bidder must have valid Health and Safety Certificate OHSAS:18001.	The Bidder must have valid Health and safety certificate OHSAS:18001 Is it mandatory?	Tender Condition prevails.
4	Part-III Conditions Of Contract and Contract Forms	Section-IX Particular Conditions (PC) sl. no. 6, sub clause 1.1.3.7	Defects Notification Period (Defect Liability Period): 24 months from the date of issue of Taking Over Certificate for the whole of the Works.	Deficit liability period for the tender?	Tender Condition prevails. 24 months from the date of issue of Taking Over Certificate for the whole of the Works.
5	Part-I: Bidding Procedure	Section II: Bidding Data Sheet, ITB 4.1 Section III. Evaluation and Qualification Criteria, Clause no 2: Qualification	Maximum number of members in the JV/Consortium shall be: Three, Lead member shall have minimum 40% participation and other members shall have minimum 20% participation in the proposed JV / Consortium for this work.	Joint venture criteria given in the tender Lead partner : 40% JV partner : 20% Is civil criteria allowed for JV partner?	Tender Condition prevails.



Corrigendum-III Reponse to Pre-Bid queries (Part-A)

Name of Work	Design of Graphics, Fabrication, Supply, Installation, Testing and Commissioning of Signage of 4 stations viz. Dapodi, Bopadi, Khadki & Range Hill of Reach 01 and 4 stations viz. Deccan Gymkhana, Sambhaji Park, PMC & Civil Court Elevated of Reach 02 of Pune Metro Rail Project.				
Tender No.	P1 Misc-28/2022				
Item No.	Volume No.	Tender Clause No.	Bid Condition	Bidder's queries	Reply to Bidder's queries
6a	Part-I: Bidding Procedure	Section I - Instructions to Bidders, Clause 17.5	Standards for workmanship, process, material, and equipment, as well as references to brand names or catalogue numbers specified by the Purchaser in the Schedule of Requirements, are intended to be descriptive only and not restrictive. The Bidder may offer other standards of quality, brand names, and/or catalogue numbers, provided that it demonstrates, to the Purchaser's satisfaction, that the substitutions ensure substantial equivalence or are superior to those specified in the Section VII, Schedule of Requirements.	Any approved Brand list?	Tender Condition prevails. Also, refer to Maha Metro approved Vendor List.
6b	Part-II, Work requirement		Clause 1 to 27	Material specifications?	Tender Condition prevails.
7	Part-III Conditions Of Contract and Contract Forms	Section-IX Particular Conditions (PC) sl. no. 6, sub clause 4.2	The performance security will be 3% (three percent) of the Accepted Contract Amount and in the same currency(ies) of the Accepted Contract Amount. This performance security will be in the form of a demand guarantee i.e. Bank Guarantee issued from a scheduled commercial bank of Indian or foreign origin having business office in India and in the same currency(ies) of the Accepted Contract Amount.	Bank Guarantee? Performance bank guarantee?	Tender Condition prevails.

